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Article

# Political Mobilization in the Laboratory: The Role of Norms and Communication

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**Abstract:** Many field experiments have shown that political mobilization increases voter turnout, with personalized strategies considerably outperforming widely administered ones. Despite the abundant evidence, there is no systematic explanation of what drives citizens' response to mobilization. In this paper, I propose and experimentally test in the laboratory a theoretical framework that investigates the psychological mechanisms underlying mobilization in both partisan and non-partisan settings. I conjecture that material mobilization efforts should increase participation because of reciprocity concerns. The transmission of normative appeals through interpersonal communication should have a similar effect by making a group norm salient. The results from two experiments show that the combination of a mobilization effort with a normative appeal leads to a significant and substantial increase in participation in both settings. Using content analysis, I show that this interaction effect is due to the way normative appeals are perceived when the sender is in charge of mobilization.



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## 1. Introduction

Mobilization is a consistent determinant of political participation [1], and a large body of field experimental evidence has shown that mobilization efforts translate into citizen participation [2].<sup>1</sup> However, not all mobilization efforts are equally effective. Whereas personalized methods, such as door-to-door canvassing, can increase participation by as much as 8.7 percentage points, impersonal methods such as direct mailings seem largely ineffective [4].

The overall evidence points to the relevance of personal contact and social pressure. However, the psychological mechanism underlying mobilization processes has not been articulated in a compelling way so far. In other words, the microfoundations of political mobilization—i.e., why citizens give in to the social pressure of campaigns and activists in their mobilization efforts—are not properly understood. In fact, such details are mostly left unspecified in the existing theoretical literature.

In this paper, I propose a conceptual framework that allows me to experimentally test two channels through which mobilization efforts can induce participation. First, mobilization efforts by campaign or civic organization representatives are an investment of resources into enabling citizens to participate, and such *actions* might command a reciprocal response from citizens. Second, virtually all mobilization tactics harness the power of social and group norms in messages conveyed to citizens. These *words* represent normative appeals aimed at convincing citizens to participate.

<sup>1</sup> Rosenstone and Hansen [3] define mobilization as the “process by which candidates, parties, activists and groups induce other people to participate.” Most commonly studied have been the cases of get-out-the-vote drives and partisan appeals by campaigns, but examples also include “distributing voter registration forms and absentee ballots, driving people to the polls on election day, or providing child care to free parents to attend meetings and demonstrations”.

Using two laboratory experiments, I test the effect that *actions*, *words*, and their interaction have on mobilization's effectiveness. While a stylized version of mobilization in the field, laboratory experiments have two important advantages over other empirical methods. First, the laboratory makes decoupling *actions* and *words* possible, allowing me to disentangle their relative influence on voters' response to mobilization. Second, it also allows me to observe the content of normative appeals and collect individual measurements on reciprocity preferences.

These research questions are investigated using two frameworks, corresponding to the partisan and non-partisan case. The comparison between the two can identify whether *actions* and *words* operate differently depending on the partisan or non-partisan nature of mobilization. Despite their presumed superiority, partisan messages seem empirically less effective in increasing participation. For example, Panagopoulos [5] finds no difference on the effects of partisan and non-partisan phone bank messages, while Foos and John [6] demonstrate that partisan campaigns' success lies in changing who participates, rather than raising partisan turnout per se. In fact, Foos and de Rooij [7] show that strong partisan cues in a telephone campaign do not increase its persuasive power. The evidence presented in this paper can contribute both to this debate and our understanding of whether *actions* and *words* persuade voters differently when competition between partisan groups is either present or absent.

The partisan framework extends the participation game of Palfrey and Rosenthal [8], while the non-partisan one implements a public good environment using an inter-group prisoner dilemma [9]. In both frameworks, a group leader decides how many members of the group to mobilize, and mobilized members subsequently decide whether they want to participate. Mobilization and participation are both costly. In the partisan case, the group where most members participate wins the election and reaps high rewards. In the non-partisan framework, competition is absent and participation becomes a public good from which all group members benefit. This benefit is increasing in aggregate participation levels.<sup>2</sup> Applying the concept of quantal response equilibrium [11], both games can be solved for the equilibrium levels of mobilization and participation.

The experimental design manipulates two treatment variables: mobilization (*actions*) and one-way communication from the group leader to its members (*words*). In half of the sessions, the group leader is a human subject, while in the other half the same mobilization patterns are implemented by the computer. This removes the intentionality from mobilization decisions, and therefore should preclude reciprocity concerns from affecting participation. Several papers in the literature have employed a similar design, as discussed in Section 5.2. Furthermore, at a pre-determined point of all sessions, the group leaders can transmit a free form message to their group using a one-way communication channel. We will see that this message becomes an appeal regarding what the group is normatively expected to do. I hypothesize that both conscious mobilization efforts (*actions*) and normative appeals (*words*) increase participation.

The experimental results show that mobilization alone is not sufficient to generate higher participation. Furthermore, there is no significant correlation between subjects' reciprocity preferences and participation behavior. The data thus suggest that mobilization's success is not driven by reciprocity towards *actions*. The behavioral response to *words* is stronger, and normative appeals are most effective when delivered by a group leader in charge of mobilization. That is, there is a strong interaction effect between *actions* and *words*. The participation boost is approximately 11 and 8 percentage points in the partisan and non-partisan cases, respectively. Using content analysis to assess a number of normative appeals' qualitative attributes, I show that this effect can be attributed to the way they are received by voters and not due to intrinsic differences in the messages conveyed across

<sup>2</sup> This framework builds on the pivotal voter framework described by Palfrey and Rosenthal [8], which relies on strong rationality assumptions. In Section 3.1, I briefly elaborate on some of the assumptions underlying the model and how they might apply to real-world elections. More generally, Feddersen [10] discusses how the literature has evolved from the original contribution of Palfrey and Rosenthal, which relies on extreme assumptions of rationality and information, to extensions that accommodate group mobilization and ethical voting agents.

treatments. The two experiments produce remarkably similar results, suggesting that the same psychological underpinnings permeate partisan and non-partisan mobilization.

## 2. Related Literature

This paper is related to two bodies of literature. First, it can inform the political economy models that explain voter participation through elite or grassroots mobilization—e.g., [12]. Second, the extensive field experimental evidence on get-out-the-vote (GOTV) tactics can inform and be informed by this paper’s findings. I review both strands of the literature in turn.

First, the political economy literature has produced a number of group-based models of turnout—i.e., in which leaders mobilize citizens to vote. These models manage to circumvent the paradox of turnout by sharing a basic structure: political group leaders head competing factions of the electorate and decide how much of their electoral base to mobilize. They do so in a cost–benefit fashion: mobilizing more supporters increases the probability of winning, but mobilization has costs that increase with the number of supporters mobilized. Despite insightful results concerning voter, leader, and candidate behavior, none of these theoretical contributions specify the nature of voters’ behavioral response to mobilization efforts. That is, mobilized supporters participate automatically. Leaders in these models influence participation according to an ‘exogenous technology’, which renders voting decisions non-strategic in the sense that they do not internalize the intensity and nature of mobilization efforts.<sup>3</sup>

In the model of Uhlaner [14], leaders influence turnout by imposing consumption costs and benefits on voters, which is possible because individual votes are observable. Schram and Van Winden [15] put forward a model in which citizens are either producers or consumers of social pressure, which drives turnout decisions. The authors acknowledge that their model does not explain why individuals attach utility to giving in to social pressure. Morton [16] postulates that group leaders control their faction’s turnout rate according to a technology with no scope for a behavioral response from voters. Herrera and Martinelli [17] endogenize the number of citizens who become leaders and persuade others to vote, but those who are mobilized do so according to a mechanistic process. The contribution of Shachar and Nalebuff [12], on which Cox [13], Herrera et al. [18,19] build, is based on leaders ‘buying’ turnout from their supporters through costly GOTV efforts. The participation calculus is nonstrategic—i.e., the voter “does not consider whether his or her vote will affect the outcome”. In sum, these models rely on citizens that respond to leaders’ mobilization efforts on a one-to-one basis, disregarding strategic and behavioral considerations. The problem is dealt with by granting leaders knowledge of the cost distribution, and they will only mobilize those voters with costs below a certain threshold. While this assumption is harmless in light of these models’ goals, it is clearly unrealistic in the context of real GOTV efforts. In particular, citizens can free ride and do react to mobilization levels and tactics.

Second, according to Green et al. [2] the field experimental literature on mobilization can be divided into works that investigate either which tactics work or which social psychological theories can influence turnout decisions. Examples of the latter include experiments that vary the scrutiny on turnout decisions, publicly expose subjects’ participation history, send messages of gratitude to those who participate, or manipulate expectations of high or low turnout. Gerber et al. [20] show that moving from a mail-delivered civic duty appeal to the threat of publicizing one’s participation decision to neighbors leads to a considerable increase in participation. Feelings of personal pride and shame also seem to influence participation decisions: receiving a mail that encourages turnout and shows either past abstention or participation has an effect [21]. In a similar spirit, Panagopoulos [22] provides evidence of a significant impact of publicly disclosing past participation or abstention

<sup>3</sup> The words of Cox [13] echo this limitation: “the main theoretical critique [of elite mobilization models] has been that they lack micro foundations. That is, they do not explain precisely what elites do and why their followers respond by bearing the costs of participation”.

on turnout. The same author [23]) shows that a gratitude message for past participation increases turnout in future elections. Gerber and Rogers [24] show that communicating a high turnout social norm is more effective than communicating a low turnout one on reported intention to vote. Condon et al. [25] show that typically ineffective direct mailings do increase turnout among partisans when subjects are explicitly told that the experimenter knows they are registered partisans.

All these works identify interventions that harness social psychology theories (priming, observer effects, feedback intervention, etc.) to influence turnout decisions. However, they do not explain why citizens respond to mobilization in the first place. In particular, it is not clear whether voters respond to material mobilization efforts (*actions*) or the implied normative messages (*words*). Barton et al. [26] show that face contact with a candidate during a canvassing drive is successful at persuading voters to vote for them, regardless of the message they convey. During a canvassing drive in the run-up to a Canadian referendum, Dewan et al. [27] investigated what persuades citizens to vote: message content, canvasser charisma, or endorsement by a public figure. Both message-based and endorsement-based campaigns are effective. There is little evidence that the endorser matters though, and no evidence that the canvasser's charisma matters. In a partisan campaign, Foos [28] presents evidence that canvassing by the candidate and volunteers does not increase support beyond what is achieved by a leaflet. In summary, it is yet unclear why citizens give in to the social pressure applied through mobilization efforts and which elements of these efforts are responsible for the behavioral response.

### 3. Framework

In this section, I put forward two related frameworks that allow me to investigate the role of mobilization efforts and normative appeals in both a partisan (Section 3.1) and non-partisan setting (Section 3.2).

#### 3.1. Experiment 1 (E1): The Partisan Case

The partisan model is an extension of the participation game of Palfrey and Rosenthal [8]. A population is divided into two competing groups,  $G_i$  and  $G_j$ , each comprising  $M + 1$  players. There are two player roles: Alpha and Beta. There is one Alpha player and  $M$  Beta players in each group. We can think of the Alpha as a campaign representative trying to mobilize their support base, the Betas. The game has two stages. Alphas move in the first stage while Betas move in the second stage. In the first stage, Alphas decide simultaneously how many  $m_i \in \{0, M\}$  Betas to activate (mobilize). If a Beta has been activated by their group's Alpha, they are said to be 'active'; otherwise, they are 'inactive'. In the second stage, active Betas decide simultaneously and individually whether to participate or not.<sup>4</sup> Inactive Betas do not have to make any decisions. The two groups compete for victory, which depends on the relative participation in the two groups. In the case of a tie, the winner is decided by a fair coin toss. All players in the winning group (Alpha and Betas, both active and inactive) receive a high monetary payoff ( $b^W$ ), while all players in the losing group receive a low monetary payoff ( $b^L$ ).

Beta players can be of two cost types: low and high, denoted by  $\Sigma = \{l, h\}$ . Activating a low and high Beta costs  $c_l^A$  and  $c_h^A > c_l^A$ , respectively. Each Alpha has a budget  $A$  at their disposal, which is exactly enough to activate all the Betas in their group; therefore,  $A = n^l c_l^A + (M - n^l) c_h^A$ , where  $n^l$  denotes the number of low Betas in the group. What is spent on activating Betas is lost, but what is left ( $A$  net of activation costs) is kept by the

<sup>4</sup> Of course, in reality citizens should be able to activate themselves—i.e., register for voting or transport themselves to the polls. However, allowing for an intermediate phase where Betas who had not been activated could activate themselves would add another stage to the model and complicate the framework considerably. The gain would be marginal as the purpose of the model is to test the behavioral response of subjects who have been activated by an Alpha member and compare it to the response of those who have been activated by a computer.

Alpha member. For the sake of tractability, I assume that Alphas always activate low Betas before high Betas.<sup>5</sup>

I define an ‘active electorate’ as a pair  $(m_i, m_j)$ , which is the number of active Betas in each group who can then participate. For each  $(m_i, m_j)$ , a standard participation game with complete information [8]) is played between the active Betas. Participation is costly for active Betas: it costs  $c_h$  and  $c_l < c_h$  for a high and low Beta, respectively.

The structure and parameters of the game are common knowledge. Hence, for each  $(m_i, m_j)$ , there exist equilibrium participation probabilities for each Beta type in any given electorate. From these participation probabilities, the Alphas can derive, for each active electorate, a probability distribution over the possible outcomes:  $G_i$  wins,  $G_i$  and  $G_j$  tie, or  $G_j$  wins. We define a vector containing the probability distribution from the perspective of  $G_i$ ’s Alpha as:

$$v_i(m_i, m_j) = [\Pr_i(\text{win}|m_i, m_j) \quad \Pr_i(\text{tie}|m_i, m_j) \quad \Pr_i(\text{lose}|m_i, m_j)]'. \tag{1}$$

The derivation of this probability distribution is carried out in detail in Appendix A.1. Table 1 presents the equilibrium participation probabilities for all possible electorates.

**Table 1.** Point predictions. Notes: Quantal response equilibrium participation probabilities for each Beta type in each active, assuming  $\mu = 0.4$ . Players in  $G_i$  ( $G_j$ ) participate with probability  $p$  ( $q$ ).

Active Electorate $m_i, m_j$	$G_i$				Outcome Distribution			Expected Participation	
	$p_l$	$p_h$	$q_l$	$q_h$	$G_i$ Wins	Tie	$G_j$ Wins	$G_i$	$G_j$
1, 0	0.92	-	-	-	0.92	0.08	0	0.92	0
2, 0	0.58	-	-	-	0.82	0.18	0	0.58	0
3, 0	0.55	0.15	-	-	0.83	0.17	0	0.42	0
4, 0	0.52	0.15	-	-	0.83	0.17	0	0.33	0
5, 0	0.49	0.14	-	-	0.84	0.16	0	0.28	0
1, 1	0.92	-	0.92	-	0.07	0.86	0.07	0.92	0.92
2, 1	0.77	-	0.56	-	0.75	0.22	0.03	0.77	0.56
3, 1	0.72	0.21	0.57	-	0.74	0.22	0.04	0.55	0.57
4, 1	0.66	0.20	0.56	-	0.75	0.21	0.04	0.43	0.56
5, 1	0.61	0.20	0.55	-	0.76	0.20	0.04	0.36	0.55
2, 2	0.90	-	0.90	-	0.16	0.68	0.16	0.90	0.90
3, 2	0.80	0.45	0.69	-	0.57	0.32	0.11	0.68	0.69
4, 2	0.74	0.33	0.64	-	0.61	0.27	0.11	0.53	0.64
5, 2	0.68	0.28	0.61	-	0.65	0.24	0.11	0.44	0.61
3, 3	0.78	0.54	0.78	0.54	0.32	0.36	0.32	0.70	0.70
4, 3	0.73	0.41	0.69	0.44	0.49	0.29	0.22	0.57	0.60
5, 3	0.69	0.33	0.64	0.38	0.56	0.26	0.18	0.47	0.55
4, 4	0.70	0.42	0.70	0.42	0.36	0.29	0.36	0.56	0.56
5, 4	0.68	0.36	0.66	0.38	0.46	0.27	0.27	0.49	0.52
5, 5	0.66	0.36	0.66	0.36	0.37	0.26	0.37	0.48	0.48

With the information presented in Table 1 in hand and knowledge of the model’s parameters, each Alpha decides how much of the budget  $A$  to spend on activating Betas. Alphas choose  $m_i$  to maximize:

<sup>5</sup> This modeling assumption imposes a minimal degree of rationality on Alphas, as low Betas cost less to activate and participate at higher rates in equilibrium. In a real-world setting, Alphas must also be able to gauge Beta’s costs of voting in order to mobilize those that have lower costs of voting. There are several observable characteristics that campaigns have access to and that correlate with voting costs, either material (such as physical distance to the polls or ability to reach the polls through own transportation) or psychological (such as the amount of political information the voter has access to).



$$\pi_i^{Alpha} = A - a(m_i) + v_i(m_i, m_j)'b, \tag{2}$$

where  $b = \left[ b^W \quad \frac{b^W + b^L}{2} \quad b^L \right]'$  and  $a(m_i)$  describes the cost of activating  $m_i$  Betas. This cost function is convex, which is a common assumption in mobilization models—e.g., [12].

The Alphas choose  $m_i$  simultaneously and are aware that Betas will know how many others (and of which type) have been activated in the two groups. The equilibrium is a pair  $(m_1^*, m_2^*)$ , which I obtain using numerical methods and the concept of quantal response equilibrium (QRE, [11]).<sup>6</sup>

The parameters of the model are presented in Table 2. Table 3 shows the payoff matrix of the game played by the Alphas assuming these parameter values. If Alphas activate no Betas, their expected payoff is 6.5: 4 from the budget  $A$ , plus  $(b^W + b^L)/2 = 2.5$ . If they both activate 5 Betas, they earn 2.5, as they spend all their budget on activation and receive the same expected tie payoff. The Nash Equilibrium is  $(m_1^*, m_2^*) = (2, 2)$ , which is also the strategy profile picked by QRE (see Appendix A.3 for details).

**Table 2.** Parameter values of Experiment 1.

Group size	$M + 1 = 6$	Activation cost: high	$c_h^A = 1$
Number of low Betas	$n^l = 2$	Activation cost: low	$c_l^A = 0.5$
Benefit for the winning group	$b^W = 4$	Participation cost: high	$c_h = 1$
Benefit for the losing group	$b^L = 1$	Participation cost: low	$c_l = 0.5$
Alpha’s budget	$A = 4$		

**Table 3.** Alphas’ payoff matrix, partisan case. Notes: Equilibrium activation levels in bold.

$(m_1, m_2)$	0	1	2	3	4	5
0	6.50, 6.50	5.11, 7.39	5.26, 6.74	5.26, 5.74	5.25, 4.75	5.25, 3.75
1	7.39, 5.11	6.00, 6.00	4.92, 6.58	4.94, 5.56	4.94, 4.56	4.93, 3.57
2	6.74, 5.26	6.58, 4.92	<b>5.50, 5.50</b>	4.81, 5.19	4.75, 4.25	4.69, 3.31
3	5.74, 5.26	5.56, 4.94	5.19, 4.81	4.50, 4.50	4.09, 3.91	3.94, 3.06
4	4.75, 5.25	4.56, 4.94	4.25, 4.75	3.91, 4.09	3.50, 3.50	3.22, 2.78
5	3.75, 5.25	3.57, 4.93	3.31, 4.69	3.06, 3.94	2.78, 3.22	2.50, 2.50

A selfish and payoff-maximizing Alpha activates two Alphas in equilibrium, which corresponds to a payoff of 5.5. Activation levels above (2, 2) cannot be explained by selfish preferences, but can be attributed to other preferences or the joy of winning. An Alpha that mobilizes more than two Betas sacrifices their own earnings to increase the chances that their group wins the election. If this choice is perceived by Betas to be driven by non-selfish motives, I conjecture that Betas are more likely to respond to such mobilization efforts. This effect is formalized as a testable hypothesis in Section 5.2.

The model is quite stylized in order to allow for a straightforward implementation. The model describes best mobilization activities in the absence of which citizens could not participate, such as voter registration or transportation to the polls. Braconnier et al. [30] show that home registration visits are crucial to increase both voter registration and voter turnout among newly registered voters.

A feature which might not represent all mobilization forms is the fact that Alphas can keep the money which they do not spend on activation. In the world of campaigning and activism, the person mobilizing other citizens is often not handed money that they can

<sup>6</sup> The model does not have a closed form solution for most group sizes ( $M > 2$ ), as the probability terms in  $v_i(m_i, m_j)$  are non-linear. Numerical methods can be used to obtain Nash equilibria (NE) and related solution concepts, such as QRE. QRE has three main advantages over NE. First, a greater ability to explain experimental data, particularly from tests of political participation models [29]. Second, QRE selects equilibria. Participation games typically have several NE, both in pure and mixed strategies. QRE selects the one that tends to have good empirical verification in the laboratory. Third, QRE retains most of the important features of NE—e.g., the probability of choosing a certain strategy is increasing in the payoff difference to the alternative(s) and beliefs are consistent in equilibrium. A more detailed discussion can be found in Appendix A.2.

ultimately keep. However, the organizations behind the people in charge of mobilization in the field have competing ends for their money. In a sense, campaigns and civic associations can allocate their money to mobilizing citizens or other competing ends. The choice faced by the Alpha member incorporates precisely this trade-off.

### 3.2. Experiment 2 (E2): The Non-Partisan Case

In addition to partisan mobilization, which I tried to capture in E1, mobilization can also be of a non-partisan nature. Non-partisan mobilization is usually conducted by civic organizations, and it has the goal of increasing electoral participation *per se*. That is, the mobilization effort does not try to persuade citizens to vote for one of the candidates or platforms, but rather to get citizens to vote (the so-called GOTV tactics referred to in Section 2).

The partisan model can thus be adapted to fit the non-partisan case, which allows us to obtain expected mobilization and participation patterns in the absence of competition between groups. The main difference between the partisan and non-partisan case is that groups no longer compete for benefits. Instead, the electorate (which coincides with the group) has the social goal of maximizing turnout. The individual payoffs of Alphas and Betas become an increasing function of aggregate participation, and the higher the share of the electorate that is mobilized, the higher the participation can be. However, both mobilization and participation remain costly. In this framework, we should think of the Alpha as a civic organization representative whose purpose is to maximize turnout among all citizens in the electorate (the Betas). Aggregate participation is said to be a public good, and these features are well captured by an  $N$ -person prisoner dilemma [9], which I extend to allow for mobilization.

As before, there are two player roles: Alpha and Beta. Each group comprises  $M + 1$  players, with exactly one Alpha player in each group. The game has two stages: the activation stage (where the Alpha moves) and the participation stage (where Betas move). In the first stage, the Alpha decides how many  $m_i \in \{0, M\}$  Betas to activate at a cost. A simplifying difference to E1 is that all Beta players cost the same to activate and all pay the same cost to participate.<sup>7</sup> In the second stage, Betas decide whether to participate or not.

The payoffs are calculated differently than in the partisan case. For the Betas, instead of a tension between saving on voting costs and helping their group win, the tension is now between saving on voting costs and contributing to the aggregate participation public good. Each Beta player still has to decide whether to participate at a cost or to abstain, but now participation generates a public good payoff, to be shared equally by all group members regardless of activation status or participation decision. In the experiment, each Beta receives an endowment,  $\omega$ , that they can keep (equivalent to abstaining) or put in a group account (equivalent to participating). The endowments placed in the group account are multiplied by  $\rho < 1$  (the so-called *marginal per capita return*) and distributed as a payoff to all group members. That is, all group members benefit equally from the aggregate participation level. The payoff function of the Beta player  $i$  linearly increases in aggregate participation and can be written as:

$$\pi_i^{Beta} = \omega(1 - d_i + \rho \sum_{h \in G_i} d_h), \quad (3)$$

where  $G_i$  is the Beta's group and  $d_i$  is the participation decision (equal to 1 in the case of participation and 0 otherwise). The difference between participating and abstaining is  $\omega(\rho - 1)$ . By participating, the Beta forgoes her endowment  $\omega$  but increases the public good available to all group members.

<sup>7</sup> In other words, there is only one cost type in E2, as no differences in behavior were found across cost types in E1, which will be discussed in the Results section.



As in E1, activating Betas has a cost, denoted by  $c^A$ . The Alpha receives a budget  $A = Mc^A$  that can be kept or used to activate Betas. The Alpha’s payoffs are aligned with those of Betas through the public good component. Alphas choose  $m_i$  to maximize:

$$\pi_i^{Alpha} = A - m_i c^A + \rho \sum_{h \in G_i} d_h. \tag{4}$$

The Alpha faces a tradeoff between keeping the budget,  $A$ , and increasing the size of the active electorate (i.e., the number of Betas in  $G_i$  that can participate) through costly mobilization. The parametrization that was implemented in the lab preserves the group size and participation costs of E1 (see Table 4). The remaining parameters were adjusted such that the participation levels found in E1 would render the payoffs similar across the two experiments.

**Table 4.** Parameter values of Experiment 2.

Group size	$M + 1 = 6$	Marginal per capita return	$\rho = 0.75$
Activation cost	$c^A = 0.4$	Endowment/participation cost	$\omega = 1$
Alpha’s budget	$A = 2$		

I apply the same QRE approach to this parameterization (see Appendix B for details), according to which Betas should participate with  $p = 0.35$  probability in equilibrium. Table 5 presents the Alpha’s payoffs for different mobilization and participation levels. The second column refers to the expected payoff conditional on the Betas’ participation probability.

**Table 5.** Alphas’ payoff matrix, non-partisan case. Notes: Equilibrium activation level in bold.

$m_i$	Expected Payoff	Participation					
	(Assuming $p = 0.35$ )	0	1	2	3	4	5
0	<b>2.00</b>	2.00	-	-	-	-	-
1	1.86	1.60	2.35	-	-	-	-
2	1.73	1.20	1.95	2.70	-	-	-
3	1.59	0.80	1.55	2.30	3.05	-	-
4	1.45	0.40	1.15	1.90	2.65	3.40	-
5	1.31	0	0.75	1.50	2.25	3.00	3.75

As in the partisan case, assuming that all Alphas and Betas are selfish implies that Alphas will activate no Betas in equilibrium. The Nash equilibrium is  $m_i = 0$ , which is also the strategy picked by QRE with the highest probability. Once we relax the selfishness assumption, it is possible to have positive activation in equilibrium. For example, if Alphas and Betas have social preferences, participation and positive activation can be an equilibrium outcome. As in E1, an Alpha that mobilizes Betas above the equilibrium prediction sacrifices their own earnings to allow group members to participate and generate a public good payoff for the entire group. If this choice is perceived to be non-selfish, I conjecture that Betas are more likely to respond to the mobilization efforts.

#### 4. Experimental Design

Two separate experiments were run for the partisan and non-partisan cases. Despite the differences in the underlying frameworks, the research questions are the same for both cases and the experimental designs are identical. Earnings in the experiment are expressed in tokens, which are converted into Euros at the rate of €0.15 (approximately \$0.2) per

token.<sup>8</sup> A transcript of the instructions and comprehension questions can be found in Appendix C.

The experiment investigates the role of reciprocity and normative appeals in the response to mobilization by manipulating two treatment variables: activation by a human subject (*actions*) and one-way appeals sent by the Alpha to the Betas (*words*). Activation by a human subject corresponds to a mobilization effort, and an appeal sent by a subject creates or makes a group norm salient.

Each experimental session has two parts. The first one is a simplified trust game, while the second one is an implementation of the previous section's frameworks (either partisan or non-partisan). All the subjects go through the two parts in this order. The first part is common to all subjects, while part 2 varies depending on the experiment and treatment.

The trust game [31] provides individual preference measurements of trust and reciprocity, which I use as a control in the analysis of treatment effects. The subject acting as 'sender' is endowed with 8 experimental tokens and must choose how many tokens to keep and how many to send to the anonymous subject acting as the 'receiver'. The amount sent by the sender increases depending on how trusting they are. The money sent to the receiver is multiplied by 3. The receiver has to decide how many tokens to keep and how many to return to the sender. The amount returned by the receiver increases depending on how reciprocal they are—i.e., the extent to which they reward or punish selfish or non-selfish actions.

I introduce two changes to the standard trust game protocol. First, subjects play both roles and do so sequentially. This allows me to obtain trust and reciprocity measurements for all subjects. Second, senders must send either 0, 4, or 8 tokens to the receiver. This restriction was implemented to allow for the use of the strategy method while keeping part 1 parsimonious. This gives me reciprocity attitudes towards two different levels of trust (intermediate and high, corresponding to 4 and 8 tokens, respectively).

Each subject is informed that she is paired with two other subjects: the one she sends 0, 4, or 8 tokens to and the one to whom she may send a share of the 12 or 24 tokens back. The pairing of a subject with two others prevents interdependency between the amount sent and the amount returned. Subjects are informed that they will only learn the results from this part of the experiment at the end. The trust game data I obtained are very similar to the typical patterns found in the literature.<sup>9</sup>

The second part of the experiment is based on a parametrization of the proposed frameworks. The values in Tables 2 and 4 correspond to the token amounts used in the experiment. In each period, the stage of the game corresponding to the model of Section 3.1 or Section 3.2 is played. Each subject goes through three blocks of 24 periods each. A block is further divided into three sub-blocks of 8 periods each. Alphas make their activation decisions at the beginning of each sub-block. Active Betas decide whether or not to participate in each of the 8 periods of a sub-block. Active Betas have no period-to-period feedback, both to avoid reactions to results and to allow them to implement mixed strategies (the selected equilibria are participation probabilities).<sup>10</sup> Alphas and inactive Betas learn their electorate's results in each period.

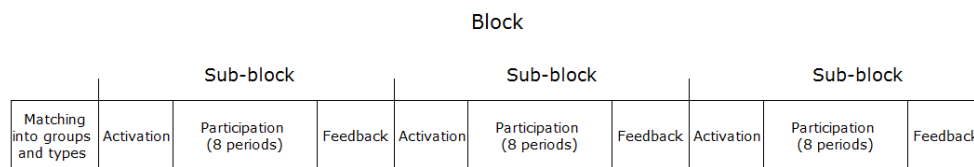
At the end of a sub-block, all members of an electorate are shown the results of the previous 8 periods. The results consist of aggregate participation in each period and cumulative earnings in the block. All subsequent sub-blocks have the same structure. Groups; roles (Alpha and Beta); and, in the case of E1, Beta types (high or low) were kept constant within each block. This means that, from one sub-block to the next, only the activation status of Beta players could change. At the end of each block, groups, roles, and

<sup>8</sup> The first of E2's nine sessions had an exchange rate of 0.12, which was adjusted to 0.15 for the remaining sessions in order to equalize the earnings in E1 and E2.

<sup>9</sup> A meta-study by Johnson and Mislin [32] shows that, on average, senders hand over 50.2% of their endowment to receivers. Receivers send back 37.2% of the multiplied amount, on average. This leads to an approximate equalization of payoffs. Appendix D provides a concise description of the trust game data.

<sup>10</sup> 75.7% and 81.6% of subjects employed mixed strategies in E1 and E2, respectively.

Beta types are drawn anew. Figure 1 presents a diagram showing the sequence within a block.



**Figure 1.** Sequence in the blocks of part 2. Block 2 differs from blocks 1 and 3 in that the Alpha can send a free form message to the Betas at the beginning of the first sub-block of Block 2 (after ‘Activation’ but before ‘Participation’).

In the periods in which the active Betas face the participation decision, Alphas and inactive Betas are asked to provide a rating of the previous period’s results using a three-step rating scale.<sup>11</sup> The main purpose of asking Alphas and inactive Betas for input is to keep them engaged with the experiment. Comparing this feature with instances of political participation, we can conceive of inactive Betas as those citizens who are not able to participate themselves but who observe the aggregate outcome. Subjects are paid for the trust game and for one randomly picked block of part 2, both of which are added to the show-up fee.

**5. Treatments, Hypotheses and Procedures**

In this section, I explain how the treatment manipulations allow me to test two hypotheses concerning the impact of mobilization (*actions*) and normative appeals (*words*). I also provide details on the experimental procedures.

*5.1. Treatments*

In order to investigate the role of reciprocity in the response to mobilization, sessions where activation is carried out by human subjects are compared (between subjects) to sessions where activation happens in a pseudo-random way. In the former type of session, mobilization is decided by each group’s Alpha and thus constitutes an intentional process; I refer to this treatment as *Mob*. The activation patterns observed in *Mob* sessions are subsequently implemented in sessions where the Alphas are present but do not decide on activation levels. These sessions serve as a control treatment (*Ctr*), as activation decisions are not the product of intentional decisions. The Alpha members are still affected by the observed activation pattern, but all subjects take it as given in the sense that they cannot be attributed to the Alphas. In *Mob*, Betas are activated by their group’s Alpha, and may thus incorporate reciprocity considerations in their decision to participate. In *Ctr*, active Betas are simply informed that they did or did not become active, and therefore reciprocity concerns cannot play a role in their decision to participate.

The second experimental manipulation is free-form one-way communication from the Alpha to the group’s Betas. This was varied within subjects. In both treatments, at the beginning of block 2 (after activation but before Betas could make any participation decision) all group members are told that the Alpha has 90 seconds to send written text to the Betas. The experiment only proceeds after all subjects read these instructions and give their permission for the one-way communication to begin, such that Alphas have enough time to plan what they want to transmit to the Betas. Subjects are not primed on message content, except that the Alpha is not allowed to identify himself or herself, to refer to the identity of other subjects in the laboratory, or to make promises or threats unrelated to the experiment. However, this window of free-form communication allows Alphas to convey an appeal which is expected to create or increase the salience of a group

<sup>11</sup> There were three available ratings: ‘satisfied’, ‘neutral’, and ‘dissatisfied’. An analysis of this data is available upon request.

norm. The participation behavior from block 2 (the ‘appeal block’) is compared to the corresponding behavior in blocks 1 and 3, where no appeal is transmitted to the Betas.

## 5.2. Hypotheses

The first hypothesis concerns the role of mobilization (*actions*) on participation. A considerable theoretical and experimental economics literature within the social preference framework has studied the influence of reciprocity concerns on behavior (e.g., [33–35]). This literature shows that actions with identical consequences lead to different responses depending on the underlying intentions. The work of Falk et al. [35] is closest to this paper, as they compare a treatment where trust behavior is the product of a subject’s choice with one where trust behavior follows a random draw from the observed distribution of choices. They show that in a game with distributional consequences, subjects are more generous towards non-selfish allocations made by human subjects than to choices with identical distributional consequences that were dictated by chance. The authors demonstrate that fairness intentions are crucial for both positive and negative reciprocal behavior.<sup>12</sup>

Evidence from the field hints at reciprocity playing a role in the response to mobilization. In a meta-study, Green et al. [2] show that volunteer phone banks have twice the impact of commercial phone banks (a 1.94 vs. 0.98 percentage point increase in turnout), while pre-recorded calls have a negligible effect (0.16 percentage points). Besides the obvious delivery differences, this evidence suggests that volunteers might command more reciprocity from voters as they are investing their time in a disinterested manner. In addition, the greater effectiveness of local canvassers compared to non-local ones in increasing turnout [36] can be partly attributed to local canvassers commanding more reciprocity than non-local ones.

The *Mob* treatment represents a situation in which the activation decisions of the Alpha player can be driven by fairness intentions, especially when Alphas activate more Betas than predicted by selfish preferences. This can cause Betas to behave differently in *Mob* than in *Ctr*. In *Ctr*, the activation patterns have no underlying intentions from the Beta players’ point of view, as they are simply implemented by the computer. I conjecture that subjects who have been intentionally mobilized by another subject will reciprocate the mobilization effort by participating more often. The first hypothesis follows.<sup>13</sup>

**Hypothesis 1 (H1).** (*Actions*). *Mobilization by another subject leads to higher participation. Participation in Mob is higher than in Ctr.*

The message transmitted to the group in block 2 is likely to take the form of a normative appeal that prescribes a course of action. My conjecture is that Alphas will call upon Betas to participate. Whenever such an appeal is observed, I expect participation to increase. Both the participation game (E1) and the *N*-person prisoner’s dilemma (E2) are situations with strong free-riding incentives. Establishing or increasing the salience of a group norm can mitigate a tendency to free-ride on others and increase participation. Outside of the laboratory, political participation is prescribed by social norms: a guiding principle individuals adhere to in order to make the group better off, despite the fact that it can be detrimental from a rational selfish perspective. In addition to creating or making a group

<sup>12</sup> In the proposed model, players’ preferences do not explicitly account for reciprocity for two main reasons. First, applying the model of Dufwenberg and Kirchsteiger [34] makes reciprocity exclusively dependent on beliefs about how kind other players are. As the authors note, a good set of predictions requires a proper measurement of first- and second-order beliefs, which is possible but would complicate the experimental design further. Second, in the case of both Dufwenberg and Kirchsteiger [34] and Falk et al. [35], the parameter that governs reciprocity preferences is exogenous and therefore would have to be estimated from data for the predictions not to be ad hoc. The calibration of the model would require more than a simple trust game. To be sure, the authors apply their models to games that are substantially simpler than the ones presented in this paper.

<sup>13</sup> E1 further allows me to observe the behavioral response from high- and low-cost subjects. I conjecture that the former, who require a larger mobilization effort, will reciprocate mobilization to a greater extent and participate more. It is well known that campaigns and activists target those who are more likely to participate—i.e., those who have low participation costs [3]. Often, those with the lowest participation costs (the more educated, the more mobile, etc.) are also the cheapest to mobilize. To the best of my knowledge, there is no evidence on how citizens with different mobilization costs respond to the mobilization effort.

norm more salient, communication by the Alpha might act as a coordination mechanism, which can support a so-called correlated equilibrium with high participation [37,38].

The second hypotheses is:

**Hypothesis 2 (H2). (Words).** *An appeal that makes an implicit group norm salient leads to higher participation. Participation in the appeal block is higher than in the other two blocks.*

### 5.3. Procedures

The experimental sessions were run at the CREED laboratory of the University of Amsterdam. The experiment was conducted in z-Tree [39]). A total of 318 subjects participated in 15 sessions, 144 subjects in E1 (6 sessions) and 174 subjects in E2 (9 sessions).<sup>14</sup> Participants were recruited online from a subject pool of students at the University of Amsterdam. Informed consent was obtained from all subjects involved in the study. In E1 (E2), 44% (57%) of the participants were female and 59% (67%) were economics (and related subjects) majors. The typical session lasted 1 hour and 30 minutes, with average earnings of €17.18 and €17.53 in E1 and E2, respectively, including a show-up fee of €7.

## 6. Results

I started the analysis by looking at the activation decisions of Alphas and then proceeding to test the hypotheses. Subsequently, I assessed the result robustness through regression analysis. I describe this separately for E1 and E2 in Sections 6.1 and 6.2, respectively.

A remark on the data's dependence structure is in order. We should expect a substantial degree of dependence across blocks, as subjects within the same session are re-matched into new groups, despite the fact that subjects are likely to change roles and cost types. For this reason, I used a statistically conservative approach and compared participation decisions using the first block ( $N = 12$  and  $N = 29$ , respectively, in E1 and E2) and the whole session ( $N = 6$  and  $N = 9$ ) as independent observations. I also reported tests using each block within a session as an independent observation ( $N = 18$  and  $N = 27$ ) for completeness. All tests are two-sided, unless otherwise noted.

### 6.1. Experiment 1: The Partisan Case

The partisan model predicts that each Alpha should activate two low Betas and zero high Betas in equilibrium (see Table 3 and Figure A1). Figure 2 presents the average activation decisions in each block. The average activation is 3.97 Betas overall. The median activation decision is two low Betas and three high Betas—i.e., the Alphas activate all the Betas in their group more than half of the times. Alphas activate low Betas before high Betas (this is violated in only 0.9% of the cases). The distribution of activation decisions is stable throughout the experiment. The overall pattern contradicts the equilibrium predictions for selfish preferences.

There are two possible explanations for the observed over-activation. The first is social preferences. Alpha members tend to activate their groups' members rather than pocketing the budget. This maximizes the group's chances of winning the election and achieving a higher payoff, at the cost of reduced earnings for the Alpha. For example, the equilibrium active electorate,  $(m_i^*, m_j^*) = (2, 2)$ , entails an expected payoff of 5.5 for each Alpha, while the modal electorate,  $(m_i, m_j) = (5, 5)$ , implies an expected payoff of 2.5. Each incremental active Beta increases the probability of winning the election (see Table A1 in the Appendix E). An Alpha activating two low Betas makes the group an 'easy target' for a competing group with more than two active Betas, despite their high material prospects. For an Alpha with social preferences, the material losses imposed on their group's Betas might not compensate this personal gain. The second explanation is the joy of winning and this works in the same direction: an Alpha who simply wants to win the game will activate as many Betas

<sup>14</sup> Two pilot sessions (48 subjects) were run prior to E1. These sessions implemented a different parameter configuration and served the purpose of testing subject comprehension of the experimental protocol and providing data for the model calibration. Those data are not part of this paper.

as possible, since the probability of winning strictly increases with group size, with all else equal.

The fact that Alphas deviate from the equilibrium assuming selfish preferences, both in the case of full (NE) and bounded (QRE) rationality, should not interfere with the test of the first hypothesis. In fact, Alphas who activate above what the selfish preference model predicts will probably command more reciprocity. This is because an Alpha who activates many Betas at a personal material cost, such that Betas can participate and determine the election outcome, is more likely to be regarded as non-selfish.<sup>15</sup>

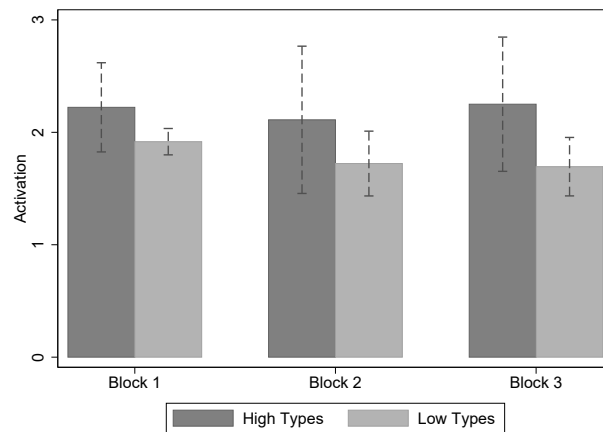


Figure 2. Activation decisions of Alphas.

### 6.1.1. The Impact of Mobilization

The first hypothesis posits that participation should be higher when subjects are activated by a human subject (*Mob*) compared to when they are activated by the computer (*Ctr*). To test this hypothesis, we look at the aggregate levels of participation in *Mob* and *Ctr*, which are depicted in Figure 3. Aggregate participation is measured conditional on being active—i.e., it is the number of active Betas who participate divided by the size of the active electorate,  $m_i + m_j$ .

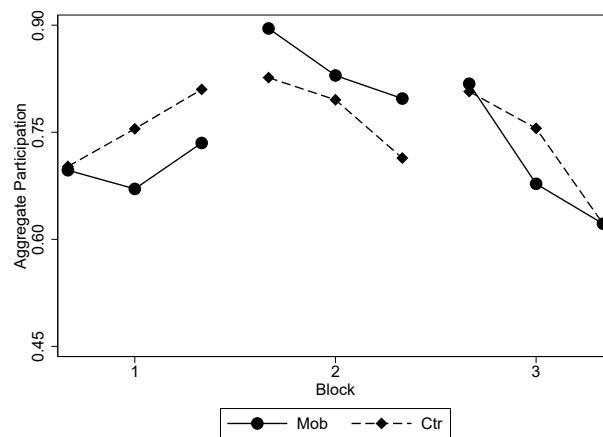


Figure 3. Aggregate participation across treatments. Notes: Each point represents average aggregate participation in a sub-block.

<sup>15</sup> In fact, one could argue that an Alpha behaving according to the selfish preference model commands no reciprocity, as they would simply be maximizing earnings. The collected data would allow us to test that conjecture. At any rate, the experimenter must grant Alphas freedom in their decisions in order to create scope for reciprocity concerns.



The participation rate is 75.2% in *Mob* and 75.8% in *Ctr*. Since the experimental design imposes the same pattern of activation in the two treatments, I carried out Wilcoxon matched-pairs signed-ranks tests (W-MP) on the data. Comparing the average participation across treatments using the whole session, block 1 or the three blocks taken separately produce no evidence of a statistical difference (W-MP  $> 0.59$ ), while in block 2 the difference is closer to the standard significance levels (W-MP  $p = 0.11$ ). I conclude that a positive relationship between mobilization and participation is not present in the overall data, except marginally in the appeal block. This hints at a possible interaction effect between mobilization and the appeal. The participation levels in the appeal block of *Ctr* are in line with the other two blocks, whereas in *Mob* that is not the case. In *Mob*, the appeal seems to induce a boost in participation. The next sub-section investigates the impact of appeals on participation.<sup>16</sup>

A further check on the potential role of reciprocity can be carried out by investigating whether reciprocal attitudes correlate with participation behavior. For this purpose, I define two types of reciprocator: strong and weak. A strong reciprocator is a subject who, as a receiver in the trust game, returns more than what the sender sent her. A strong reciprocator sends back both more than four and more than eight tokens in cases where the sender trusted them with four or eight tokens, respectively; recall that tokens are multiplied by three by the experimenter, which means that the receiver gets 12 or 24 tokens in each of these cases. In other words, a strong reciprocator leaves the sender better off than they would be had they not trusted the receiver; all other subjects are weak reciprocators. The share of strong reciprocators in E1 is 43%. Comparing the participation of strong and weak reciprocators across treatments renders no statistically significant differences (W-MP  $p = 0.37$  and  $p = 0.29$ , respectively), however.

### 6.1.2. The Impact of Normative Appeals

Hypothesis 2 claims that an appeal by the Alpha to the Betas increases participation insofar as it proposes a desirable course of action—i.e., a norm for the group to follow. In block 2, Alphas have the possibility to deliver written messages to their group's Betas for 90 seconds after the first activation decision of block 2.<sup>17</sup>

Alphas sent an average of 15 words to the Betas when they were responsible for activation decisions (*Mob*), and 12 when they were not (*Ctr*). The difference is not statistically significant according to a Wilcoxon–Mann–Whitney rank-sum test (WMW,  $p = 0.13$ ). Two typical appeals are reproduced here:<sup>18</sup>

*Alpha*<sub>1</sub> (*Mob*): *I want everybody to buy a disc each round.*

*Alpha*<sub>2</sub> (*Ctr*): *Let us try buying four discs. Everyone buy one and we will see what they do.*

According to content analysis, 89% of appeals request participation (disc buying) from Betas. This number is slightly higher in *Mob* (91.6%) than in *Ctr* (86%), but the difference is not significant (WMW  $p = 0.26$ ).<sup>19</sup> In sum, the Alphas transmit an appeal that puts forward a norm to be followed by the group (e.g., 'I want everybody to buy a disc each round'—i.e., 'I want everybody to participate'; 'everyone buy one and let's see what they do'—i.e., 'everyone participate and let's see what they do'), often accompanied by a rationale relating to group payoffs or how participation will leave the group better

<sup>16</sup> The observed null effect of mobilization could in principle be due to a differential response from high and low cost subjects. Along the reciprocity rationale, low-cost subjects might not be responsive to activation while high-cost subjects might be. However, the response to treatments is not more pronounced for high-cost subjects (W-MP  $p > 0.50$ ).

<sup>17</sup> It has been shown that within-group discussion in participation games leads to increased participation [40–42]. Open discussion allows subjects to propose, discuss and commit to a given strategy. It also allows subjects to infer others' intentions. Important differences exist between these open discussion protocols and my experiments' one-way appeals. The messages sent by the Alpha can propose a strategy and motivate it, but no commitment for the participation game is present, as Alphas cannot participate themselves. The absence of two-way interaction reduces the scope of promise exchange between Alphas and Betas. Even though Alphas could potentially convey intentions about future activation decisions (sub-blocks 5 and 6), that was never the case.

<sup>18</sup> The participation decision was framed as "buying a disc" in the experiment. Subjects were told that the group in which most subjects bought a disc would win that round of the game, and so on. An appeal to buy a disc is therefore equivalent to an appeal for participation.

<sup>19</sup> These numbers are based on content analysis carried out by four independent coders. The procedure is explained in the next sub-section.

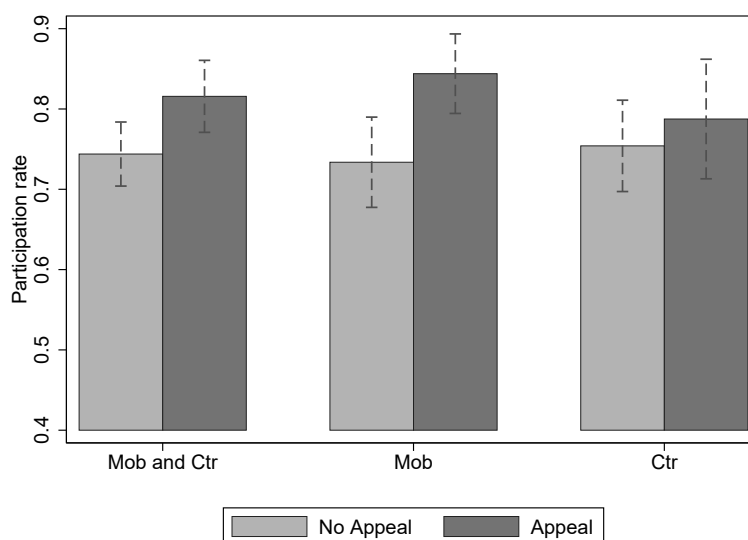
off despite implying a self-sacrifice from each member. Such statements make an implicit social norm (costly contribution to group effort) explicit in a laboratory setting.

Figure 4 shows aggregate participation in the appeal block compared to the other two blocks. We observe that participation is higher when subjects receive an appeal: 81.6% versus 74.4%. Comparing the appeal block's aggregate participation rate with the pooled aggregate participation rate in the other two blocks (i.e., each session contributing two observations, one from the appeal block and one from the pooled non-appeal blocks), we observe a statistically significant difference (WMW  $p = 0.02$ ). A one-sided t-test on the difference of means confirms this result ( $p = 0.01$ ). The null of no difference between the appeal block and the non-appeal blocks is rejected in favor of Hypothesis 2. In other words, the Alphas' appeals induce an increase in participation.

A closer inspection of Figure 4 suggests that this effect is mainly driven by the mobilization treatment. In fact, the appeal induces a 11.02 percentage point participation increase in *Mob*, compared to an increase of only 3.34 percentage points in *Ctr*. Performing the same tests on each treatment separately confirms this: whereas the difference is still statistically significant in *Mob* (WMW  $p = 0.05$ ), it becomes insignificant in *Ctr* (WMW  $p = 0.28$ ).<sup>20</sup> A one-sided t-test confirms this pattern ( $p = 0.00$  and  $p = 0.23$  for *Mob* and *Ctr*, respectively).

The effect observed in *Mob* can have two explanations: either the normative appeals are different across treatments (how inspiring or legitimate they sound to Betas, for example), or they are received differently by the Betas. That is, they induce different participation levels not because they are intrinsically different, but because they are delivered under different circumstances. In *Mob*, they are delivered by the subject in charge of mobilization, which is not the case in *Ctr*, and that triggers a different response from the Betas.

The normative appeals could differ across treatments for a number of reasons. It could be that Alphas appeal to participation more often in *Mob*, for example. Or perhaps the Alphas in *Mob* feel more entitled to demand a particular behavior from Betas and deliver the norm in a more assertive or motivational way. In contrast, appeals might not differ systematically across treatments but can be received differently, leading to different responses. For example, a Beta in *Mob* may perceive the Alpha's appeal as more legitimate than if the exact same appeal was delivered in *Ctr*. The next sub-section investigates these issues.



**Figure 4.** Participation and normative appeals. Notes: Participation in the appeal versus non-appeal blocks across treatments. Confidence intervals are constructed using individual-level standard errors.

<sup>20</sup> Excluding those groups in *Ctr* where a message was not sent (two cases) and where the message was only one word (one case), the difference is still insignificant (WMW  $p = 0.83$ ).

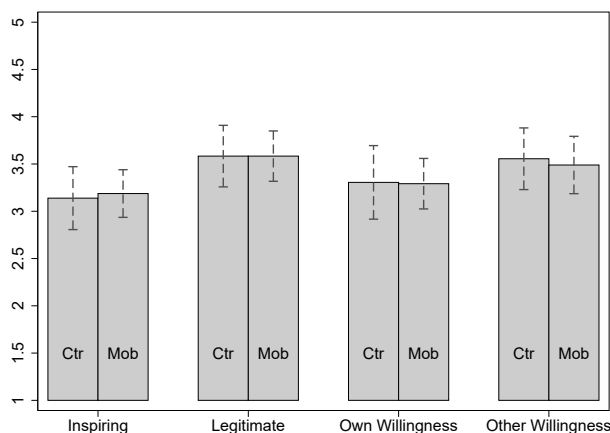
### 6.1.3. Content Analysis of the Normative Appeals

The content of the normative appeals was independently coded and classified by four coders (research assistants).<sup>21</sup> The analysis that follows includes 21 appeals (out of 24 groups, as some Alphas chose not to send an appeal or sent an empty appeal). The coders had to fill in one coding question proper and to classify each normative appeal along four dimensions.

The coding item asks whether a participation appeal (buying a disc) was present in each message. There is considerable agreement among the coders on this item (Cronbach's alpha = 0.83). The average value is slightly higher in *Mob* than in *Ctr* (92 and 86%, respectively), but the difference is not statistically significant (WMW,  $p = 0.26$ ). We conclude that messages do not seem to differ with respect to participation appeals across treatments.

The coders were also asked to classify (on a 1-to-5 scale, where 1 and 5 correspond to 'strongly disagree' and 'strongly agree') each normative appeal according to how inspiring and how legitimate they perceived it to be from the perspective of a Beta player. They were further asked to classify how much each normative appeal would increase both their own willingness to participate and the willingness of others in their group to participate (i.e., buying a disc). These numbers are reported in Figure 5.

There exist no statistical differences between the ratings across treatments (WMW,  $p > 0.61$ ;  $t$ -test,  $p > 0.83$ ). This means that, according to the employed classification scheme, the normative appeals do not differ between *Mob* and *Ctr*. The evidence lends support to the conjecture that the boost in participation observed in *Mob*, which is not present in *Ctr*, is due to the way normative appeals are received and not to them being intrinsically different. A normative appeal is thus most effective when it is delivered by the subject responsible for mobilizing others; a similar appeal conveyed by a subject not in charge of mobilization is unlikely to induce a comparable participation increase.



**Figure 5.** Evaluation of appeals across treatments.

### 6.1.4. Regression Analysis

The results presented up to this point show that mobilization efforts alone (*actions*) do not lead to an increase in participation. Furthermore, subjects with different reciprocity preferences do not seem to participate differently. However, we have seen that there is a boost to participation when the mobilization effort is accompanied by a normative appeal (*words*). In the following, I use regression analysis to test the robustness of these findings. Table 6 presents two panel models in which individual participation is regressed on the treatment variables (*Activation* and *Appeal*), trust and reciprocity preferences (*Trust* is the amount sent, and *Reciprocity (Int.)/(High)* are the amounts returned), participation costs

<sup>21</sup> The coders were not part of the same subject pool. They were given instructions such that they were able to understand the experiment but were not told about the research questions or treatments.

(*Cost* is a dummy variable that equals 1 if the subject is high-cost), and the number of active Betas in the electorate (*Activation Level*). Marginal effects are estimated using the method of Ai and Norton [43] and Norton et al. [44], and evaluated at average sample values. Model 1 presents no interaction effect between the treatment variables, whereas Model 2 does.

**Table 6.** Panel regression results. Notes: The dependent variable is a Beta's binary decision whether to participate in each round that he or she is active. The table presents model coefficients and marginal effects estimated using a panel data logit specification with mixed effects (random effects at the session and subject level). The marginal effects are reported as percentage values. Standard errors reported in parentheses.  $N = 7722$  in both models (number of periods in which the Betas were activated; 6 sessions and 142 subjects are considered). \*\*\* indicates significance at the 1% level.

	Model 1		Model 2	
	Coeff.	Mg. Effect (%)	Coeff.	Mg. Effect (%)
Activation	−0.07 (0.16)	−0.31 (0.76)	−0.19 (0.16)	−0.77 (0.72)
Appeal	0.26 *** (0.06)	1.43 *** (0.44)	0.06 (0.09)	0.27 (0.41)
Activation*Appeal			0.40 *** (0.12)	2.23 *** (0.87)
Trust	0.02 (0.03)	0.12 (0.14)	0.02 (0.03)	0.10 (0.13)
Reciprocity (Int.)	0.06 (0.06)	0.31 (0.31)	0.07 (0.06)	0.29 (0.28)
Reciprocity (High)	−0.02 (0.03)	−0.09 (0.16)	−0.02 (0.03)	−0.07 (0.14)
Activation Level	0.57 *** (0.04)	2.73 *** (0.57)	0.57 *** (0.04)	2.53 *** (0.54)
Cost	−0.75 *** (0.07)	−2.62 *** (0.68)	−0.76 *** (0.07)	−2.42 *** (0.63)
Constant	−1.61 *** (0.26)		−1.56 *** (0.26)	
Log likelihood		−4414.5		−4409.0
Random Effects				
Session		$0.64 \times 10^{-4}$ ( $18.84 \times 10^{-4}$ )		$0.55 \times 10^{-4}$ ( $16.72 \times 10^{-4}$ )
Subject		0.73 (0.11)		0.73 (0.11)

As suggested by the non-parametric analysis, mobilization alone does not seem to influence participation. Both the coefficient and the marginal effects are insignificant. In contrast, the effect of a normative appeal is positive and significant according to Model 1, but it becomes insignificant when the interaction between the appeal and activation is included in Model 2. This interaction effect is highly significant, which allows us to conclude that an appeal per se does not lead to a significant increase in participation. However, when the subject delivering the appeal is responsible for mobilization the effect is considerable and highly significant. The observed increase in participation is 2.23 percentage points at average sample values.

Regarding reciprocity preferences, the variables measuring trust and reciprocity are insignificant, attesting that reciprocal behavior is largely irrelevant for individual participation behavior. Participation costs, on the contrary, matter. High participation costs lead to a significant decrease in participation relative to a low participation cost, as expected. The size of the active electorate is also significantly associated with higher participation,

which can be explained by the fact that larger electorates tend to be more even (e.g., five active Betas in each group) than the smaller ones and thus generate closer races.

### 6.2. Experiment 2: The Non-Partisan Case

I now turn our attention to the non-partisan case, for which the analysis is identical to the one carried out for the partisan case. Recall that in E2, there is no longer competition between groups, participation is a public good, and all Beta players have the same activation and participation costs. All other features are the same. The payoffs are calculated differently, but the average earnings in each experiment are very similar (cf. Section 5.3).

Figure 6 shows the activation choices of Alphas throughout the experiment. Activation is quite stable, at around four Betas (average of 4.12). This clearly contradicts the prediction that Alphas should not activate Betas (see Table 5 and Figure A2), but is in line with what was observed in E1. The overall activation numbers are remarkably similar across experiments. An Alpha can expect to earn 1.45 tokens if they activate four Betas, while 2 tokens can be secured by activating no Betas. However, a group where four Betas are active and all participate generates a social surplus of 19.4 tokens (with 3.4 tokens accruing to the Alpha), while the social surplus is 7 tokens (including the 2 tokens accruing to the Alpha) if no Betas are active.

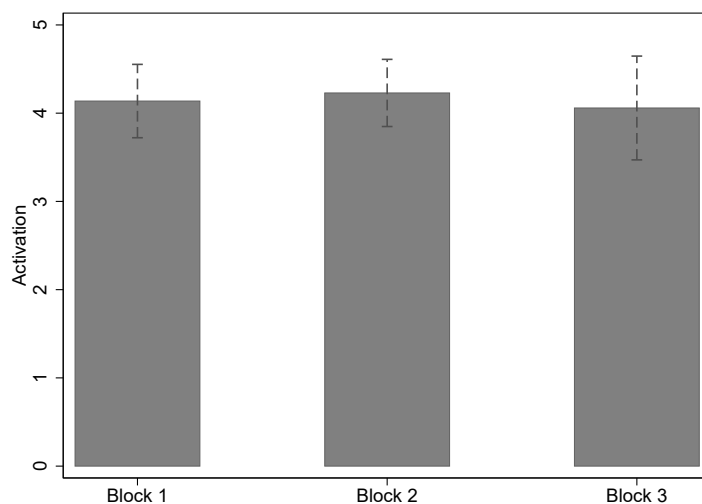
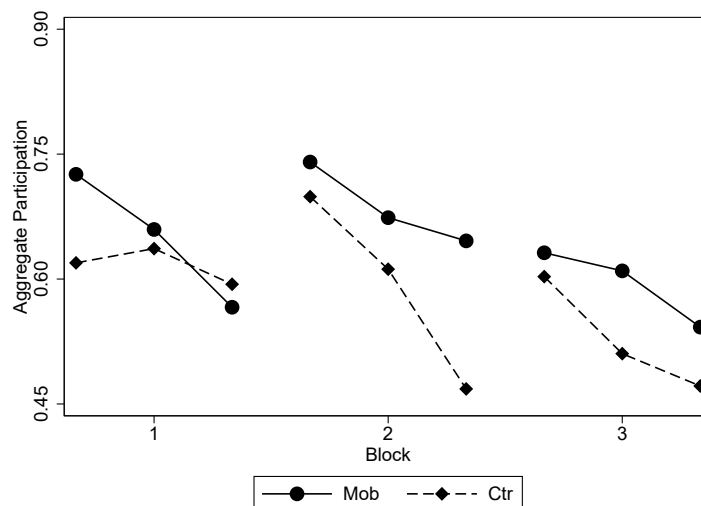


Figure 6. Activation decisions of Alphas.

#### 6.2.1. The Impact of Mobilization

Figure 7 presents the participation patterns in E2 across the two treatments. Aggregate participation is higher in *Mob* than in *Ctrl*, at 64.5% and 58.2%, respectively. However, the difference is not statistically significant using the whole session, block 1, or the three blocks taken separately (W-MP,  $p > 0.15$ ). Despite the higher participation observed in *Mob*, the first hypothesis does not receive statistical support from the non-parametric tests. The results do not change if we compare high and low reciprocator types (see Section 6.1.1 for the definition). There are 45% strong reciprocators in E2, but for neither strong nor weak reciprocators is there a treatment effect (W-MP,  $p = 0.47$  and  $p = 0.72$ , respectively). Next, I investigate whether normative appeals have the predicted effect.



**Figure 7.** Aggregate participation across treatments. Notes: Each point represents the average aggregate participation in a sub-block.

### 6.2.2. The Impact of Normative Appeals

The second hypothesis puts forward that a normative appeal should lead to an increase in participation. As in the partisan case, Alphas have the opportunity to send one-way written messages to their group's Betas in block 2.

Alphas sent an average of 12 words to the Betas in their group, with no noticeable differences between treatments (11.4 words in *Mob* and 12.6 in *Ctr*; WMW,  $p = 0.75$ ). Two typical appeals are reproduced below:

*Alpha<sub>1</sub> (Mob): All the activated beta members should buy the disc so that we can get the highest payoff for everyone.*

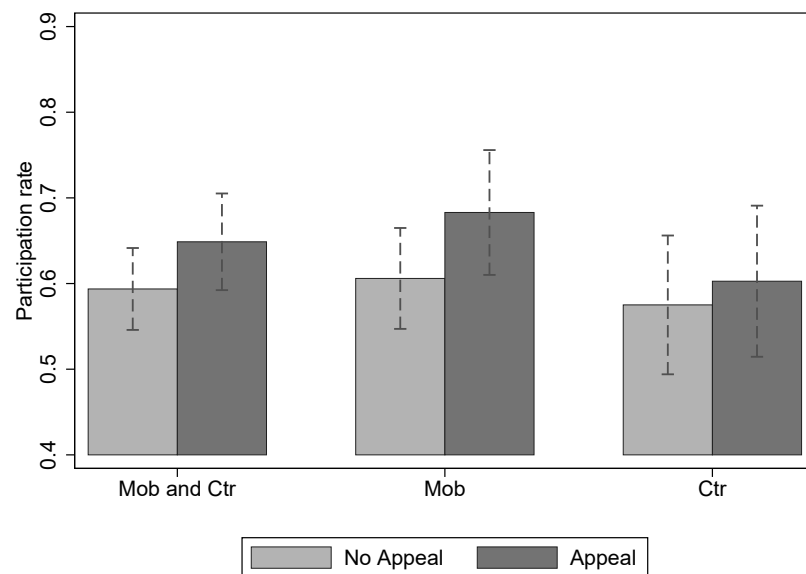
*Alpha<sub>2</sub> (Ctr): All the active members should buy discs; that is the way to make the most profit for everyone (including yourself).*

According to content analysis, the great majority of appeals request participation from the Betas (79%), with no differences between treatments (80% in *Mob* and 79% in *Ctr*). The Alphas ask Betas to participate ("buy a disc") by invoking group-oriented motives ("highest payoff for everyone", "most profit for everyone"). The norm of costly contribution to group effort is made salient and explicit, just as in E1.

Figure 8 plots aggregate participation in the appeal block and in the other two blocks. Participation is 5.5 percentage points higher in the appeal block than in blocks without an appeal. This difference is more pronounced in *Mob* (68% participation in the appeal block, compared to 61% in the other two blocks) than in *Ctr* (60% and 58%, respectively). However, these differences are not statistically significant according to non-parametric tests (WMW,  $p = 0.31$  for the overall comparison and  $p = 0.25$  and  $p = 0.77$  for *Mob* and *Ctr*, respectively).<sup>22</sup> A one-sided t-test on the difference in means confirms the absence of an overall difference ( $p = 0.07$ ) or a difference in *Ctr* ( $p = 0.33$ ), but lends support to a difference in *Mob* ( $p = 0.05$ ). I will return to this comparison in the regression analysis of Section 6.2.4. For the moment, I will investigate whether the evidence in favor of a larger difference in *Mob* than in *Ctr* (7 and 2 percentage points, respectively) can be explained by differences in the appeals sent by the Alpha to the Betas in their group.

<sup>22</sup> Excluding the groups where no message was sent does not alter this result (WMW  $p > 0.17$ ).



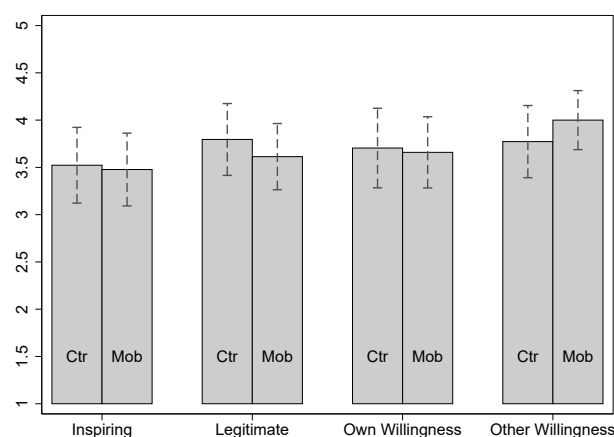


**Figure 8.** Participation and normative appeals. Notes: Participation in the Appeal versus non-Appeal blocks across treatments. Confidence intervals are constructed using individual-level standard errors.

### 6.2.3. Content Analysis of the Normative Appeals

The content of the normative appeals from E2 was independently coded and classified by another group of four coders (research assistants). The coding and evaluation items were the same as in E1. The analysis includes a total of 23 normative appeals (out of 29 groups). As mentioned in the previous sub-section, an appeal to participation was present in 79% of all messages, with no significant differences between treatments. The coders agree to a great extent on this classification (Cronbach's  $\alpha = 0.81$ ). The higher impact of normative appeals in *Mob* does not seem to be related to more frequent requests to participation than in *Ctr*.

The next question is whether the appeals were intrinsically different across treatments. The classification exercise explained in Section 6.1.3 was also carried out on E2's data. Figure 9 presents the results. We observe no statistical differences across treatments (WMW  $p > 0.30$ ;  $t$ -test  $p > 0.41$ ). The evidence suggests that the higher participation triggered by an appeal in *Mob* was not due to an intrinsic difference in those appeals, but rather to the way they were received by the Betas. As in E1, a normative appeal delivered by the Alpha in charge of mobilization is more effective than equivalent appeals delivered by Alphas who are not responsible for mobilizing their group.



**Figure 9.** Evaluation of appeals across treatments.

### 6.2.4. Regression Analysis

The results of E2 described so far suggest that mobilization efforts (*actions*) have a non-significant impact on participation, as in E1. In E1, a normative appeal increases participation, but only when it is delivered by the subject in charge of mobilization. For E2, the evidence is thinner if we consider the non-parametric tests alone. At all rates, the normative appeals do not seem to intrinsically differ across treatments. Overall, the patterns found in E2 mirror those in E1, albeit in a much less pronounced way. I conduct an analogous regression analysis to evaluate whether a multivariate approach will corroborate these findings. Table 7 presents the results.

The model is identical to the one of Table 6, except for the absence of the cost variable (costs were homogenous in E2). Most results are qualitatively and quantitatively similar. Mobilization alone does not increase participation, while normative appeals do. Model 1 exhibits a positive coefficient and marginal effect for *Appeal* but, as Model 2 makes clear, this is driven by the interaction effect. An appeal delivered by the subject in charge of mobilization increases participation by 2.08 percentage points at average sample values. Furthermore, the activation level also seems to increase participation, but to a lesser extent than in E1. The main difference has to do with the marginal significance of *Trust*, indicating that subjects who send more to the receiver in the trust game tend to participate more often.

**Table 7.** Panel regression results. Notes: The dependent variable is a Beta’s binary decision whether to participate in each round that he or she is active. The table presents model coefficients and marginal effects estimated using a panel data logit specification with mixed effects (random effects at the session and subject level). The marginal effects are reported as percentage values. Standard errors reported in parentheses.  $N = 9576$  in both models (number of periods in which the Betas were activated; 9 sessions and 168 subjects are considered). \*/\*\*/\*\* indicates significance at the 10/5/1% level.

	Model 1		Model 2	
	Coeff.	Mg. Effect (%)	Coeff.	Mg. Effect (%)
Activation	−0.01 (0.30)	−0.08 (1.64)	−0.13 (0.30)	−0.66 (1.62)
Appeal	0.26 *** (0.06)	1.66 *** (0.62)	0.07 (0.09)	1.08 (1.75)
Activation*Appeal			0.32 *** (0.12)	2.08 * (1.09)
Trust	0.07 * (0.04)	0.37 * (0.22)	0.07 * (0.04)	0.36 * (0.21)
Reciprocity (Int.)	−0.04 (0.08)	−0.20 (0.47)	−0.04 (0.08)	−0.22 (0.46)
Reciprocity (High)	0.09 (0.04)	0.53 (0.29)	0.10 ** (0.04)	0.53 * (0.28)
Activation Level	0.14 *** (0.04)	0.79 *** (0.26)	0.14 *** (0.04)	0.78 *** (0.26)
Constant	−1.49 (0.33)		−1.43 (0.33)	
Log likelihood		−5286.1		−5282.2
Random Effects				
Session		0.08 (0.09)		0.08 (0.09)
Subject		1.91 (0.26)		1.92 (0.26)

## 7. Discussion

In this Section, I identify and discuss a few regularities that emerge in both E1 and E2. To be sure, the experimental results in each experiment must be taken with caution, considering the mentioned statistical inter-dependencies in the data and the low number of independent observations for some tests. In this sense, a joint qualitative appraisal of E1 and E2's results might lend greater confidence to the findings.

Both experiments paint a similar picture of which elements of mobilization increase participation in laboratory elections. The overall evidence points to the irrelevance of material mobilization efforts (*actions*) in increasing participation, resulting in the rejection of Hypothesis 1. On the other hand, Hypothesis 2 is mostly supported, as normative appeals (*words*) lead to increased participation. We further observe mobilization and participation levels above what is predicted under selfish preferences. Over-participation is a common finding in laboratory elections, which is often ascribed to social or altruistic preferences or the joy of winning [45]. Over-mobilization might be explained by similar motives. The comparison between E1 and E2 lends speculative support to the altruism rationale, as competition is absent in the non-partisan experiment.<sup>23</sup> However, a definite answer to why we observe over-mobilization (which is not the focus of the paper) would require a different experimental design.<sup>24</sup>

The main empirical regularity is the effectiveness of *words* that are backed by *actions*. Normative appeals delivered by subjects in charge of mobilization lead to participation increases of 11.02 and 7.70 percentage points in the partisan and non-partisan cases, respectively (see Figures 4 and 8). Regression analysis confirms this effect, producing quantitatively similar marginal effects across the two settings (2.23% and 2.08%, respectively). Subjects who were not in charge of mobilization deliver similar appeals, as evidenced by the content analysis of Sections 6.1.3 and 6.2.3, but participation increases by a mere 3.34 and 2.77 percentage points. This pattern can be interpreted as a 'skin in the game' effect: only the words of those subjects who took deliberate actions to mobilize their group will induce its members to participate more. As discussed in the Introduction, personal contact and social pressure are crucial for mobilization's success. My evidence suggests that voters who are exposed to personal contact (communication from the Alphas) give in to social pressure (messages containing participation appeals) when this comes from someone who made a deliberate investment in mobilization. Contrary to the available evidence of (e.g., [27]), the person delivering the message makes a difference.

A close comparison of E1 and E2 reveals that *words* have a lower impact in E2. This could be due to non-partisan appeals being 'weaker', as conjectured in much of the literature. Comparing E1 and E2's appeal rating is subject to caveats, as they were rated by different coders. Nonetheless, E2's appeals received higher average ratings on all dimensions except 'legitimacy', which suggests that the lower impact of non-partisan appeals is not because they are 'weaker', but rather because appeals in a partisan setting influence participation to a greater extent. Once again, the effect of normative appeals depends on the context in which they are delivered. Looking at which appeal features influence participation, no consistent relationship is observed across the two experiments. That is, no specific element of persuasion (how legitimate, inspiring, etc., appeals are) seems to influence participation (see Table A1 in the Appendix E for the supporting regression analysis). This finding echoes field experimental work that shows that message content is mostly irrelevant for a given mobilization tactic's effectiveness (e.g., [4,46]).

## 8. Conclusions

This paper provides a laboratory test of the psychological mechanisms underlying the behavioral response to political mobilization. Political mobilization is a massive endeavor

<sup>23</sup> The other substantial difference between E1 and E2 is the absence of two cost types in the latter case.

<sup>24</sup> To be sure, equilibrium mobilization depends on anticipated (equilibrium) participation by the Betas. In fact, over-mobilization by the Alphas might be an equilibrium response if they expect over-participation from the Betas.

in most modern democracies, with a considerable impact on participation behavior. The fact that simple gestures and appeals can foster participation has intrigued social scientists for a long time. In the words of Cox [47], “one may ask why it is rational for voters to participate merely because they are urged to vote”. This question is particularly puzzling given that strangers seem to be at least as good as friends when trying to persuade others to participate in politics. This paper presents evidence showing that personalized normative appeals are crucial for mobilization to work, even if delivered by absolute strangers.

In this paper, I tested two channels through which mobilization can work: reciprocal behavior as a response to mobilization efforts (*actions*) or adherence to normative appeals (*words*). Citizens who are reached by an activist or a campaigner might perceive the mobilization effort as non-selfish and return this kindness by participating. At the same time, mobilization efforts invariably deliver an appeal that harnesses social or group norms. My experimental design makes the decomposition of the mobilization process into the material act of mobilizing others and the transmission of a normative appeal possible.

The experiment tests these two non-mutually exclusive forces in both a partisan and non-partisan setting. In the partisan one, subjects play a game in which two groups compete for benefits on the basis of participation, whereas in the non-partisan case participation is a public good that can be enjoyed by all. Participation is an individual and costly decision in both cases. The novelty of the proposed frameworks is that subjects have to be mobilized by a group leader, who faces a trade-off between pocketing the mobilization budget and mobilizing subjects in their group. I compare treatments in which the mobilization process is decided by a human subject, and is therefore intentional, to treatments where mobilization is implemented by a computer, and is thus non-intentional. In addition, at a point in the experiment, the group leader can send a normative appeal to the other subjects in the group. This appeal invariably requests group members to participate.

The results show that mobilization alone does not increase participation, suggesting that reciprocity concerns are not a strong determinant of mobilization’s effectiveness. Furthermore, a measurement of individual trust and reciprocity preferences does not correlate with participation behavior. However, appeals to participation seem to be effective in raising participation levels, especially when the appeal is sent by the group leader in charge of mobilization. An appeal by group leaders who were not responsible for mobilization is intrinsically similar, but does not lead to a significant increase in participation.

This evidence sheds light on the psychological mechanisms underlying the mobilization process. It seems that the mere investment of material resources to make participation possible does not garner enough gratitude to increase participation. However, normative appeals delivered by the person responsible for mobilization are more effective. This suggests that violating the normative appeal conveyed by those in charge of mobilization is psychologically costly, leading to more frequent participation.

Despite the obvious limitations of laboratory elections, my findings can inform future research in two ways. First, formal modelers can use this evidence as a starting point for incorporating mobilization into the pivotal voter framework. Models can perhaps eschew reciprocity concerns in the response to material mobilization efforts, but should take into account the intricacies of norm transmission. Second, the framework I propose is well-suited for further investigation of substantive mobilization questions. Useful extensions include the study of non-partisan mobilization in a partisan setting or the behavioral response to cross-mobilization—i.e., whether citizens that are mobilized by the opposing faction are more or less likely to vote. The theoretical and experimental framework I propose can become a testbed for new formal models as well as a tool to isolate countervailing forces that field researchers cannot control for.

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**Institutional Review Board Statement:** Ethical review and approval were granted to this study after a preliminary presentation of the design to the laboratory’s managing board and faculty.

**Informed Consent Statement:** The laboratory where the study was conducted obtains informed consent from all subjects enrolled in the subject pool.

**Data Availability Statement:** Not applicable.

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**Conflicts of Interest:** The author declares no conflict of interest.

## Appendix A. Theoretical Framework—Experiment 1

### Appendix A.1. Participation Probabilities for Beta Players

In this section, I look at Betas' participation behavior to help me derive the probability vector in Equation (1):

$$v_i(m_i, m_j) = [\Pr_i(\text{win} | m_i, m_j) \quad \Pr_i(\text{tie} | m_i, m_j) \quad \Pr_i(\text{lose} | m_i, m_j)]'. \quad (A1)$$

Let  $m'_h \leq m_h$ ,  $h = i, j$  be the number of active Betas who choose to participate. Then:

$$v_i(m_i, m_j) = [\Pr[m'_i > m'_j | (m_i, m_j)] \quad \Pr[m'_i = m'_j | (m_i, m_j)] \quad \Pr[m'_i < m'_j | (m_i, m_j)]]'. \quad (A2)$$

For a given  $(m_i, m_j)$ , an active Beta in  $G_i$  is indifferent between participating and abstaining if:

$$\mathbf{E}[\pi_i^{\text{Beta}} | \text{Part.}] = \mathbf{E}[\pi_i^{\text{Beta}} | \text{Abst.}]. \quad (A3)$$

Define  $m''_i < m'_i$  and  $m''_j \leq m'_j$  as the number of others in the own and the other group who participate. For an active Beta of type  $\sigma \in \Sigma$ , Equation (A3) can be re-written as:

$$\begin{aligned} & \Pr[m''_i + 1 > m''_j] b^W + \Pr[m''_i + 1 = m''_j] \frac{b^W + b^L}{2} + \Pr[m''_i + 1 < m''_j] b^L - c_\sigma \quad (A4) \\ & = \Pr[m''_i > m''_j] b^W + \Pr[m''_i = m''_j] \frac{b^W + b^L}{2} + \Pr[m''_i < m''_j] b^L, \end{aligned}$$

which simplifies to:

$$\Pr[m''_i = m''_j] + \Pr[m''_i = m''_j - 1] = \frac{2c_\sigma}{b^W - b^L}. \quad (A5)$$

This equation shows that, in equilibrium, a player will equate costs and benefits, where the latter are discounted by the probability that their vote matters (it breaks or creates a tie).

Next, I derive the probability terms in Equation (A5). Let  $n^l \leq M + 1$  be the number of low Betas in each group. Define the probability of participating as  $p_l$  and  $p_h$  for low and high Betas in  $G_i$ , respectively, and  $q_l$  and  $q_h$  for low and high Betas in  $G_j$ , respectively. Recall that I assume that Alphas activate low Betas before high Betas. The formulas that follow refer to a low Beta in  $G_j$ ; formulas for high Betas can be written in an analogous way.

If  $m_i = 0$  and  $m_j \leq n^l_j$ , the probability terms in Equation (A5) are simply  $\Pr[m''_i = m''_j] = (1 - p_l)^{m_j}$  and  $\Pr[m''_i = m''_j - 1] = m_j q_l (1 - q_l)^{m_j - 1}$ . If  $0 < m_i \leq n^l_i$  and  $m_j \leq n^l_j$ , the probability terms in Equation (A5) are:

$$\begin{aligned} & \Pr[m_i'' = m_j''] & (A6) \\ &= \sum_{k=0}^{\min[m_i-1, m_j]} \binom{m_i-1}{k} \binom{m_j}{k} p_l^k (1-p_l)^{m_i-1-k} q_l^k (1-q_l)^{m_j-k} \end{aligned}$$

$$\begin{aligned} & \Pr[m_i'' = m_j'' - 1] & (A7) \\ &= \sum_{k=0}^{\min[m_i-1, m_j-1]} \binom{m_i-1}{k} \binom{m_j}{k+1} p_l^k (1-p_l)^{m_i-1-k} q_l^{k+1} (1-q_l)^{m_j-k-1}. \end{aligned}$$

If  $m_i > n^l$  and  $m_j \leq n^l$ , the probability terms in Equation (A5) are:

$$\begin{aligned} & \Pr[m_i'' = m_j''] & (A8) \\ &= \sum_{k=0}^{m_j} \left\{ \begin{aligned} & \binom{m_j}{k} q_l^k (1-q_l)^{m_j-k} \\ & \sum_{s=0}^k \binom{n^l-1}{s} \binom{m_i-n^l}{k-s} \\ & p_l^s (1-p_l)^{n^l-1-s} p_h^{k-s} (1-p_h)^{(m_i-n^l)-(k-s)} \end{aligned} \right\} \end{aligned}$$

$$\begin{aligned} & \Pr[m_i'' = m_j'' - 1] & (A9) \\ &= \sum_{k=0}^{m_j-1} \left\{ \begin{aligned} & \binom{m_j}{k+1} q_l^{k+1} (1-q_l)^{m_j-(k+1)} \\ & \sum_{s=0}^k \binom{n^l-1}{s} \binom{m_i-n^l}{k-s} \\ & p_l^s (1-p_l)^{n^l-1-s} p_h^{k-s} (1-p_h)^{(m_i-n^l)-(k-s)} \end{aligned} \right\}. \end{aligned}$$

Finally, if  $m_i > n^l, i = 1, 2$ , the probability terms in Equation (A5) are:

$$\begin{aligned} & \Pr[m_i'' = m_j''] & (A10) \\ &= \sum_{k=0}^{\min[m_i-1, m_j]} \left\{ \begin{aligned} & \sum_{s=\max[0, k-(m_i-n^l)]}^{\min[k, n^l]} \binom{n^l}{s} \binom{m_i-n^l}{k-s} \\ & p_l^s (1-p_l)^{n^l-1-s} p_h^{k-s} (1-p_h)^{(m_i-n^l)-(k-s)} \\ & \sum_{s=\max[0, k-(m_j-n^l)]}^{\min[k, n^l]} \binom{n^l}{s} \binom{m_j-n^l}{k-s} \\ & q_l^s (1-q_l)^{n^l-1-s} q_h^{k-s} (1-q_h)^{(m_j-n^l)-(k-s)} \end{aligned} \right\} \end{aligned}$$



$$\begin{aligned}
 & \Pr [m_i'' = m_j'' - 1] \tag{A11} \\
 &= \sum_{k=0}^{\min [m_i-1, m_j-1]} \left\{ \begin{aligned} & \left[ \begin{aligned} & \sum_{s=\max [0, k-(m_i-n^l)]}^{\min [k, n^l]} \binom{n^l}{s} \binom{m_i-n^l}{k-s} \\ & * \\ & p_i^s (1-p_l)^{n^l-s} p_h^{k-s} (1-p_h)^{(m_i-n^l)-(k-s)} \end{aligned} \right] \\ & \left[ \begin{aligned} & \sum_{s=\max [0, k-(m_j-n^l)]}^{\min [k+1, n^l]} \binom{n^l}{s} \binom{m_j-n^l}{k+1-s} \\ & * \\ & q_i^s (1-q_l)^{n^l-s} q_h^{k+1-s} (1-q_h)^{(m_j-n^l)-(k+1-s)} \end{aligned} \right] \end{aligned} \right\}
 \end{aligned}$$

The probability terms presented in Equations (A6)–(A11) can be plugged into the equilibrium condition (Equation (A5)) to derive the participation game equilibria.

### Appendix A.2. Quantal Response Equilibrium

I apply the concept of quantal response equilibrium (QRE; Ref. [11]) to solve the model. QRE is an extension of Nash equilibrium (NE) that accommodates bounded rationality and is therefore more attuned to the assessment of laboratory data. QRE extends payoffs by an additive stochastic component, incorporating statistical noise into players’ choices. Best response functions, which are deterministic in NE, become probabilistic in QRE. That is, best responses are played with higher probability than worse responses but not with certainty, as in NE. This allows for a better track record in explaining experimental data, particularly in tests of political participation models [29]). The main advantage of QRE in my framework is thus its better predictive power. A secondary advantage has to do with equilibrium selection. Participation games typically have several NE, both in pure and mixed strategies, which can be divided into different classes.<sup>25</sup> In a game where several classes of NE exist, QRE helps to select the one which tends to have good empirical verification. A third advantage is that QRE retains most of the important features of NE—e.g., the probability of choosing a certain action increases the payoff difference to the alternative(s) and beliefs are consistent in equilibrium.

#### Appendix A.2.1. Beta Players

In order to obtain quantal response equilibria, the payoff to each action, Participation and Abstention, is extended by a stochastic component. Equation (A4) is augmented as follows:

$$\begin{aligned}
 & \Pr [m_i'' + 1 > m_j''] b^W + \Pr [m_i'' + 1 = m_j''] \frac{b^W + b^L}{2} + \Pr [m_i'' + 1 < m_j''] b^L \tag{A12} \\
 & - c_\sigma + \mu^{Beta} \epsilon_i^{Part.} \\
 & = \Pr [m_i'' > m_j''] b^W + \Pr [m_i'' = m_j''] \frac{b^W + b^L}{2} + \Pr [m_i'' < m_j''] b^L \\
 & + \mu^{Beta} \epsilon_i^{Abs.},
 \end{aligned}$$

where  $\epsilon_i^{Part.}$  and  $\epsilon_i^{Abs.}$  are i.i.d. shocks with the parameter  $\mu^{Beta}$ . I re-write Equation (A12)

<sup>25</sup> The two most relevant ones are pure strategy NE and ‘totally quasi-symmetric Nash equilibria’, in which all players use mixed strategies and players in the same group employ the same strategy. Namely, for  $(m_i, m_j) = (1, 1)$ , there exists a unique NE where both players choose to participate. The same equilibrium exists for all cases where  $m_i = m_j \gg 1$ . When  $m_i \geq 1$  and  $m_j = 0$ , the game reduces to a public goods game. For such games, there exists  $m_i$  pure strategy NE in which one player in  $i$  participates and the others abstain. For  $m_i \geq 2$  and  $m_j = 0$ , there also exists a mixed-strategy NE. For  $(m_i, m_j) \gg 1, m_i \neq m_j$ , several mixed-strategy NEs exist. These results are available upon request.

as:

$$\left\{ \Pr \left[ m_i'' = m_j'' \right] + \Pr \left[ m_i'' = m_j'' - 1 \right] \right\} \frac{b^W - b^L}{2} - c_\sigma = \mu^{Beta} \left( \varepsilon_i^{Abs.} - \varepsilon_i^{Part.} \right). \tag{A13}$$

Following Goeree and Holt [29] and Levine and Palfrey [48], among others, I assume that  $\varepsilon_i^{Abs.}$  and  $\varepsilon_i^{Part.}$  follow independent extreme value distributions with the parameter  $\mu^{Beta}$ , which results in the difference  $\varepsilon_i^{Abs.} - \varepsilon_i^{Part.}$  following a logistic distribution. McKelvey and Palfrey [11] refer to this as a logit equilibrium, in which the probability of participation of a Beta of type  $\sigma \in \Sigma$ ,  $p_\sigma$  is:

$$\begin{aligned} p_\sigma &= \frac{\exp\left(\frac{E[\pi_i^{Beta}|Part.]}{\mu^{Beta}}\right)}{\exp\left(\frac{E[\pi_i^{Beta}|Part.]}{\mu^{Beta}}\right) + \exp\left(\frac{E[\pi_i^{Beta}|Abst.]}{\mu^{Beta}}\right)} \\ \Rightarrow p_\sigma &= \frac{1}{1 + \exp\left(\frac{E[\pi_i^{Beta}|Abst.] - E[\pi_i^{Beta}|Part.]}{\mu^{Beta}}\right)} \\ \Rightarrow p_\sigma &= \frac{1}{1 + \exp\left[\frac{c_\sigma - \frac{b^W - b^L}{2} \left(\Pr[m_i'' = m_j''] + \Pr[m_i'' = m_j'' - 1]\right)}{\mu^{Beta}}\right]}, \sigma = \{l, h\}. \end{aligned} \tag{A14}$$

This is similar for  $q_\sigma$ . Note that the probability terms (Equations (A6)–(A11)) are unchanged.

### Appendix A.2.2. Alpha Players

A similar procedure can be applied to the Alpha’s decision to obtain a logit QRE, with the difference that we must implement a multinomial logistic specification, as Alphas have six actions at their disposal ( $m_i \in \{0, 5\}$ ). Define  $\pi_i^{Alpha}(m_i, m_j, \mu^{Beta})$  as the payoff accruing to Alpha  $i$  when the active electorate is  $(m_i, m_j)$  and  $\mu^{Beta}$  is assumed. The Alpha maximizes:

$$\pi_i^{Alpha}(m_i, m_j, \mu^{Beta}) = A - a(m_i) + v_i(m_i, m_j, \mu^{Beta})' b, \tag{A15}$$

which is analogous to Equation (2).

As with Betas, we need to extend Alpha’s payoffs by a stochastic component:  $\pi_i^{Alpha}(m_i, m_j, \mu^{Beta}) + \mu^{Alpha} \varepsilon_i^{m_i}$ . Define  $s_i := \Pr[m_i]$  as the probability assigned by Alpha  $i$  to activating  $m_i$  Betas. Imposing the same assumptions on  $\varepsilon_i^{m_i}$  as I did in the case of Betas, I can write:

$$s_i = \frac{\exp\left[\frac{\pi_i^{Alpha}(m_i, m_j, \mu^{Beta})}{\mu^{Alpha}}\right]}{\sum_{m_i=0}^5 \exp\left[\frac{\pi_i^{Alpha}(m_i, m_j, \mu^{Beta})}{\mu^{Alpha}}\right]}, i = 0, \dots, 5. \tag{A16}$$

### Appendix A.3. Implemented Parameterization and Equilibrium Predictions

The parameter  $\mu$  and the distribution of the  $\varepsilon_i$  are the primitive elements of QRE. As mentioned before, I follow most of the literature and employ the logistic distribution for  $\varepsilon_i^{Abs.} - \varepsilon_i^{Part.}$ . The parameter governing the amount of bounded rationality,  $\mu$ , determines how the participation decision responds to the expected payoffs. A value of  $\mu = 0$  corresponds to a situation of no stochastic noise in decisions and therefore full rationality. A NE results in this case. As  $\mu \rightarrow \infty$ , the amount of noise increases and players become indifferent between alternatives, playing each with equal probability.

The parameters of the model are those in Table 2. In order to obtain point predictions, I must choose a value for the  $\mu$  assigned to Betas,  $\mu^{Beta}$ . A value of  $\mu^{Beta} = 0.4$  was chosen for two reasons. First, it is consistent with estimates from experiments which implement participation games. Goeree and Holt [29] rationalize the data of Schram and Sonnemans [49] using  $\mu$  ranging from 0.8 to 0.4; Cason and Mui [50] estimate  $\mu$  to be between 0.4 and 0.6; Levine and Palfrey [48] find  $\mu = 0.17$ ; and Grosser and Schram [51] base their theoretical predictions on  $\mu \geq 0.3$ . In a strategic voting setting, Tyszler and Schram [52] estimate  $\mu = 0.55$ . Second,  $\mu = 0.4$  is partially consistent with a maximum likelihood estimation performed on pilot sessions of this experimental design.<sup>26</sup> Table 1 presents the participation probabilities and outcome distribution for this  $\mu^{Beta}$  value. Fixing  $\mu^{Beta}$ , Alphas know  $v_i(m_i, m_j, \mu^{Beta})$  and therefore the payoffs of the activation game too. The payoffs for the case  $\mu^{Beta} = 0.4$  are reproduced in Table 3.

The equilibrium probabilities and the resulting probability distribution over outcomes allows me to close the model. The Alpha members of each group use the information in the 6th–8th columns of Table 1 to solve Equation (2). The two Alphas know the expected payoffs that will result in each of the sub-games that correspond to an active electorate  $(m_i, m_j)$ . Using backward induction, they choose the optimal number of Betas to activate,  $(m_i^*, m_j^*)$ , which constitutes a sub-game perfect equilibrium.

As with Betas, I derive a QRE of the game played by the Alphas. Figure A1 shows the QRE predictions for the number of Betas to be activated by an Alpha, assuming  $\mu^{Beta} = 0.4$ . Note that the equilibrium is always conditional on the  $\mu$  assigned to both Alphas (denoted  $\mu^{Alpha}$ ) and Betas ( $\mu^{Beta}$ ). However, this equilibrium is robust to a wide range of  $\mu^{Beta}$  and that  $\mu^{Alpha}$ . For the depicted values of  $\mu^{Alpha}$ , we observe that QRE predicts  $m_i = 2$  should be chosen with the highest probability. As  $\mu^{Alpha}$  increases, the difference between the probability of choosing  $m_i = 2$  and other values of  $m_i$  decreases, but the prediction is never overturned, regardless of  $\mu^{Beta}$ . The most natural assumption is to choose  $\mu^{Alpha} = 0.4$ , in which case Alphas are expected to activate two (low) Beta players with a probability of 0.484 and one (low) Beta player with a probability of 0.23 in equilibrium. Figure A1 also depicts the NE prediction ( $m_i = 2$ ), which is obtained for all values of  $\mu^{Beta}$ .

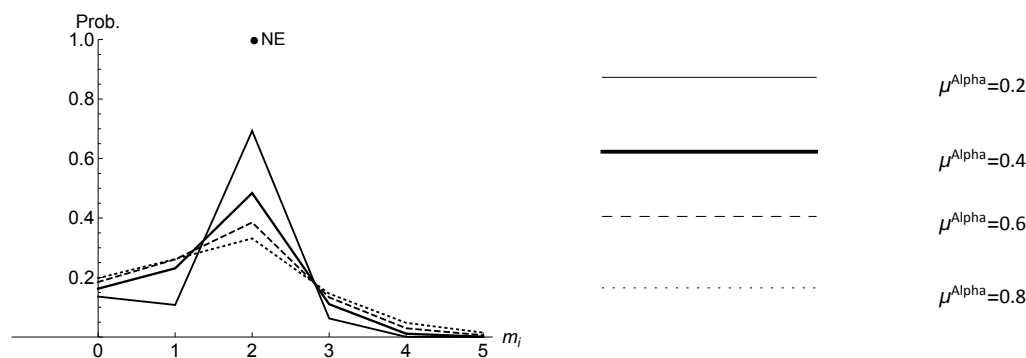


Figure A1. QRE and NE predictions for Alphas. Notes: Lines are drawn assuming  $\mu^{Beta} = 0.4$ .

<sup>26</sup> A maximum likelihood estimation using data from the pilot sessions yields  $\mu = 0.2$  for the low Betas and  $\mu \rightarrow \infty$  for high Betas. The reason for this is that, as we saw in Section 6.1, high Betas over-participate relative to any admissible prediction and therefore bias the estimate in the direction of random behavior.

### Appendix B. Theoretical Framework—Experiment 2

In this section, I derive the optimal behavior of Betas and Alphas using the same procedure employed in E1’s case. Active Betas are indifferent between participating and abstaining if:

$$\begin{aligned} \mathbf{E}[\pi_i^{Beta}|Part.] &= \mathbf{E}[\pi_i^{Beta}|Abst.] & (A17) \\ \Rightarrow \omega\rho\left(1 + \mathbf{E}\left[\sum_{j \in G_i, j \neq i} d_j\right]\right) &= \omega\left(1 + \rho\mathbf{E}\left[\sum_{j \in G_i, j \neq i} d_j\right]\right) \\ \Rightarrow \omega(\rho - 1) &= 0, \end{aligned}$$

where the variables and parameters are as defined in Section 3.2. A rational and selfish Beta player will participate in equilibrium if and only if  $\rho > 1$  and abstain otherwise.

#### Appendix B.1. Quantal Response Equilibrium

An identical QRE derivation is applied to E2’s framework.

##### Appendix B.1.1. Beta Players

In order to obtain quantal response equilibria, the payoff to each action, Participation and Abstention, is extended by a stochastic component. Equation (A17) is augmented as follows:

$$\begin{aligned} \Rightarrow \omega\rho\left(1 + \mathbf{E}\left[\sum_{j \in G_i, j \neq i} d_j\right]\right) + \mu^{Beta}\epsilon_i^{Part.} &= & (A18) \\ \omega\left(1 + \rho\mathbf{E}\left[\sum_{j \in G_i, j \neq i} d_j\right]\right) + \mu^{Beta}\epsilon_i^{Abs.} &. \end{aligned}$$

I re-write Equation (A18) as:

$$\omega(\rho - 1) = \mu^{Beta}\left(\epsilon_i^{Abs.} - \epsilon_i^{Part.}\right). \tag{A19}$$

The corresponding logit equilibrium for the probability of participation of a Beta player,  $p$ , is:

$$\begin{aligned} p &= \frac{\exp\left(\frac{E[\pi_i^{Beta}|Part.]}{\mu^{Beta}}\right)}{\exp\left(\frac{E[\pi_i^{Beta}|Part.]}{\mu^{Beta}}\right) + \exp\left(\frac{E[\pi_i^{Beta}|Abst.]}{\mu^{Beta}}\right)} & (A20) \\ \Rightarrow p &= \frac{1}{1 + \exp\left[\frac{\omega(1-\rho)}{\mu^{Beta}}\right]}. \end{aligned}$$

##### Appendix B.1.2. Alpha Players

A similar procedure can be applied to the Alpha’s decision to obtain a logit QRE, with the difference that we must implement a multinomial logistic specification, as Alphas have six actions at their disposal ( $m_i \in \{0,5\}$ ). Define  $\pi_i^{Alpha}(m_i, \mu^{Beta})$  as the payoff accruing to Alpha  $i$  when  $m_i$  Betas are activated and  $\mu^{Beta}$  is assumed. The Alpha maximizes:

$$\pi_i^{Alpha}(m_i, \mu^{Beta}) = A - m_i c^A + \mathbf{E}\left(\sum_{h \in G_i} d_h\right), \tag{A21}$$

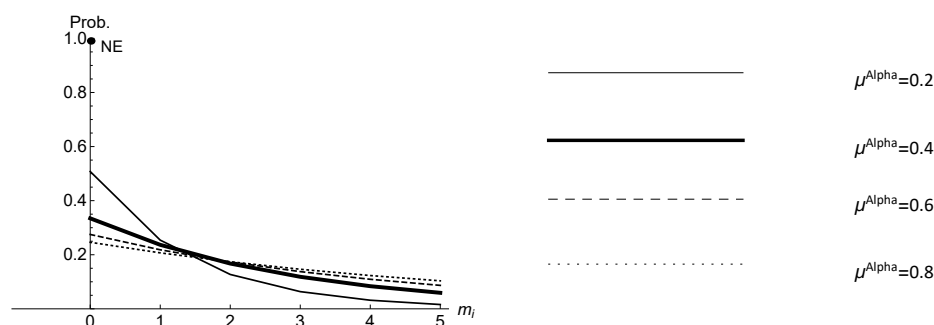
which is analogous to Equation (4), with the difference that now the expected public good component depends on  $p$ , which in turn depends on  $\mu^{Beta}$ .

Extending the Alpha’s payoffs by a stochastic component, we obtain:  $\pi_i^{Alpha}(m_i, \mu^{Beta}) + \mu^{Alpha} \varepsilon_i^{m_i}$ . Define  $s_i := \Pr[m_i]$  as the probability assigned by Alpha  $i$  to activating  $m_i$  Betas. Imposing the same assumptions on  $\varepsilon_i^{m_i}$  as before, we can write:

$$s_i = \frac{\exp\left[\frac{\pi_i^{Alpha}(m_i, \mu^{Beta})}{\mu^{Alpha}}\right]}{\sum_{m_i=0}^5 \exp\left[\frac{\pi_i^{Alpha}(m_i, \mu^{Beta})}{\mu^{Alpha}}\right]}, i = 0, \dots, 5. \tag{A22}$$

*Appendix B.2. Implemented Parameterization and Equilibrium Predictions*

The parameters of the model are those in Table 4. As for E1, I assume  $\mu^{Beta} = 0.4$ . The resulting participation probability for Betas is  $p = 0.35$ , regardless of the active electorate size (note that the equilibrium condition Equation (A17) does not depend on  $m_i$  or  $M$ ). This participation probability value is used to compute the expected public good payoff for each activation level  $m_i$ —i.e., to compute  $E(\sum_{h \in G_i} d_h)$ . These values can be found in Table 5, in the second column. Figure A2 shows the probabilities assigned to each activation level under the assumptions of  $\mu^{Beta} = 0.4$  and four  $\mu^{Alpha}$  values. The most natural choice is  $\mu^{Alpha} = 0.4$ , in which case Alphas are expected to activate zero Beta players with a probability of 0.335 and one Beta player with a probability of 0.24. Figure A2 also depicts the NE prediction ( $m_i = 0$ ), which is obtained for all values of  $\mu^{Beta}$ .



**Figure A2.** QRE and NE predictions for Alphas. Notes: Lines are drawn assuming  $\mu^{Beta} = 0.4$ .

**Appendix C. Experimental Instructions**

What follows is an abridged transcript of the experimental instructions. The changes from E1 to E2 are shown in italics. The changes from *Mob* to *Ctr* are shown within square brackets.

This experiment is composed of two tasks: Task 1 and Task 2. You will receive instructions for Task 2 after Task 1 has been completed. Tasks are made up of rounds. Task 1 has one round. Task 2 is divided into 3 blocks of 27 rounds each, which makes a total of 81 rounds.

**Task 1**

In Task 1, you have to make two decisions. You will be paired with two different participants of this experiment. You will not know their identity and they will not know yours. All results from this task will only be revealed at the end of the experiment. For the sake of explanation, let us refer to the two participants with whom you are paired as Participant A and Participant B.

For this task, you have been given 8 tokens by the experimenter, which you can keep for yourself or send to Participant A. You can send 0, 4, or 8 tokens to Participant A. The tokens that you send to Participant A will be multiplied by 3. Participant A then has to decide how many of them to keep for himself or herself and how many to send back to you.

After subjects submit their decision.

Participant B, who is not the same person as Participant A, has been asked how many tokens he or she wants to send to you. Basically, Participant B was asked to make the same decision which you had to make regarding Participant A. Participant B could choose to send you 0, 4, or 8 tokens out of the 8 tokens that he or she received from the experimenter. These tokens, if any, have been multiplied by 3. This means that if Participant B decided to send you 0 tokens, there will be 0 tokens at your disposal; if Participant B decided to send you 4 tokens, there will be 12 tokens at your disposal; and if Participant B decided to send you 8 tokens, there will be 24 tokens at your disposal. The tokens that you do not send back to Participant B are yours and will be converted into earnings.

### **Task 2**

Task 2 consists of 3 blocks of 27 rounds each, which makes a total of 81 rounds. What follows is a complete description of Task 2. At all times during Task 2, there will be a summary of relevant instructions on your screen.

You are part of a group of 6 participants, including you and 5 others. Your group will interact with another group that is identical in every respect and which will face the same decisions. In each group, there is 1 Alpha member and 5 Beta members. The Alpha member is appointed randomly for the duration of a block (27 rounds). This means that any participant can be either an Alpha member or a Beta member and will remain so for the duration of a block of 27 rounds. At the beginning of a new block, new Alpha and Beta members will be randomly chosen. This means that the group composition remains constant for the duration of a block. Groups change when a new block starts.

Each block has the same structure: 1 Activation round followed by 8 Decision rounds, repeated 3 times. In the Activation round, only the Alpha member makes a decision. In the Decision rounds, all members have to make a decision, even though the kind of decision might differ per member. At the end of each 8th decision round, a summary of the decisions and payoffs will be shown to all members.

In the Activation round, only the Alpha member makes a decision. [In the Activation round, it is announced how many Beta members have been activated for the following 8 Decision rounds. The activation status of each Beta member will change every 8 rounds and is determined randomly. No decision has to be made by any member in the Activation round.] In the Decision rounds, all members have to make a decision, even though the kind of decision might differ per member.

### **Alpha Member**

The Alpha member of each group has to decide how many Beta members to activate. The activation decision is made every 8 rounds and applies to the 8 rounds between activation decisions. Alpha members get an amount of tokens (a budget), which they can either keep for themselves or use to activate Beta members. Activating Beta members has a cost, to be incurred per each round that a Beta member is active. [The Alpha member is affected by the activation state of the Beta members: active or inactive. Alpha members get an amount of tokens (a budget) in each round. Active Beta members represent a cost to the Alpha member. For each round that a Beta member is active, a cost is deducted from the budget of the Alpha member.] The budget and costs will be explained in more detail below.

During the 8 Decision rounds, the Alpha member will observe and rate the decisions made by the active Beta members. The ratings will not be revealed to any participant of the experiment.

### **Beta Member**

The Beta members of a group can be in one of two states: active and inactive. This depends on whether they have been activated by the Alpha member or not. [The Beta members of a group can be in one of two states: active and inactive, which is determined



randomly.] In every round, each Beta member of a group, active or inactive, is given an allowance of 1 token.

The Beta members that are active will have to make the following decision. In every round, each active Beta member of a group will have to decide on whether to buy a “disc” or not.

A “disc” has a cost, which will be explained in more detail below. The members of the group with more “discs” receive a higher reward in that round: 4 tokens. The members of the group with fewer “discs” receive a lower reward in that round: 1 token. If the number of discs in the two groups is the same, the group who gets the higher reward in that round is picked with equal probability. In other words, in case of a tie each group has a 50% chance of getting the high reward. Note that if one of the groups gets the high reward, the other necessarily gets the low reward.

The cost of a disc is 1 token. If a participant buys a disc, he or she has to pay this cost. The disc will be put together with the discs of all the other Beta members in the same group who also decided to buy a disc. The total number of discs in a group is then multiplied by 0.75. Call this the number of multiplied discs. For example, if two Betas in a group decide to buy a disc, the number of multiplied discs in that group is  $2 \times 0.75 = 1.5$ . The table below lists the number of multiplied discs depending on how many discs were bought by the group.

Number of Discs Bought by the Group	Multiplied Discs
0	0
1	0.75
2	1.5
3	2.25
4	3
5	3.75

Each multiplied disc is worth 1 token. Each member of the group, be it the Alpha or a Beta (active or inactive), receives the number of multiplied discs as a payoff in tokens. This does not depend on whether he or she bought a disc or not. In other words, the tokens earned from multiplied discs apply equally to all the members of a group in a given round, be it an Alpha member, an active Beta member or an inactive Beta member.

The Beta members that are inactive observe and rate the decisions of the active Beta members. The ratings will not be revealed to any participant of the experiment.

Important: these rewards apply equally to all the members of a group in a given round, be it an Alpha member, an active Beta member, or an inactive Beta member.

The Beta members that are inactive observe and rate the decisions of the active Beta members. The ratings will not be revealed to any participant of the experiment.

### **Budget, Activation Costs and Disc Buying Costs**

Both Activation Costs and Disc Buying Costs depend on the type of Beta member. There are 3 high-cost Beta members and 2 low-cost Beta members in each group. You will be informed which one you are, in case you are a Beta member.

In each round, the Alpha member gets a budget of 4 tokens that he or she can keep for himself or herself or use to activate Beta members. The tokens spent on activating Beta members cannot be recovered. The budget is just enough to activate all Beta members in his or her group, which means that nothing remains of the budget if all Beta members are activated. The cost of activating a high-cost Beta member and a low-cost Beta member are 1 and 0.5 per round, respectively. Note that the amounts we refer to are per round. However, the Alpha member makes a decision that is valid for 8 rounds. [In each round, the Alpha member gets a budget of 4 tokens. The tokens deducted from the Alpha member’s budget due to active Beta members cannot be recovered. The budget is just enough to pay for all Beta member activation in his or her group, which means that nothing remains of the budget if all Beta members are active. The costs of an active high-cost Beta member and

a low-cost Beta member are 1 and 0.5 per round, respectively. Note that the amounts we refer to are per round. However, the activation state of Beta members is valid for 8 rounds.]

The cost of buying a disc is also different for high-cost Beta members and low-cost Beta members: 1 and 0.5 per round, respectively.

*In each round, the Alpha member gets a budget of 2 tokens that he or she can keep for himself or herself or use to activate Beta members. Activating a Beta member has an activation cost of 0.4 tokens. The tokens spent on activation costs cannot be recovered. The budget is just enough to activate all Beta members in a group, which means that nothing remains of the budget if all Beta members are activated. Note that the amounts we refer to are per round. However, the Alpha member makes a decision that is valid for 8 rounds.[In each round, the Alpha member receives a budget of 2 tokens. The tokens deducted from the Alpha member's budget due to active Beta members cannot be recovered. If all Betas in a group are activated, nothing remains of this budget. Note that the amounts we refer to are per round. However, the activation state of Beta members is valid for 8 rounds.]*

In summary, the earnings per round of each member are as follows:

Alpha member = Reward + Budget – Eventual Activation Costs .

Active Beta member = Reward – Cost of a Disc .

Inactive Beta member = Reward .

*Alpha member = Multiplied Discs + Budget – Eventual Activation costs .*

*Active Beta member = Allowance – Cost of a Disc + Multiplied Discs .*

*Inactive Beta member = Allowance + Multiplied Discs .*

Before we head to the 3 blocks, there will be some practice questions to make sure you understand Task 2.

#### Comprehension Questions

The following questions were administered after the instructions. Subjects could only proceed after correctly answering all questions. Questions were adapted to fit E1 and E2. Text in square brackets indicates the differences between *Mob* and *Ctr*.

Q1: What is the maximum number of Beta members that can be activated by the Alpha member [can be active in a group]? A: 5.

Q2 (E1): If an Alpha member activates all the Beta members of his or her group, [if all the Beta members of a group are active] how much is left of the budget? Recall that an Alpha member receives a budget of 4 tokens, that there are 2 low-cost Beta members and 3 high-cost Beta members in each group, and that activating a low-cost Beta member and a high-cost Beta member costs [an active low-cost Beta member and an active high-cost Beta member represent a cost of] 0.5 and 1 tokens, respectively. A: 0.

Q2 (E2): If an Alpha member activates all the Beta members of his or her group [if all the Beta members of a group are active], how much is left of the budget? Recall that an Alpha member receives a budget of 2 tokens, and that activating a Beta member [an active Beta member] costs 0.4 tokens. A: 0.

Q3 (E1): Suppose that the Alpha member activates 2 low-cost Beta members and 1 high-cost Beta member. [Suppose that 2 low-cost Beta members and 1 high-cost Beta member are active in a group.] Suppose further that, in a given round, these Beta members all buy a disc, whereas the Beta members of the other group only buy 1 disc. What is the payoff of the Alpha member in this round? Recall that activating a low-cost Beta member and a high-cost Beta member costs [represent a cost of] 0.5 and 1 tokens per round, respectively, and that a member of a group receives 4 tokens if his or her group buys more discs than the other group. A: 6.

Q3 (E2) Suppose that the Alpha member activates 4 Beta members. [Suppose that 4 Beta members are active in a group.] Suppose further that, in a given round, these Beta members all buy a disc. What is the payoff of the Alpha member in this round? Recall that the Alpha member has a Budget of 2 tokens per round, that activating a Beta member [an active Beta member] costs 0.4 tokens per round, and that each group member receives 0.75 tokens for each multiplied disc. A: 3.4.

Q4: At the end of a block of 27 rounds, all participants are assigned new (random) member roles and new groups are formed. True or false? A: True.

Q5 (E1): Suppose that the other group buys 2 discs in total. What is the minimum number of discs that your group has to buy such that your group gets the high reward of 4 tokens for sure? A: 3.

Q5 (E2): Suppose that in a certain round there are 4 active Beta members in a group. Two Beta members buy a disc. What is the individual payoff of a Beta who bought a disc in that round? A: 1.5.

Q6 (E1): Suppose that your group bought 2 discs and the other group bought 2 discs as well. What is the probability that your group gets the high reward in this round of the game? Note: Express probability in decimal terms; for example, if you want to answer “20% probability” please type “0.2”. A: 0.5.

Q6 (E2): Suppose that in a certain round there are 5 active Beta members in a group. Three Beta members buy a disc. What is the individual payoff of a Beta who did not buy a disc in that round? A: 3.25.

Q7 (only E1): Suppose you are a high-cost Beta member and that all Beta members have been activated in both groups. Suppose further that, in a given round, your group buys 5 discs and the other group buys 4 discs. What are your earnings (in tokens) in this round of the game? A: 3.

#### Appendix D. Trust Game Results

The data from the trust game are presented in this Appendix. Recall that senders can send 0, 4, or 8 tokens to the receiver, who can send back a share of the three times-multiplied amount. Note that 8 tokens induces round numbers when calculating the amount to send back according to many heuristics, such as the typical fairness heuristics of returning 1/2 or 2/3 of the multiplied amount, as well as the less frequent 1/4 or 3/4.

Approximately half of the subjects send the intermediate amount (4), roughly 30% send the high amount (8), and 20% send 0 (see Figure A3). Averaging this, subjects send 55.5% of their endowment (standard deviation: 35.5%), which is consistent with the typical 50% result found in trust games with a finer action space [32]). The amount returned is also in line with typical results. The distribution of the returned amount is remarkably close for the intermediate and high received amounts: subjects return 34.4% and 35.3%, respectively (standard deviations of 21.2% and 21.0%; see Figure A4).

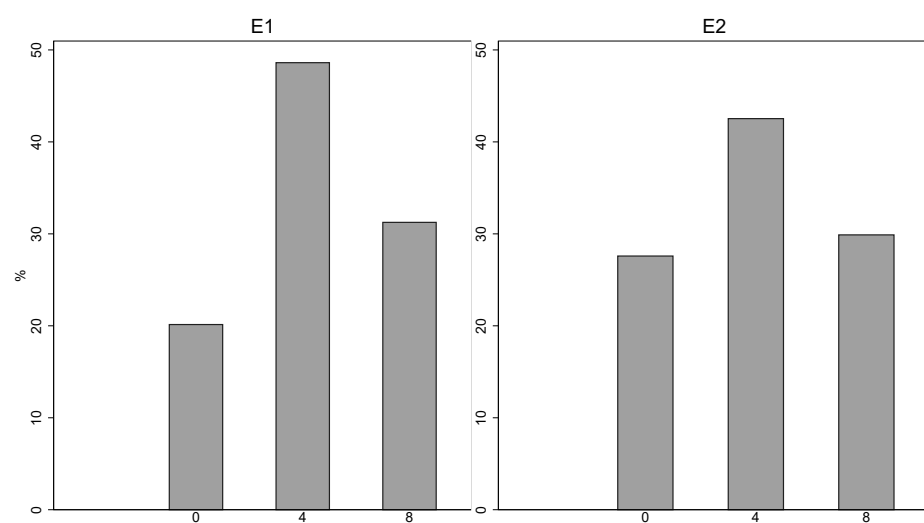
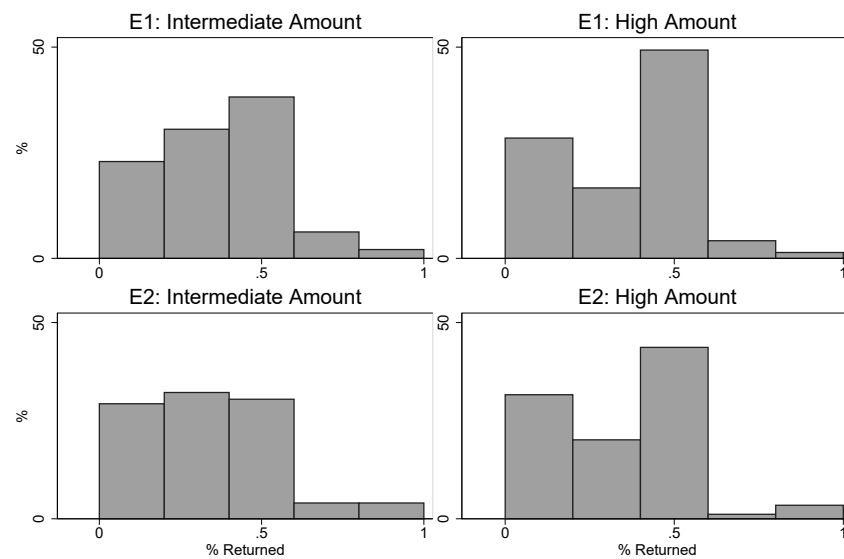


Figure A3. Amount sent in the trust game.



**Figure A4.** Amount returned in the trust game.

These data are not in line with Burks et al. [53], who report evidence that playing both roles: (i) decreases the amount sent if subjects are aware of this beforehand, and (ii) decreases the amount returned, regardless of whether playing both roles was known beforehand.

#### Appendix E. Analysis of Normative Appeal Features

This Appendix presents OLS regression results on the relationship between average group participation and the features of the normative appeal the group received.

**Table A1.** Normative appeal features and participation. Notes: This table presents the model coefficients of a linear regression model. The dependent variable is average group participation in block 2. Standard errors are shown in parentheses. \*\*/\*\* indicate significance at the 10/5/1% level.

	E1	E2
Activation	−0.46 (0.64)	0.65 (0.18)
Inspiring	−0.08 (0.31)	−0.11 (0.31)
Activation*Inspiring	0.06 (0.31)	0.18 (0.31)
Legitimate	−0.06 (0.44)	−0.01 (0.15)
Activation*Legitimate	0.18 (0.46)	−0.03 (0.16)
OwnWillingness	0.08 (0.17)	−0.37 *** (0.08)
Activation*OwnWillingness	−0.08 (0.19)	0.78 *** (0.20)
OtherWillingness	−0.02 (0.20)	0.60 ** (0.21)
Activation*OtherWillingness	−0.01 (0.25)	−1.01 *** (0.29)
Constant	1.03 (0.59)	0.12 (0.10)
$R^2$	0.18	0.69
$N$	22	23

## Appendix F. Transcript of Alphas' Messages

The messages sent by the Alphas to the Betas are transcribed verbatim below.

### Appendix F.1. Experiment 1

Alpha<sub>*i*</sub> stands for the Alpha of group *i*; Group 1(3) competed with Group 2(4). The numbers in parentheses after 'Session' indicate the active electorate at the beginning of block 2. The number in parentheses after 'Alpha<sub>*i*</sub>' indicates each message's time-stamp in seconds (the clock counted down from 90 to 0). Sessions A, B, and C implemented *Mob*; the remaining ones implemented *Ctr*.

#### Session A (5-5, 4-5):

Alpha<sub>1</sub>(73): Hi there, I think we should all buy discs  
 Alpha<sub>1</sub>(37): In that way we can make the most tokens  
 Alpha<sub>2</sub>(50): I want everybody to buy a disc each round  
 Alpha<sub>3</sub>(71): all choose to buy a disc  
 Alpha<sub>3</sub>(40): we are with four, but one of the other does not choose to buy. if we all buy we can get 4  
 Alpha<sub>3</sub>(34): payoff  
 Alpha<sub>4</sub>(24): Let's work together and get the most tokens for sure!

#### Session B (5-4, 1-1):

Alpha<sub>1</sub>(51): Please, always buy a disc in every round. We have got 5 members, they've got 4, so we could earn a lot of points here. Thanks in advance.  
 Alpha<sub>2</sub>(40): okay guys, if you're low cost always buy the disc, payoff will still be 0.5 if you lose, high cost at least 1 per round, payoff could be 4-1  
 Alpha<sub>2</sub>(10): scorched earth  
 Alpha<sub>3</sub>(41): i hope you can buy discs, because we have higher chance to win  
 Alpha<sub>4</sub>(19): the beta member always has to buy a disc! the expected payoff is higher because the other group also has one beta. the expected payoff is 2

#### Session C (5-5, 5-4):

Alpha<sub>1</sub>(44): please all buy a disk, if we do it together we can make more profit. Otherwise I'd rather make a lot of profit on my own.  
 Alpha<sub>1</sub>(2): I think the best way is to stick together :)  
 Alpha<sub>2</sub>(74): please all buy a disc!  
 Alpha<sub>2</sub>(7): thats all i have to say lol  
 Alpha<sub>3</sub>(12): I've activated you all. If you all buy discs, we all will earn the maximum to my opinion.  
 Alpha<sub>4</sub>(54): hey, Ok so there is one more beta activated in the other group. here there are 4 and in the other group 5. So in my opinion you should  
 Alpha<sub>4</sub>(33): all buy discs, so we have a higher probability of getting the reward  
 Alpha<sub>4</sub>(24): lets see how it goes :)

#### Session D(5-5, 4-5):

Alpha<sub>2</sub>(58): hi  
 Alpha<sub>3</sub>(41): think critically what to choose, last round the other group had 5 (we only 4) members just as in this case. They all bought disk!  
 Alpha<sub>4</sub>(84): He all :-)  
 Alpha<sub>4</sub>(55): Let's try to buy all the discs we can. So that we always go for the highest reward  
 Alpha<sub>4</sub>(41): It will cost you a little bit, but makes it more likely that you earn more money  
 Alpha<sub>4</sub>(22): 4-1 or 4-0.5 is still more than.. 1-1 or 1-0.5  
 Alpha<sub>4</sub>(16): Let's do it!!!!  
 Alpha<sub>4</sub>(13): And earn some money

#### Session E (5-4, 1-1):

Alpha<sub>1</sub>(80): buy  
 Alpha<sub>1</sub>(60): buy them all  
 Alpha<sub>1</sub>(12): “good luck :)”  
 Alpha<sub>2</sub>(48): lets try buying 4 discs. everyone buy one and lets see what they do.  
 Alpha<sub>3</sub>(69): In the first 8 rounds we have one active member  
 Alpha<sub>3</sub>(63): and the other group also one active member  
 Alpha<sub>3</sub>(39): so if the active member buys all the time the disc we have 50% chance to get the high reward which is good  
 Alpha<sub>3</sub>(17): I think it would be good to try and have the higher rewards in the other rounds as well  
 Alpha<sub>4</sub>(70): everybody buy discs

#### **Session F (5-5, 5-4):**

Alpha<sub>1</sub>(29): both groups have 5 members, please all buy discs, it has shown in the past that in round there are always some who dont, we buy all!!!  
 Alpha<sub>2</sub>(54): Ok, we can get them if we play disciplined. Which means every one buy discs every round!  
 Alpha<sub>3</sub>(88): Hi  
 Alpha<sub>3</sub>(77): We should buy all discs each round \  
 Alpha<sub>3</sub>(68): Especially now we have more active beta members  
 Alpha<sub>3</sub>(56): That way we’re certain we get 4 points each round  
 Alpha<sub>3</sub>(29): So, everyone. Don’t skip.

#### *Appendix F.2. Experiment 2*

The numbers in parentheses after ‘Session’ indicate the activation level at the beginning of block 2. The number in parentheses after ‘Alpha<sub>i</sub>’ indicates each message’s time-stamp in seconds (the clock counted down from 90 to 0). Sessions A, B, D, F and G implemented *Mob*, the remaining ones implemented *Ctr*.

#### **Session A (4)**

Alpha<sub>2</sub>(57) I hope all chose disk so next rond I activate 5

#### **Session B (3, 5)**

Alpha<sub>1</sub>(47) The best : activate all Beta members and they all buy discs.  
 Alpha<sub>2</sub>(49) buy 5 disc!! trust me

#### **Session C (3, 5)**

Alpha<sub>1</sub>(49) guys, if you all buy you win 2.25 points comparing to 1 point. so focus and strice for more earnings :)  
 Alpha<sub>2</sub>(77) say buy  
 Alpha<sub>2</sub>(46) everyone ^^

#### **Session D (4, 5, 1)**

Alpha<sub>1</sub>(62) If you’ll buy a disc, we all will have a higher profit.  
 Alpha<sub>2</sub>(53) Hi everyone! It’s in the best interest of everybody’s wallet if all the beta members buy a disc each round. So if we can all trust on that  
 Alpha<sub>2</sub>(45) i think we will have the best results!  
 Alpha<sub>2</sub>(17) good luck  
 Alpha<sub>2</sub>(1) and please be quick otherwise i will be bored :)  
 Alpha<sub>3</sub>(35) 3

#### **Session E (4, 5, 1)**

Alpha<sub>1</sub>(58) If all af the active beta members buy a disk every time there will be more money for everyone  
 Alpha<sub>1</sub>(42) Just buy discks if you are an active beta  
 Alpha<sub>1</sub>(27) that way you gat more because of the discks that others bought

Alpha<sub>1</sub>(18) and the others also get more  
 Alpha<sub>1</sub>(15) ;)  
 Alpha<sub>2</sub>(38) if everyone buys a disc, we can all get 3.75. please!!  
 Alpha<sub>3</sub>(49) if you all buy the disks, we all win. and the quicker you do that, the sooner we get out of here ;)

#### Session F (3, 5, 5)

Alpha<sub>2</sub>(29) active all Beta member , increase the multiplied discs will benefit  
 Alpha<sub>3</sub>(29) I will make every beta active. Please note that if everyone buys a disc overall efficiency is reached!  
 Alpha<sub>4</sub>(77) Ok, everybody please buy discs every round  
 Alpha<sub>4</sub>(67) this way we will all benefit the most  
 Alpha<sub>4</sub>(55) I will activate evryone every round  
 Alpha<sub>4</sub>(46) If you all buy the discs  
 Alpha<sub>4</sub>(34) otherwise I will not activate anymore  
 Alpha<sub>4</sub>(22) So be warned ;-)

#### Session G (4, 5, 4)

Alpha<sub>1</sub>(35) all the activated beta members buy the disc so that we can get the highest payoff for everyone  
 Alpha<sub>2</sub>(52) come on everyone buy a disc.... team work... then we can all make a nice amount of money.... greed will get us nowhere..unity and peace man  
 Alpha<sub>2</sub>(11) i trust in you  
 Alpha<sub>3</sub>(28) Hi, please everyone who is activated by the disc. In the end we will have 3 points. If not, next round I wont activate anyone, youll have 1  
 Alpha<sub>3</sub>(9) buy the disc\*

#### Session H (5, 3, 5)

Alpha<sub>1</sub>(42) All the active members should buy discs, that's the way to make the most profit for everyone (including yourself).  
 Alpha<sub>2</sub>(72) hi  
 Alpha<sub>3</sub>(86) ...  
 Alpha<sub>3</sub>(54) just do it  
 Alpha<sub>3</sub>(13) as much discs as possible

#### Session I (4, 5, 4)

Alpha<sub>1</sub>(8) Dear active member, please buy some disc.. better together if you all get the disc  
 Alpha<sub>2</sub>(14) Guys if we all work together we can earn 3.75 per round which is about 30 per block and even 90 in the whole block!!!!  
 Alpha<sub>3</sub>(63) Dear all, Great job! We're making a lot of money :)  
 Alpha<sub>3</sub>(35) I encourage everyone to buy disks all the time. Like that, everyone will multiply their earnings :)  
 Alpha<sub>3</sub>(17) Keep up with the great job!

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