The Framing of Elections: Cooperation vs. Competition

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Abstract

We show that framing an election as a "competition" compared to "cooperation" reduces the chances that egalitarian alternatives will win under Plurality Voting, but not under Approval Voting. Individual voting behavior shows that the effect is mainly driven by voters who switch to their selfish payoff-maximizing alternatives under a competitive framework, but only when those are also payoff-efficient (in terms of the sum of payoffs for the group). This shift does not happen for voters whose payoff-maximizing alternatives are not payoff-efficient, or even if a majority of voters are better off under the payoff-efficient alternative. This suggests that voters are more likely to switch to selfish payoff-maximizing alternatives under a competitive frame if they can (self-)justify the switch in terms of the common good.
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1 Introduction

An extensive literature in psychology and economics has documented the effects of *framing* on decision making (Tversky and Kahneman, 1981; Tversky et al., 1988; Quattrone and Tversky, 1988). For decision making in groups, several contributions have shown that framing the decisions in terms of ingroups vs. outgroups can systematically affect behavior (Brewer, 1999; Halevy et al., 2012; Greenwald and Pettigrew, 2014; Yamagishi and Mifune, 2016). Specifically, when this framing is adopted, people are willing to incur personal costs to help the ingroup and also to hurt the outgroup, two phenomena referred to as "ingroup love" and "outgroup hate," respectively.

Many group decisions are made through voting, from small committees and corporate boards to large elections in democratic societies. The conflicts arising between different

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groups (parties, interest groups, socioeconomic partitions, etc.) often carry the risk of inducing a competitive "us vs. them" frame which might in turn influence voters' behavior. In this work, we ask whether a competitive frame (compared to a more cooperative one) influences voting behavior and electoral outcomes, especially when a cooperative (egalitarian) alternative is available, but voter groups could support selfish (group-)payoff-maximizing options instead.

To investigate this question, we carried out a laboratory experiment following standard experimental designs (Forsythe et al., 1993; Granić, 2017; Alós-Ferrer and Garagnani, 2022), but framing the elections either in terms of a cooperative decision or a competitive one. Compared to field data, the laboratory setting allows us to exert more control over the variables of interest, and in particular the framing. Preferences over alternatives are induced through monetary payoffs, and hence we can design alternatives reflecting our research question, and in particular ensure that there is a conflict between an egalitarian potential outcome and the selfish payoff-maximizing alternatives preferred by several groups.

Our framing manipulation was minimal. In one treatment, experimental participants were described as "cooperators" in the instructions, while in the other treatment they were referred to as "competitors." Participants made decisions in small experimental societies composed of three groups characterized by different preferences, but no other manipulation of group identity was used. We hypothesized that the salience of group identities should be higher in the competitive decision situation than under the cooperative description. Therefore, under competitive framing, we should see more support for selfish (ingroup) options and less support for the egalitarian alternative compared to the cooperative treatment.

We considered two different voting procedures. The first, Plurality Voting, underlies the most commonly-used voting methods in Western societies. Voters are asked to provide only the maxima of their preferences, disregarding all other information, and the alternative with the most votes wins. The second, Approval Voting (AV; Brams and Fishburn, 1978) allows voters to "approve of" as many alternatives as they wish, and the one with the most approvals wins. This method is particularly interesting for our research questions because it has been shown to reduce ingroup bias (parochialism Baron et al., 2005). More generally, AV has been argued to be more robust than other voting methods against (strategic) manipulation and to ameliorate related problems as the wasted-vote effect. The theoretical advantages of AV have been shown in axiomatic characterizations (Fishburn, 1978, 1979; Alós-Ferrer, 2006; Xu, 2010) and theoretical analyses of (non-)manipulability (Brams and Fishburn, 1978; Alós-Ferrer and Buckenmaier, 2019), and the empirical performance of the method has been investigated in large-scale field experiments during actual elections (Laslier and Van der Straeten, 2008; Alós-Ferrer and Granić, 2012, 2015), as well as in laboratory experiments (Laslier, 2010; Bassi, 2015; Granić, 2017). Intuitively, under AV voters have more room to express their preferences (by means of approving of more alternatives) and face no strategic tradeoffs

(supporting one alternative does not imply withdrawing support from another), which makes the method less vulnerable to manipulations. In relation to framing, a recent study (Alós-Ferrer et al., 2021) found that voting behavior under PV is affected by a framing manipulation in terms of whether the payoffs are expressed as gains or losses, but AV is less affected by this frame (although the average number of approvals was affected by framing in that study; see Section 3.3). Similarly, Alós-Ferrer and Garagnani (2022) found that voting behavior under PV is influenced by time pressure, but AV is more robust to this manipulation. Hence, we hypothesized that the effects of a competitive (vs. cooperative) frame would be present for PV but not necessarily for AV.

Klor and Shayo (2010) carried out a laboratory experiment on the effects of social identity on preferences over redistribution and voting behavior. Alternatives were presented as alternative redistributive tax regimes and the decision was made through a simple majority rule, i.e. PV. A large fraction of the participants were willing to incur personal costs to support alternatives that benefitted their group. However, no framing manipulation was employed. In contrast to Klor and Shayo (2010), our groups are uniform in terms of preferences, i.e. there is no tradeoff between personal and group payoffs. Rather, we concentrate on whether a competitive framing decreases the support for egalitarian ("fair") alternatives when those differ from (group-)payoff maximizing ones.

In alignment with our hypothesis, we find that a competitive frame, compared to a cooperative one, shifts voter support away from egalitarian alternatives and toward selfish, payoff-maximizing ones, and this shift is strong enough to induce a significant difference in electoral outcomes. Our experimental design created qualitatively different groups, and we use this feature to investigate the individual determinants underlying the effect on voting outcomes. We find that the shift in voter support comes mainly from voters whose payoff-maximizing option is also payoff-efficient, i.e. increases aggregate payoffs for the entire society. Crucially, the shift is not significant for voters whose payoff-maximizing alternative differs from the payoff-efficient one, even if the latter increases their own payoffs compared to the egalitarian outcome. Also, those voters do not significantly shift support to the payoff-efficient alternative either. This strongly suggests that a competitive frame induces voters to shift support from egalitarian alternatives towards more selfish ones, but only if they can (self-)justify this shift on the grounds that the selfish alternative benefits the common good in terms of aggregate payoffs.

The article is structured as follows. Section 2 presents the experimental societies and the experimental design and procedures. Section 3 presents the results, distinguishing effects on electoral outcomes, individual voting behavior, and a brief report on the acceptance thresholds in the Approval Voting decisions. Section 4 concludes. Appendix A presents supplementary analyses focused on the payoff-efficient option (instead of the egalitarian one, which is our focus), and Appendix B contains the experimental instructions.

Table 1: Experimental Societies (Preference Profiles).

Society 1

Voter Type	Number	Induced Preferences	A	B	C	D	Total
Type 1	2	$A \succ C \succ D \succ B$	80	30	60	55	225
Type 2	2	$B \succ C \succ D \succ A$	20	90	60	55	225
Type 3	2	$D \succ C \succ A \succ B$	55	30	60	80	225
Total			155	150	180	190	

Society 2

Voter Type	Number	Induced Preferences	A	B	C	D	Total
Type 1	2	$A \succ D \succ C \succ B$	80	30	55	60	225
Type 2	2	$B \succ C \succ D \succ A$	30	90	55	50	225
Type 3	2	$D \succ A \succ C \succ B$	60	30	55	80	225
Total			170	150	165	190	

2 Experimental Design

We recruited 144 participants (69 females) in a 2 within (voting method: AV vs. PV) $\times$ 2 between (framing manipulation: Cooperative vs. Competitive) design. The experiment was conducted in three separate sessions (48 participants each) at the "Laboratori d'Economia Experimental" (LEE) in the Universitat Jaume I de Castelló de la Plana (Spain) using z-Tree (Fischbacher, 2007). Participants were recruited using the LEE proprietary recruitment system. Two participants were excluded from the analysis of individual behavior due to failure to understand the instructions, and two further because they failed to obey the rules of the lab regarding smartphone use during the experiment. The results are qualitatively unaffected if their decisions are included in the analysis. The final sample for individual behavior includes $N = 140$ participants, 70 in each framing condition.

2.1 The Experimental Societies

The experimental design is based on standard implementations of voting games, as e.g. in Forsythe et al. (1993), Granić (2017), or Alós-Ferrer and Garagnani (2022). Preferences over alternatives were induced using monetary incentives in the form of payoff tables displaying the rewards from different election outcomes (see right-hand side of Table 1). Payoffs were given as Experimental Currency Units (ECUs), which were converted at a rate of EUR 0.20 per ECU at the end of the experiment.

In each framing treatment, participants voted in two different *Societies* represented by different payoff tables. In each society, there were four available alternatives and three types (groups) of voters (preferences), with two voters of each type.

The two societies used in the experiment are presented in Table 1. Both societies pit selfish, payoff-maximizing options against more cooperative ones which benefit most voters. Specifically, in both societies, there is an egalitarian option (C) that does not

maximize the payoff for any type. Types 1 and 2 have selfish payoff-maximizing options (A and B, respectively), while the payoff-maximizing option of Type 3 (D) is efficient in terms of aggregate payoffs for the entire society. The difference between societies is that in Society 1, the socially-efficient alternative benefits only a minority compared with the egalitarian outcome, while in Society 2 it favors a majority. An important observation is that, in both societies, Type 3 is the only type that could justify going for its own selfish, payoff-maximizing alternative with a common-good argument (efficiency).

In detail, in Society 1, alternatives A and B maximize the individual payoffs for voters of Types 1 and 2, respectively, but induce relatively low payoffs for one or two of the other types. In contrast, alternative C leads to an egalitarian outcome, where every voter receives the same payoff. Further, the sum of payoffs under C exceeds the sum of payoffs under either A or B. Hence, for Types 1 and 2, there is a clear tradeoff betwen selfish payoff-maximization and the common good.

However, for Type 3, and to distinguish different possible motives (equality vs. efficiency), individual payoffs are maximized by alternative D, which also leads to the highest sum of payoffs (hence efficiency in this sense) but lower payoffs than C for both of the other two types. This socially-efficient alternative D hence creates inequality and divides the electorate into two groups. Voters of Type 3 are *Efficiency Winners* (EW), as they would obtain more than the equal split if the socially-efficient alternative D were implemented. Types 1 and 2 are *Efficiency Losers* (EL), as they would receive less than the equal split in that case.

The main purpose of Society 2 is to reproduce the structure of Society 1 while having a majority of Efficiency Winners. Again, alternatives A and B are payoff-maximizing for types 1 and 2, respectively, while leading to low payoffs for one or two of the other types. Also, alternative C remains egalitarian, and alternative D is both payoff-efficient and payoff-maximizing for Type 3. However, contrary to Society 1, voters of Type 1 prefer D to C and are hence also Efficiency Winners (as Type 3) in this society.

2.2 Experimental Procedures

Ballots were displayed on the screen, and voters could decide their choices anonymously. In each election, participants saw the entire payoff table. That is, they knew the payoff and the induced preferences of all voters. Under PV, voters had to choose one alternative only, and the winner was determined by the number of votes received. In contrast, under AV, voters could choose (approve of) as many alternatives as wished per ballot. The election winner was the alternative with the highest number of approvals. Ties between two or more alternatives were broken randomly. Abstention (empty ballots) was not allowed. However, under AV one could interpret approving of all alternatives as an abstention. This only happened 25 times in our entire dataset, (2.98% of all 140×6 AV observations).

Participants were randomly allocated to different blocks of six voters each, which were fixed for the entire experiment. However, there was no interaction within the block, as voting decisions were made individually and no feedback on voting outcomes was given until the end of the experiment. For half of the blocks, elections were framed in terms of cooperation, specifically referring to voters as "cooperators." For the other half, they were framed in terms of "competitors" voting to implement an alternative. The framing of the election started with the general instructions at the beginning of the study and was present on each voting screen during the entire experiment.

Each participant faced twelve voting rounds, corresponding to all combinations of voting method (PV vs. AV), society, and type of voter. That is, every voter made decisions for every Type in every payoff table and every voting method (in different voting rounds). Specifically, participants first made six decisions under a voting method before switching to the other voting method for the remaining six decisions. The order of methods was counterbalanced, with half of the blocks (in each treatment) starting with PV and switching to AV after six voting rounds, and conversely for the other half. For each voting method and for each participant, in each round the participant was assigned to one of three types in one of the societies. Payoffs were jittered every round, so that the preference profiles were fixed for a given society, but the actual numerical payoffs varied. Each round, participant were simply given the corresponding payoff table and told their type.

Experimental sessions lasted around 50 minutes including instructions and payment. At the end of the experiment, for each block of voters, one of the twelve rounds was randomly selected and implemented, and payoffs were the ones derived from the corresponding outcome. The average payoff was EUR 12.01 (median 12.00), ranging from EUR 4 to EUR 18.

Election outcomes were not announced until the end of the experiment to avoid learning, feedback, and repeated-game effects. Thus, at the end of each round, participants went directly to the next round without knowing the previous round's outcome. We implemented this procedure because Esponda and Vespa (2014) shows that strategic voting increases when feedback is provided in a laboratory voting game. Hence, to elicit the voters' support for each alternative (i.e. one-shot voting behavior) as cleanly as possible and isolate the effect of framing on the voting decision, we deliberately refrained from providing feedback after each election.

2.3 Power

The minimum required power for detecting a medium effect size ($d = 0.5$) with a test of proportions was set to 0.80, yielding a required sample size of $N = 64$ per condition. Since we obtained data from 140 individuals (70 in each condition), the power of our study is sufficient to find a medium effect of the treatment manipulation on voting behavior.

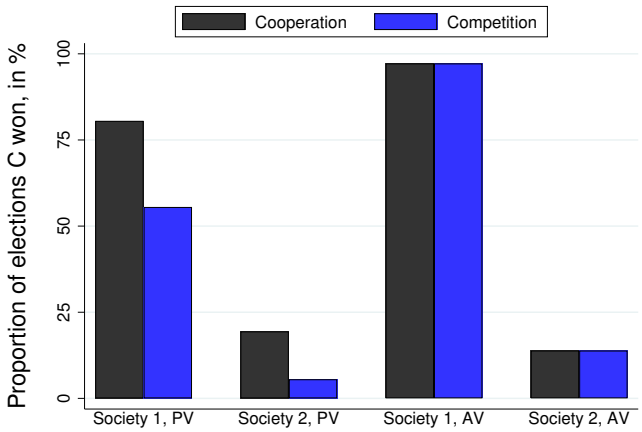

Figure 1: Proportion of times alternative C won the election by treatment (cooperation vs. competition), society (Society 1 vs. Society 2), and voting method (PV vs. AV).

3 Results

We are interested in how framing affects the support for the cooperative (egalitarian) alternative C, as well as its success in terms of electoral outcomes. Appendix A presents the analogous analyses for the efficient alternative D.

3.1 Electoral outcomes

We start with the overall effect of framing in the ultimate variable of interest, which is electoral outcomes. We had a total of 144 elections per voting method, 72 in each treatment. Figure 1 depicts the proportion of times that alternative C was a winner of the election by treatment, society, and voting method. For Plurality Voting, as expecte, the egalitarian alternative won the election more often under the cooperative treatment than under the competitive treatment, both in Society 1 (75.00% vs. 55.56%) and in Society 2 (19.44% vs. 5.56%). Both effects are significant according to two-sample tests of proportions (one-sided since hypotheses are directional; Society 1, $z = 2.274$, $p = 0.0115$; Society 2, $z = 1.7817$, $p = 0.0374$). Hence, we confirm that a competitive framing decreases the winning chances of egalitarian alternatives, compared to a cooperative framing.

Also as expected, this effect is absent for Approval Voting, which has been shown to reduce ingroup bias (Baron et al., 2005) and has been repeatedly argued to be more robust than Plurality Voting to strategic behavior (Brams and Fishburn, 1978, 2005; Wolitzky, 2009; Alós-Ferrer and Buckenmaier, 2019) and other factors (Alós-Ferrer et al., 2021). In particular, C is almost always one of the winners under AV in Society 1 independently of the frame (97.22% in both frames; $z = 0.000$, $p = 0.5000$), and is only rarely a winner in Society 2 (Cooperation frame, 13.89%; Competition frame, 13.89%;

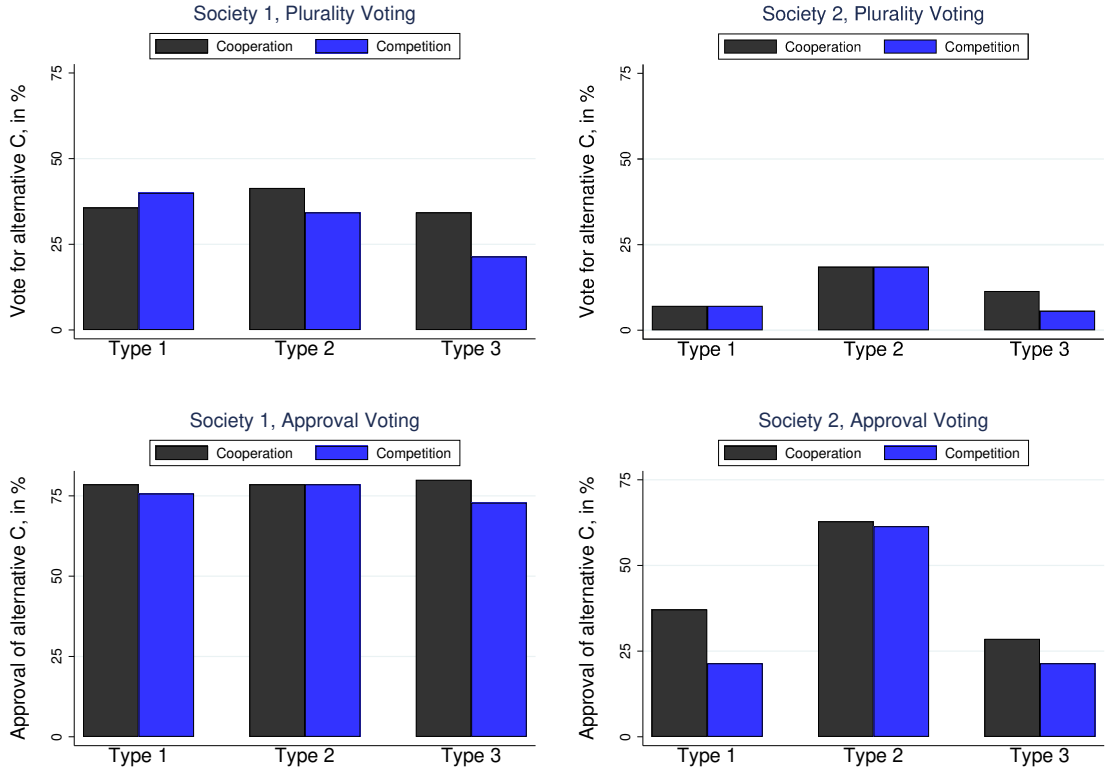

Figure 2: Voters' support for the fair alternative C by treatment (cooperation vs. competition), society (Society 1 vs. Society 2), voting methods (PV vs. AV) and voters' types.

$z = 0.000$, $p = 0.5000$). This confirms that possible framing effects might be less relevant for AV than for PV.

As Figure 1 shows, the egalitarian alternative was far more likely to be a winner in Society 1 than in Society 2. This shows that the two Societies are different in the expected direction. Specifically, cooperation is less attractive in Society 2, as the socially-efficient alternative D favors a majority of Efficiency Winners in that society. We also remark that, in Society 1, the egalitarian alternative wins overwhelmingly more under AV than under PV (see Figure 1), independently of the frame. This is in line with the observation that AV facilitates the selection of compromise alternatives, compared to PV (Alós-Ferrer and Buckenmaier, 2021).

3.2 Individual Voting Behavior

To uncover the individual-level effects underlying the aggregate effect on voting outcomes, we now turn to the analysis of individual voting behavior. Figure 2 depicts the proportion of votes or approvals for the cooperative alternative for each society, voting method, and voter type, comparing both frames. That is, each double-bar aggregates the proportion of votes or approvals for C across all participants, comparing the cooperative and the competitive frame.

For conciseness, we summarize the main findings through random effects probit regressions on the probability of voting for alternative C, as reported in Table 2. The table contains separate regressions for each of the voter types. The effects documented in the regressions can also be confirmed by two-sample tests of proportions for each comparison, which we will mention whenever appropriate.

First, we observe that the coefficients for Society 2 are significantly negative for all voter types. Indeed, as can be seen in Figure 2, the cooperative option was overwhelmingly more supported in Society 1 than in Society 2, across all frames and voting methods. Aggregating across types, for PV and a cooperative frame, 37.14% of voters chose C in Society 1, vs. only 12.38% in Society 2. The comparison also holds for PV and a competitive frame (Society 1, 31.90%; Society 2, 10.48%), for AV and a cooperative frame (Society 1, 79.05% approvals; Society 2, 42.86%), and for AV and a competitive frame (Society 1, 75.71%; Society 2, 34.76%). Individual tests of proportions (two-sample, one-sided) show that the difference is significant at $p < 0.05$ for all twelve combinations of society, voting method, and voter type. This confirms that the two Societies are different in the expected direction, and in particular that cooperation is less attractive in Society 2. Table A.1 in Appendix A shows that the socially-efficient alternative D, which favors a majority of Efficiency Winners in Society 2 but not in Society 1, received larger support in the former compared to the latter, across all voter types.

Second, the support for C is larger for AV compared to PV across all types, as evidenced by the significantly positive coefficients for Approval Voting in the regressions. This is a mostly mechanical effect, as, under AV, voting for an alternative does not detract from the possibility of voting for another, hence there are no strategic trade-offs (Brams and Fishburn, 1978). Section 3.3 below briefly reports on the number of approvals per voter in the experiment.

Our focus, however, is on the treatment effects, i.e. the effects of cooperative vs. competitive framing. The coefficient of the competition treatment is significant and negative for Type 3 voters, showing that a competitive frame decreases the support for the egalitarian option (or, conversely, a cooperative frame increases it) for this type of voters. Specifically, in Society 1, voters of Type 3 voted less often for the cooperative option C in the competitive frame (21.43%) than in the cooperative frame (34.39%). A similar difference is observed for Society 2 (5.71% in the competitive frame compared to 11.43% of votes for C in the cooperative frame), but the linear combination test (bottom of the table) misses significance ($p = 0.108$).[1] The reason for this effect is further clarified by Table A.1 in Appendix A, which shows that, for both societies, Type 3 voters voted more often for the efficient alternative D in the competitive frame than in the cooperative frame.

[1] The effect for Society 1 is also significant according to a two-sample test of proportions (one-sided as the hypothesis is directional; $z = 1.6967$, $p = 0.0449$). However, the test for Society 2 does not reach significance ($z = 1.2076$, $p = 0.1136$).

Vote for Option C	Type 1		Type 2		Type 3	
Competition	−0.152	0.205	−0.090	−0.238	−0.359**	−0.476*
	(0.194)	(0.260)	(0.249)	(0.313)	(0.183)	(0.256)
Soc.2	−1.600***	−1.469***	−0.836***	−0.894***	−1.436***	−1.414***
	(0.170)	(0.223)	(0.152)	(0.208)	(0.163)	(0.209)
Competition × Soc. 2		−0.305		0.117		−0.051
		(0.296)		(0.287)		(0.288)
AV (Approval Voting)	1.298***	1.515***	1.787***	1.705***	1.330***	1.223***
	(0.160)	(0.224)	(0.181)	(0.229)	(0.159)	(0.204)
Competition × AV		−0.419		0.179		0.233
		(0.291)		(0.304)		(0.286)
Constant	−0.292*	−0.471**	−0.466**	−0.397*	−0.405***	−0.355**
	(0.162)	(0.187)	(0.200)	(0.219)	(0.155)	(0.174)
Comp.+Comp.×Soc.2		−0.100		−0.122		−0.527
		(0.335)		(0.340)		(0.328)
Observations	560	560	560	560	560	560

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Random effects probit regressions on the probability of of voting for (or approving of) the egalitarian alternative (C) across voters' types.

These effects, however, are absent for voters of Types 1 and 2, in both societies. The picture that arises is the following. A competitive frame, compared to a cooperative one, shifts voter support away from egalitarian alternatives and toward selfish, payoff-maximizing ones, but only if voters have a "common-good" justification for this shift. Recall that the difference between Type 3 voters and other voters is that, for the former, the selfish payoff-maximizing option is also the efficient option. That is, Type 3 voters can justify (maybe implicitly and even unconsciously) switching to their payoff-maximizing alternative because it also favors the common-good in terms of aggregate payoffs. Type 1 and 2 voters could of course also prefer the efficient alternative to the egalitarian one due to this argument, but, for them, the efficient alternative is *not* payoff-maximizing. That is, the shift is due to the fact that D is payoff-maximizing, and not to the fact that it is payoff-efficient for the group.

One could ask whether the shift to D occurs because it is payoff-maximizing or merely because it is better (for a specific voter type) than the egalitarian alternative C. Our data suggests that the reason is that D is payoff-maximizing. Recall that the difference between societies is that Type 1 voters are Efficiency Winners in Society 2, i.e. they are better off under the efficient outcome than in the egalitarian one. Thus, these voters could also justify supporting the efficient alternative in terms of the common good, and this would benefit them compared to the egalitarian alternative. The key difference to Type 3 voters, however, is that the efficient alternative is better for them than the egalitarian one, but it is *not* the (selfishly) payoff-maximizing one. However, in Society 2, voters of Type 1 do not vote less often for alternative C under the competitive frame,

as shown by the non-significant linear combination test at the bottom of the table (PV; 7.14% vs. 7.14%; two-sample test of proportions, one-sided, $z = 0.000, p = 0.500$).

The discussion above refers to Plurality Voting. For Approval Voting, however, approving of one option does not come at the cost of having to withdraw approval from another option. Hence, the method has been often argued to be more robust, in particular in terms of strategic behavior (Brams and Fishburn, 1978, 2005; Wolitzky, 2009; Alós-Ferrer and Buckenmaier, 2019). Further, the shift towards group-payoff-maximizing alternatives might correspond to ingroup bias, that AV has been shown to reduce (Baron et al., 2005). Indeed, we find no significant differences in the percentages of approval of alternative C (all tests of proportions $p > 0.16$), except for Type 1 in Society 2. Voters of this type approve of C 37.14% of the time in the cooperative frame, vs. only 21.43% in the competitive frame (two-sample test of proportions, one-sided, $z = 2.043, p = 0.0205$).[2]

3.3 Acceptance threshold

Most voting methods, including PV, are social choice functions which formally map preferences into outcomes. In contrast, AV is a ballot aggregation function which directly aggregates choices. The difference is important, because all social choice functions are vulnerable to strategic behavior (manipulable; Gibbard, 1973; Satterthwaite, 1975), but AV has been argued to at least partially escape manipulability (Brams and Fishburn, 1978; Alós-Ferrer and Buckenmaier, 2019). However, this creates a difficulty. Assuming sincere voting, every social choice function uniquely translates (strict) preferences into ballots. This is not true for AV, because whether a voter approves of her most-preferred alternative only, or the two most-preferred ones, or the five most-preferred ones, remains her choice. In other words, voters also have to decide on the *acceptance threshold*, and there is no clear theoretical basis for this decision. This is a well-known criticism of AV, which has been argued to produce arbitrary results because of this (Saari and Van Newenhizen, 1988). It is hence important for research on AV to study the empirical determinants of the acceptance threshold in AV. For this reason, and even though this is not the main focus of our contribution, we briefly report on this data here.

We remark that previous work (Alós-Ferrer et al., 2021) found that payoff valence (whether payoffs are framed as gains or losses) influences the acceptance threshold in AV, with a loss framework resulting in lower numbers of approvals. This effect is in line with the "do-no-harm" principle (Baron, 1995; Royzman and Baron, 2002), in the sense that voters might be reluctant to administer losses through an explicit action and thus refrain from approving alternatives harming other voters. Thus, it was reasonable to explore whether other forms of framing, as the one considered here, might also have an effect on the number of approvals. In particular, it would be reasonable to expect

[2]Type 1 voters in Society 2 also approve of D more often in the cooperative frame (70.00%) than in the competitive frame (58.57%; two-sample test of proportions, one-sided, $z = 1.4111$, $p = 0.0791$).

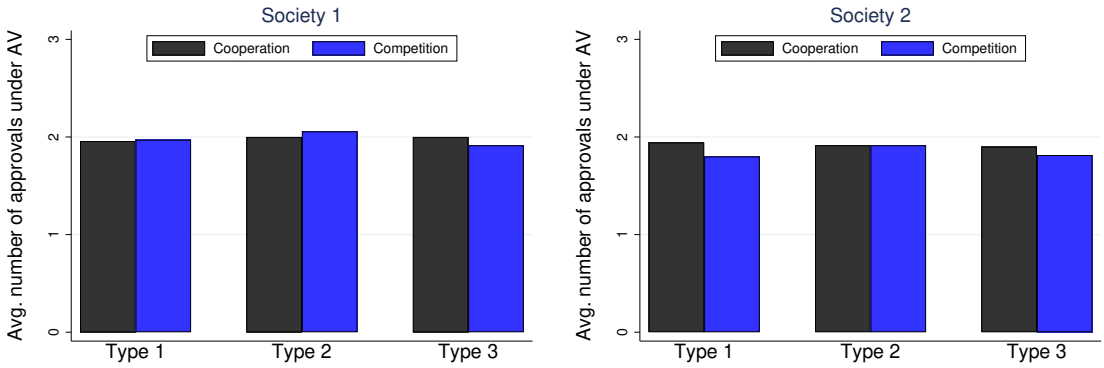

Figure 3: Average number of approvals per ballot in Society 1 (left) and Society 2 (right).

that framing the election as a cooperative procedure increased the number of approvals compared to a competitive frame.

This was not the case. Figure 3 displays the average number of approvals by treatment, society, and voter type. The number of approvals per ballot was not significantly different under cooperation than under competition, as reflected by non-parametric Mann-Whitney-Wilcoxon tests. This holds for Society 1 (Type 1, cooperation 1.96 vs. competition 1.97, $z = -0.080$, $p = 0.9721$; Type 2, 2.00 vs. 2.06, $z = -0.513$, $p = 0.6105$; Type 3, 2.00 vs. 1.91, $z = 0.599$, $p = 0.5454$) and Society 2 (Type 1, cooperation 1.94 vs. competition 1.80, $z = 1.190$, $p = 0.2368$; Type 2, 1.91 vs. 1.91, $z = -0.144$, $p = 0.8928$; Type 3, 1.90 vs. 1.81, $z = 0.741$, $p = 0.4617$).

4 Conclusions

We show that framing an election in terms of competition instead of cooperation reduces the chances that cooperative, egalitarian alternatives are elected. The analysis of individual behavior shows that the effect mainly comes from voters whose (group-)payoff-maximizing option is also payoff-efficient, i.e. maximizes aggregate payoffs for the entire society. However, this shift does not occur for voters whose payoff-maximizing option differs from the payoff-efficient one. That is, the shift is not due to an enhanced preference towards payoff efficiency, but rather towards selfish payoff maximization, possibly related to ingroup bias. In other words, a competitive frame induces voters to shift support from egalitarian alternatives towards selfish ones, but only if they can (self-)justify this shift on the grounds that the selfish alternative benefits the common good.

This effect, however, is absent if the voting method is changed to Approval Voting instead of simple majority (Plurality Voting). This is in line with previous results showing that Approval Voting reduces ingroup bias (Baron et al., 2005) and that it is more robust than Plurality Voting to gain-loss framing (Alós-Ferrer et al., 2021) and other manipulations (time pressure; Alós-Ferrer and Garagnani, 2022). In this sense,

our data contributes to the growing literature suggesting that shifting to alternative voting methods might be beneficial for society.

For Plurality Voting, our results are particularly striking because our framing manipulation was minimal, reducing to whether voters were referred to as "cooperators" or "competitors." In actual group decisions, an ingroup vs. outgroup frame might often be particularly strong, e.g. when the decision affects ideological or belief-based positions. Thus, our work suggests a detrimental psychological channel leading to less-cooperative outcomes when the social or political discussion emphasizes thinking in terms of competition among different groups.

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Competing Interests Statement

The authors have no competing interests.

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APPENDICES

A Support for the Efficient Alternative

Our focus is on the effects of framing on the support for the cooperative alternative (alternative C in our experimental implementation). For completeness and ease of reference, this Appendix reports the analogous analyses on the efficient alternative (D).

A.1 Voting Outcomes

Figure A.1 depicts the proportion of times that alternative D was a winner of the election by treatment, society, and voting method. In contrast to alternative C (as reported in the main text), there are essentially no effects of framing for electoral outcomes of alternative D. Only for Society 2 under PV the proportion of elections where D was a winner was significantly larger under competition (77.78%) than under cooperation (63.89%; two-sample test of proportions, $N = 144$, $z = 1.2964$, $p = 0.0974$). The other comparisons are not significant.

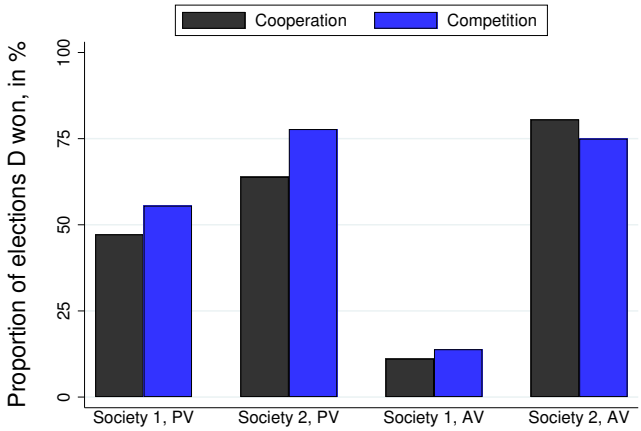

Figure A.1: Proportion of times alternative D won the election by treatment (cooperation vs. competition), society (Society 1 vs. Society 2), and voting method (PV vs. AV).

A.2 Individual Voting Behavior

Figure A.2 shows the proportion of votes or approvals for the efficient alternative for each society, voting method, and voter type, comparing both frames. That is each double-bar aggregates the proportion of votes or approvals for D comparing the cooperative and the competitive frame.

Table A.1 presents random effects probit regressions on the probability of voting for alternative D. This alternative was generally more supported in Society 2 than in Society 1, across voting methods and treatments. Aggregating across types, for PV and a cooperative frame, 24.76% of voters chose D in Society 1, vs. 35.71% in Society 2. The comparison also holds for PV and a competitive frame (Society 1, 30.00%; Society 2, 41.43%), for AV and a cooperative frame (Society 1, 45.71% approvals; Society 2, 67.62%), and for AV and a competitive frame (Society 1, 47.14%; Society 2, 62.86%).

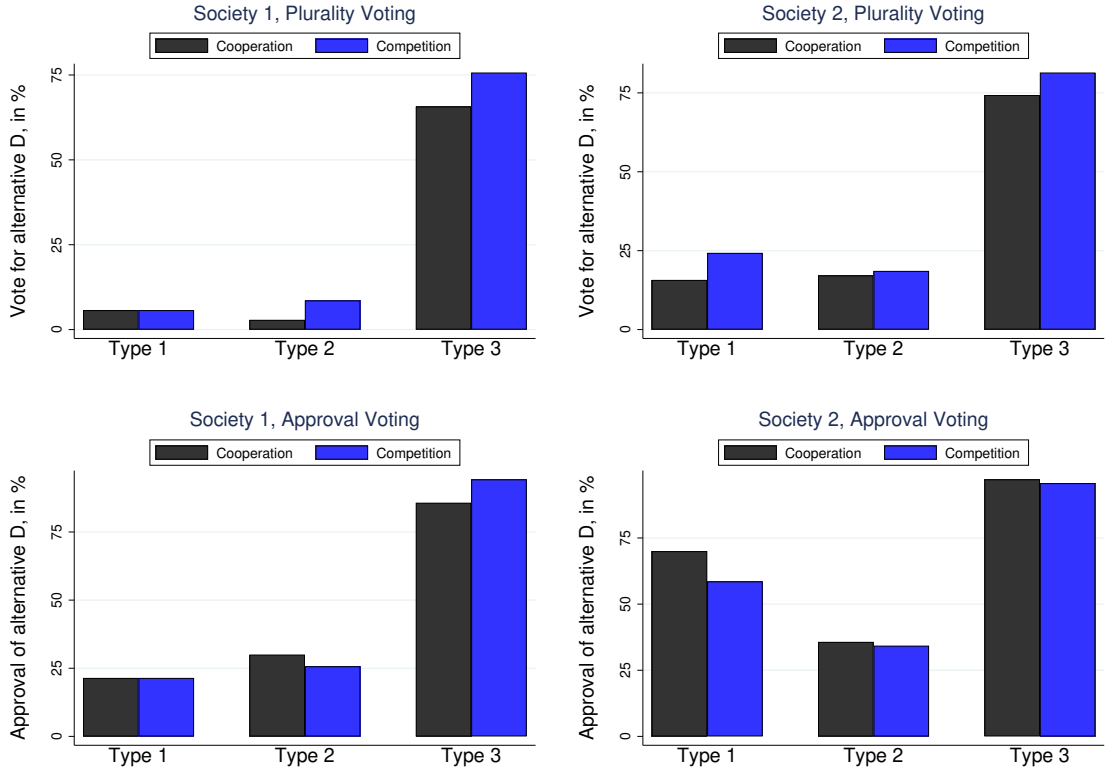

Figure A.2: Voters' support for the efficient alternative D by treatment (cooperation vs. competition), society (Society 1 vs. Society 2), voting methods (PV vs. AV) and voters' types.

As in the case of C, support for D is larger under AV than under PV, but this is mostly a mechanical effect since one can approve of several alternatives under AV. As for treatment effects, Type 3 voters in Society 1 voted more often for D under the competitive frame compared to the cooperative one (two-sample tests of proportions, one-sided: PV: 75.71% vs. 65.71%, $z = 1.3000, p = 0.0968$; AV: 94.29% vs. 85.71%, $z = 1.6903$, $p = 0.0455$).

Vote for Option D	Type 1		Type 2		Type 3	
Competition	−0.028	0.318	−0.009	0.254	0.396	0.558*
	(0.163)	(0.316)	(0.213)	(0.340)	(0.274)	(0.332)
Soc.2	1.150***	1.212***	0.484***	0.519**	0.458***	0.617***
	(0.150)	(0.210)	(0.146)	(0.207)	(0.172)	(0.235)
Competition × Soc.2		−0.112		−0.063		−0.345
		(0.280)		(0.288)		(0.340)
AV (Approval Voting)	1.202***	1.434***	0.950***	1.132***	1.318***	1.348***
	(0.151)	(0.217)	(0.157)	(0.224)	(0.211)	(0.272)
Competition × AV		−0.442		−0.353		−0.050
		(0.282)		(0.299)		(0.382)
Constant	−2.000***	−2.188***	−1.853***	−1.995***	0.580***	0.508**
	(0.201)	(0.256)	(0.225)	(0.272)	(0.216)	(0.231)
Comp.+Comp.×Soc.2		0.207		0.191		0.213
		(0.250)		(0.306)		(0.345)
Observations	560	560	560	560	560	560

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.1: Random effects probit regressions on the probability of voting for (or approving of) the efficient alternative (D) across voters' types.

B Experimental Instructions

General Instructions for Treatment Cooperation and [Treatment Competition]

Welcome! The overall duration of this experiment is approximately one hour. If you have difficulties understanding something now or during the experiment or if you have any questions, please raise your hand and remain seated. We will come to you to answer your question. It is important that you read the instructions and all the explanations on the screen carefully before you start making decisions.

During the experiment, it is forbidden to talk to other participants in the experiment or to communicate with them in any other way. Failing to comply will lead to the exclusion from any payments.

In the following, the general course of the experiment is explained. Today's experiment consists of **three decision-making parts and a subsequent questionnaire**.

In the three decision-making parts, you can earn **Experimental Currency Units (ECU)**. How many ECU you will earn depends on your decisions and decisions made by the other experiment participants. At the end of the experiment, your earnings in ECUs will be converted to Euros. The conversion of your ECUs to Euros will be made in the following way:

$$1 \text{ ECU} = 0.20 \text{ Euros} \quad \text{or} \quad 100 \text{ ECUs} = 20 \text{ Euros}.$$

You will receive the total amount in cash at the end of the experiment **anonymously**. On the next page, you will find further information on the experiment.

[Next Page] You have been allocated to a group of six people **(cooperators)** [**(competitors)**] that have to jointly decide how to allocate the available resources among the **cooperators** [**competitors**] of the group. The decision will be made by voting. Therefore, voting decisions will determine how the available resources are shared.

General procedure:

In each of the three parts you are going to take part in several elections. You are going to decide with five other voters about the outcome of the election. The voting method differs in each decision-making part and will be explained to you in detail on-screen. Each time, there will be 4 alternatives to choose from: A, B, C, and D.

Voting decision:

Your task is to choose between the alternatives in each round according to this election's method. Please notice that you have to make a decision and are not allowed to abstain. Thus, you have to fill a valid ballot in each round.

Payoffs:

At the end of the experiment, **one out of all the rounds will be chosen randomly, and this voting result will be implemented. Thus, your payment will be determined by the winning alternative in the chosen round. It does not matter if you have voted for the winning alternative or not.**

Layout on screen:

On the screenshot below [Figure B.1 or Figure B.2, respectively], you can see how a typical decision-making screen looks like (depending on the voting method, the screen may differ). The numbers on the screenshot are only an example to illustrate some particular elements. The exact numbers on the screen during the experiment will differ

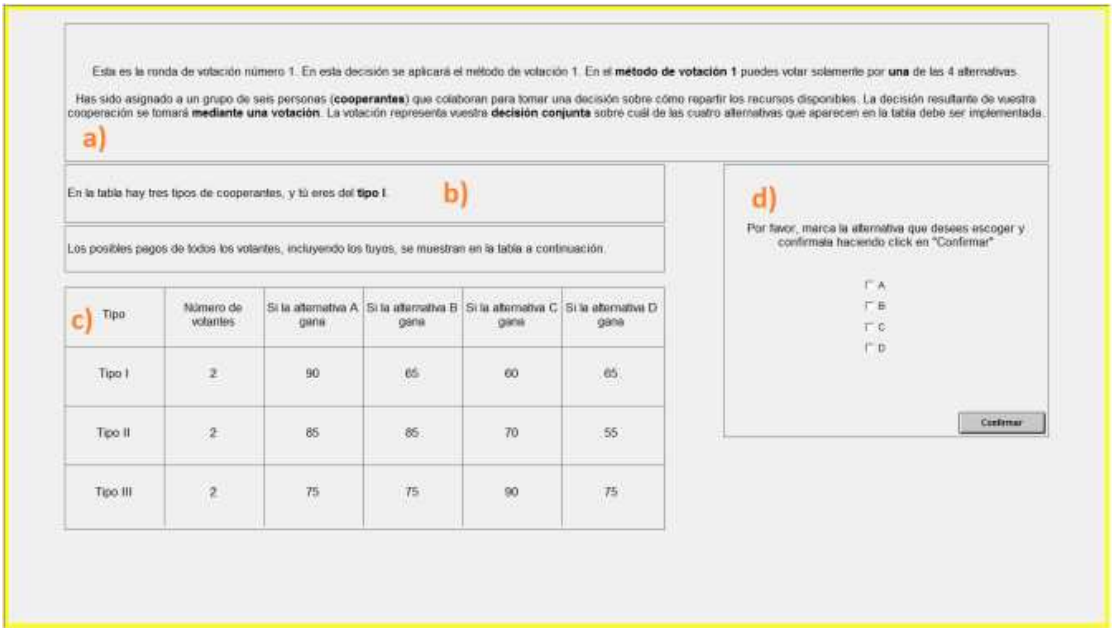

Figure B.1: Screenshot for the cooperation frame of the original Spanish version.

from the numbers in the example below. However, the information for the experiment will be displayed as in the example.

• In box "a," on the upper edge of the screen, you see information about the current round. In addition, you are informed about which part of the experiment you are in, and the rules of the voting method that apply to the current round are explained to you again.
• In box "b" you are informed about your type for the current round.
• Table "c" displays the details of the payoffs for each type in the current round. In this example your potential payoffs are the ones of type I.
• In box "d" you can see that the ballot you have to use contains all the alternatives. Depending on the voting method, the ballot can vary a bit. Please fill in the ballot according to the voting method used in the current round. To confirm your decision click on "confirm."

How to read your payoff profile:
In this example you would receive the following payment in ECUs:
If alternative A wins, you earn 90 ECUs.
If alternative B wins, you earn 65 ECUs.
If alternative C wins, you earn 60 ECUs.
If alternative D wins, you earn 65 ECUs.

If, for instance, alternative C wins the election, you will earn 60 ECUs. Your payment does not depend on whether you have voted for C or not. Only the winning alternative matters for your payment in ECUs. Please keep in mind that the possible payoffs in this example will differ from those in the experiment.

How to read the payoff profile of all six voters:
In Table c, the payment profiles of all the six voters are displayed. This includes your payoff profile as well. The first column of the table ("type") tells you the type of the voters, and the potential payoffs for every type are specified in the corresponding row. The second column ("number of voters") tells you how many voters of every type there

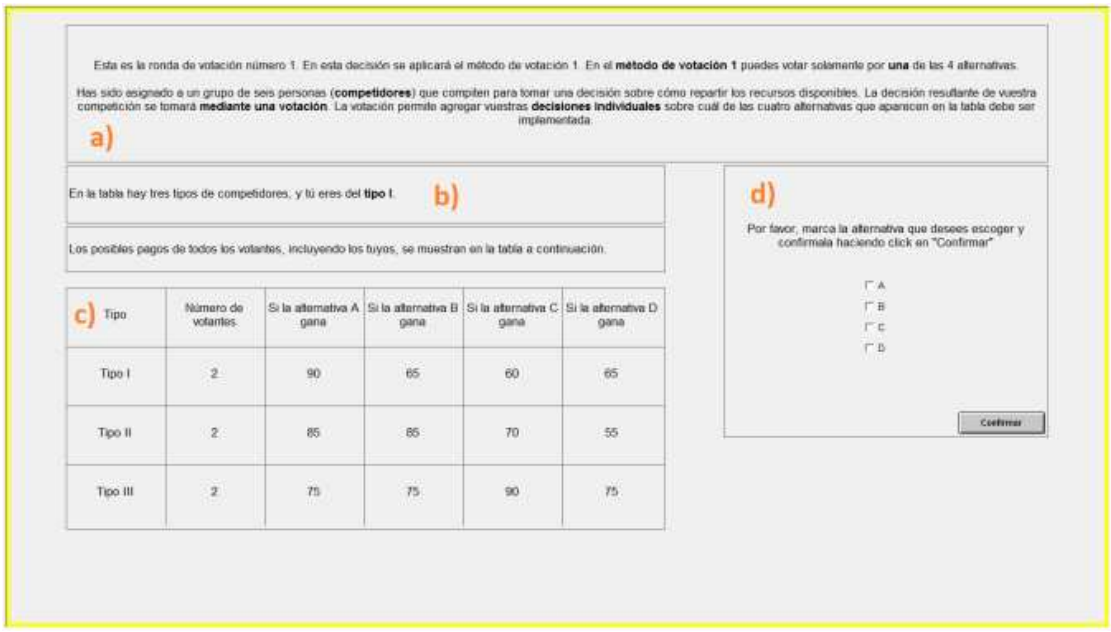

Figure B.2: Screenshot for the competition frame of the original Spanish version.

are. In this example, you are of type I. Therefore, your potential payoffs are displayed in the first row. In addition, there are other 2 voters whose payoffs are displayed in the second row and 2 voters whose payoffs are displayed in the third row.

In this example, the first row of the table tells you that the 2 voters of type I would get 90 ECUs if alternative A wins the election, 65 ECUs if B wins, 60 ECUs if C wins, and 65 ECUs in case alternative D wins the election. The second row of the table tells you that the 2 voters of type II would get 85 ECUs if alternative A wins the election, 85 ECUs if B wins, 70 ECUs if C wins, and 55 ECUs in case alternative D wins the election. The third and last row tells you that the 2 voters of type III would get 75 ECUs if alternative A wins the election, 75 ECUs if B wins, 90 ECUs if C wins, and 75 ECUs in case alternative D wins the election.

As you can see, there are 6 voters in total. The table displays the possible payoffs of all the voters: **Your own possible payoffs, as well as the payoffs of the other 5 voters** who have to decide jointly with you. Please keep in mind that the payoffs in the experiment will differ from the ones in this example.

Control Questions:

Please answer the following comprehension questions. If you have any questions, please raise your hand and remain seated. We will come to you to answer your question.

QUESTION 1: The payment in ECUs I am going to receive in every voting round depends on: (Please circle the correct response)
a) On which alternative wins the election.
b) On the alternative I voted for.

QUESTION 2: The total payoff I receive for my decisions is computed: (Please circle the correct response)
a) By collecting the payoffs of every decision.
b) At the end of the experiment, the round that will be implemented is randomly determined. I will receive my payoffs according to the result of this round.

QUESTION 3: I know the possible payoffs of all the other voters. True or false?
a) True b) False

QUESTION 4: Consider the possible payoffs in the screenshot displayed in the example on page *[page]*. How many voters have the same possible payoffs as you? (apart from yourself)
a) Two b) One

QUESTION 5: Consider again the possible payoffs in the screenshot displayed in the example on page *[page]*. If these are the payoffs of all the voters, and you are of type II, how many ECUs would you get if alternative C wins the election?
a) 60 b) 70 c) 90