

## **Selfish and Cooperative Voting: Can the Majority Restrain Themselves?**

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### **Abstract**

At every scale from small committees to national elections, voters face tradeoffs between self-interest and the common good. We report three experiments in which participants vote for policies with real payoffs at stake. We manipulate self-interest by randomly assigning participants to two groups in society with different policy payoffs. Participants in the majority group are confronted by a simple choice between a policy that is better for themselves or a policy that is best for society. Overall, we find a clear effect of self-interest: Participants are more likely to choose the policy that earns them more money, compared to participants in the other group, even when the policy is detrimental to the common good. Simultaneously, we observe considerable levels of cooperative voting among participants in the majority, ranging from 47%-79% across different payoff regimes. We discuss the implications of coexisting selfish and cooperative motives for multiple literatures about voting behavior.

## Introduction

How do voters make tradeoffs between their own self-interest and the greater good of society? This question is fundamental to multiple strands of political science. For instance, theories about why citizens vote at all, with little chance of being decisive, often point to cooperative motives such as fulfilling civic duty or valuing other citizens' welfare (Downs 1957; Edlin, Gelman, and Kaplan 2007; Meehl 1977; Riker and Ordeshook 1968). Research on voters' choices has studied sociotropic voting in which citizens consider not only their own interests and circumstances but also the well-being of the whole nation (Kinder and Kiewiet 1981). At the same time, traditional models in political economy typically assume voters are selfish (Downs 1957; Ferejohn 1986; Meltzer and Richard 1981). For example, prominent models of redistribution assume voters will favor the tax rate that maximizes their own wealth (Acemoglu and Robinson 2006). In fact, some theorists argue that the origin of democracy lies in voters' selfish motives to maximize their own redistributive benefits (Acemoglu and Robinson 2000). Finally, classic political theorists and modern scholars alike have worried that selfish voting could undermine the benefits of democracy (e.g., Ferejohn 1986; Hamilton, Madison, and Jay 1788; Tullock 1959). Madison, Hamilton, and other drafters of the U.S. Constitution designed checks and balances on majority rule to protect minorities against selfish majorities.

Despite its centrality to multiple literatures, it is difficult to know whether voters are cooperative, to what extent, and under what conditions. A large literature addresses this question by using observational survey data to compare citizens' circumstances to their political behavior (Kinder and Kiewiet 1981; Mansfield and Mutz 2009; Sears et al. 1980). These studies show intriguing patterns that point to voters' sociotropic motives. However, the correlational nature of observational methods makes it difficult to disentangle cooperative motives from many other sources of behavior. For instance, what might appear to be selfish or cooperative could instead reflect a voter's uncertainty, ignorance, blame, or partisan loyalty (Campbell et al. 1960; Caplan 2007; Feldman 1982; Gomez and Wilson 2001).

Here we use methods from experimental economics to precisely control citizens' political incentives in order to get a clear look at selfish versus cooperative voting. Most important, we use economic games in which players vote for policies that have clear monetary payoffs. This allows us to directly manipulate a voter's self-interest by randomly assigning participants to two groups in society with different policy payoffs. Participants in the majority group are confronted by a simple choice between a policy that has greater payoffs for themselves or a policy that has greater aggregate payoffs for everyone in society.

We use this controlled environment to examine two main questions. First, very simply, do voters choose the policy that is best for themselves or the policy that is best for society as a whole? In all experiments, we recreate the situation that troubled Madison and Hamilton—a selfish majority can select a policy that benefits themselves at the expense of a minority and society as a whole. Second, we investigate whether citizens are more cooperative under a democratic institution of majority rule compared to other institutions, as has been suggested in previous research (Sears et al. 1980). We test whether the act of voting itself inspires greater cooperation in citizens' policy choices compared to two alternative institutions based on a lottery or a leader's decision.

### **Testing theories versus generalizing results**

We make a few preliminary clarifications. First, we do not propose a new theory about voting but instead report experimental tests of two broad, opposing theories in political science. We do not claim that these experiments replace previous research using other methods, nor do we claim they are entirely novel. But we do think they address the longstanding question of cooperative voting with unusual clarity, due to the use of transparent policy incentives and because we designed them with this specific purpose in mind. To this end, our experiments zoom out to concentrate on the broad opposition between selfish and cooperative voting, while for the moment collapsing across multiple variations within each category, such as the many different types of social preferences that have been studied in the cooperation literature (reviewed in Camerer 2003).

Second, we do not claim or speculate that the results of these experiments generalize to the American electorate, American legislators, or any other specific population, nor do we claim that they are externally valid with respect to the wide variety of voting institutions within and across societies. This is important to clarify because much research in political science has the primary goal of generalizing from a sample to a population, such as polling public opinion or assessing an intervention in a specific nation at a certain point in time. However, experimental research in political science and the broader sciences often aims instead to *test theories*, which is a different aim that should not be confused with efforts to generalize results.

In experimental sciences broadly, some of the most revealing tests occur under artificial conditions and in unrepresentative samples, such as studying particles in supercolliders, chemical reactions in test tubes, planes in wind tunnels, genes in fruit flies, medicine in zebrafish, memory in maze-running rodents, or depth perception in visual illusions. In fact, the traditional hypothetico-deductive method of science is based on hypotheses and tests, rather than sampling and generalization (many even argue that generalizing results is never logically valid due to the well-known *problem of induction*; see Popper 1959). For example, when Newton aligned two prisms in a beam of light, he was testing theories about light, rather than estimating a parameter in a specific population; when Tolman studied rats in changing mazes, he was testing theories about cognition, rather than estimating a population's behavior. The same is true of many social science experiments including economic games: Vernon Smith (1982) tested theories about markets and market bubbles, and in political science, Elinor Ostrom tested theories about regulating common pool resources—two examples of pioneering, Nobel Prize-winning research programs that leveraged artificial conditions and unrepresentative samples to gain insights into economic and political phenomena.

Like many scientific experiments, the primary goal of this research is not to generalize the results, but rather to test the predictions of theories within a rarefied model system. (For extended discussion of artificial conditions and unrepresentative samples in experimental political science, including thorough responses to persistent misunderstandings, see Druckman and Kam 2011; McDermott 2002; Morton and Williams 2010.)

### **Selfish versus cooperative voting**

Political scientists have studied cooperation in multiple aspects of voting including why citizens vote at all, which choices voters make, how democratic institutions are established, and

how voting can threaten minority interests. For instance, citizens might make a costly effort to vote due to a cooperative motive like fulfilling their civic duty (Downs 1957; Riker and Ordeshook 1968). More recently, Edlin, Gelman, and Kaplan (2007) showed in a model that when citizens value other citizens' well-being, their willingness to vote scales with the size of the electorate because although they have less chance of being decisive in larger groups, the outcome will also affect more people.

If voting itself is a cooperative act, then it seems to follow that citizens' vote choices will also consider other citizens' welfare. Meehl (1977) used this point to argue that citizens are sociotropic, which he originally defined as being at least partially altruistic toward other citizens:

“I should not say altruistic, but something weaker, say sociotropic ... By *sociotropic* I mean taking some account—we needn't say exactly how much—of other persons' interests or, if you like, of the collective's interest.” (p.14, italics original)

In later work, the meaning of “sociotropic” became more narrowly attached to voting based on the performance of the national economy, in contrast to voting based on one's own financial success or failure, i.e., pocketbook voting (Kinder and Kiewiet 1981). Moreover, the meaning also shifted from sociotropic motives to sociotropic information with the idea that citizens could use the health of the economy as a heuristic cue for a leader's quality (Kinder and Kiewiet 1981).

Overall, this literature argues that self-interest plays a small role in citizens' vote choices, with larger roles played by sociotropic concerns and symbolic politics (Kinder and Kiewiet 1981; Mansfield and Mutz 2009; Sears et al. 1980). Caplan (2007) summarized, “Empirically, there is little connection between voting and material interests ... Voters typically favor the policies they perceive to be in the general interest of their nation” (pp.18-19). Similarly, Mansfield and Mutz (2009) wrote that, “self-interest enters into the formation of policy opinions only under very special and rare circumstances,” (p. 431), and further, “The list of failed attempts to observe the influence of self-interest in the formation of policy preference is by now quite lengthy” (p. 432). Moreover, Sears et al. (1980) suggested that people are even more cooperative in politics than in personal life: “political socialization teaches people to weigh most heavily the collective good when they don their ‘political hats,’ and to weigh their private good most heavily only when dealing with their personal affairs” (p. 681).

However, other research has challenged or tempered these claims. For example, in the area of immigration policy, when researchers targeted sectors at risk of economic threat or expanded measures of economic impacts, they found sizeable effects of self-interest on attitudes about immigration (Gerber et al. 2017; Maholtra et al. 2013). Similarly, other researchers have found effects of self-interest when voters are more sophisticated (Gomez and Wilson, 2001), when the policy stakes are clear (Chong et al. 2001), and when the notion of self-interest includes multiple psychological motives and perceptions, rather than only immediate financial interests (Aarøe and Petersen 2013; Petersen et al. 2014; Weeden & Kurzban 2014).

Meanwhile, the idea of sociotropic voting stands in contrast to political economy models that typically assume selfish voters (Acemoglu and Robinson 2006; Downs 1957, Ferejohn 1986; Meltzer and Richard 1981; Tullock 1959). For example, Acemoglu and Robinson (2000) argued that the very origin of democracy is poor citizens' pursuit of redistribution of wealth to themselves. However, some researchers have incorporated social preferences into models of

redistribution, arguing that this provides a better fit to cross-national patterns, namely that more equal societies tend to show greater redistribution (Benabou 2000).

Selfish voting is also a major concern in democratic theory. For example, Tullock (1959) showed how self-interested voters could favor inefficient policies, and Ferejohn (1986) argued that only sociotropic citizens can effectively exert electoral control over political leaders. Centuries before, James Madison famously argued in Federalist No.10, “When a majority is included in a faction, the form of popular government, on the other hand, enables it to sacrifice to its ruling passion or interest both the public good and the rights of other citizens,” and further that, “a pure democracy . . . can admit of no cure for the mischiefs of faction” (Hamilton, Madison, and Jay 1788). Similarly, John Adams (1787/1851) warned about the tyranny of the majority: “And that the desires of the majority of the people are often for injustice and inhumanity against the minority, is demonstrated by every page of the history of the whole world” (p. 48). The architects of the U.S. Constitution designed institutional safeguards to rein in selfish majorities—institutions that would be unnecessary if voters were not selfish.

These concerns are reinforced by modern world politics. Democratization has often failed or even stoked violence between factions when voters pursue their ingroup’s interests to the detriment of others in society (Mansfield and Snyder 2007; Reilly 2006; Snyder 2000). In response, policymakers in many new democracies have designed regulations for suppressing intergroup conflict such as banning ethnicity-based political parties and requiring parties to show broad support across segments and regions of society (Reilly 2006).

This review shows that multiple literatures in political science hinge on whether, how much, and when voters care about what is best for themselves versus best for society. Theories about why people vote, which choices they make, how much redistribution they favor, and whether new democracies will succeed, depend on the degree to which voters’ choices are selfish or cooperative. Previous research using various methods has drawn mixed and opposing conclusions (e.g., Gerber et al. 2017; Kramer 1983). We suggest that methods from experimental economics can offer a complementary approach to these questions due to their particular advantages for controlling incentives, testing causal theories, and distinguishing motives.

### **Experiments on cooperation**

A growing interdisciplinary field uses economic games to study cooperation in controlled experiments where payoffs are precisely known (reviewed in Camerer 2003). Researchers use variations on games such as the dictator game, ultimatum game, prisoner’s dilemma, public goods game, and common pool resource game to isolate and distinguish a variety of social motives (e.g., Camerer 2003; Dawes et al. 2007; McDermott, 2002; Ostrom 1990, 2006). Broadly, this literature shows that people’s behavior in groups is shaped by a variety of motives to cooperate, reciprocate, free ride, punish, reward, retaliate, and other social behaviors that researchers have carefully teased apart with clever experimental manipulations.

However, the mainstream literature on cooperation does not specifically study cooperative voting. Cooperation within a voting institution could differ in important respects from other forms. For instance, recall the above argument by Sears et al. (1980) that political decisions differ from personal ones. Methods like the dictator game might miss distinctive political behaviors, especially since cooperation is highly sensitive to social cues such as

ownership and different types of relationships (DeScioli and Krishna 2013; Hoffman et al. 1994; List 2007). Hence, experiments on cooperative voting should embody the basic features of these decisions, including an electorate of citizens who make a collective choice by casting ballots.

The experimental literature on cooperation specifically in voting is more limited. Several experiments have examined different types of social preferences, such as distinguishing sociotropic motives from concerns for the local community (Rogers and Tyszler, 2016), or distinguishing motives for equity, reciprocity, and competition (Sauermann and Kaiser, 2010). Another study looked at participants' social preferences in the lab, using the dictator game, to predict their turnout in actual elections (Dawes, Loewen, and Fowler 2011; Fowler 2006). Interestingly, participants who gave more money to a partner in the lab reported greater turnout rates (Fowler 2006), and subsequent work found that cooperation in the lab predicted turnout whereas equity motives to reduce payoff differences did not (Dawes et al. 2011). This work helps bridge lab and observational research, but its mixed methods also sacrifice control because we do not know what payoffs participants attributed to the election's possible outcomes; turning was cooperative if voters intended to promote society, but it could also reflect competition, spite, or other motives depending on how citizens perceive everyone's payoffs.

Other experiments have used economic games in which participants vote for different policies (reviewed in McDermott 2002; Palfrey 2016). However, this work has largely focused on other questions besides cooperation. For instance, one experimental literature examines whether voters faced with an array of alternatives tend to elect the Condorcet winner (if there is one), which is an alternative that defeats all others in a one-on-one majority-rule vote (Fiorina and Plott 1978). Another literature examines strategic voting when voters have three or more alternatives that they evaluate in a series of laboratory elections (Eckel and Holt 1989). A third literature examines legislative bargaining in which participants act as legislators who vote on proposals to divide a constant sum of payoffs (Diermeier and Morton 2005; Frechette, Kagel, and Lehrer 2003). Other experiments have examined voter participation in elections (Großer and Schram 2010) and how successful voters are at aggregating information to make better choices (Battaglini, Morton, and Palfrey 2007, 2010; Guarnaschelli, McKelvey, and Palfrey 2000; Ryan 2011, 2013). Differing from this previous research, the present experiments focus specifically on voter cooperation—how voters make tradeoffs between their own payoffs and others' payoffs.

### **The policy game**

We designed a policy game for studying citizens' collective decisions in experiments. We constructed the game to be as simple as possible while embodying the most basic features of a society's collective choices. It is modeled in the spirit of simple 2x2 games such as the prisoner's dilemma or hawk-dove game, which have provided invaluable conceptual and experimental tools in the social sciences (e.g., Camerer 2003; Schelling 2010).

The policy game is also 2x2 except that it involves 2 groups in society that collectively choose between 2 policies. Society is composed of  $n$  citizens who can be divided in any proportion into two mutually exclusive groups. Each citizen chooses one of two policies. Each policy specifies separate payoffs for citizens in each group. An institution sets an aggregation rule that maps citizens' choices into a single policy for everyone. The institution is an open parameter to fit multiple political systems: It could be majority rule, leadership in which one

citizen's choice is deterministic, a consensus rule with one policy as the default, and so on. This game represents the minimal case of a society's collective choice; two options are a prerequisite for choice and at least two groups are a prerequisite for diverging interests in society.

Table 1 shows an example of a policy game, which is the actual game used in Experiment 1. Society consists of two groups, artisans and farmers, that contain 6 and 4 players, respectively. Each player chooses between policies for building a road going north or a road going south. Each policy has separate payoffs for artisans and farmers; the north road yields (50, 50) payoffs for artisans and farmers, respectively, and the south road yields (65, 25). Moreover, the groups have divergent interests: Artisans earn greater payoffs from the south road and farmers earn greater payoffs from the north road. Further, the north road yields more equal payoffs and greater aggregate efficiency (500 vs. 490) than the south road. However, under majority rule, the larger artisan group could selfishly implement their payoff-maximizing policy to the detriment of the farmers.

Table 1  
A Policy Game

	Number	North road	South road
Artisans	6	50	65
Farmers	4	50	25

The parameters of the policy game can be varied to model a wide range of political environments. Researchers can independently vary the number of citizens in each group, the number of groups, the magnitude of payoffs at stake for each group, the institutional aggregation rule, and the equality and efficiency of each policy choice. Further, the labels of the groups, policies, and what the payoffs represent (money, food, health, reputation, etc.) can be varied to examine different decision-making contexts, as has been studied in traditional economic games (reviewed in DeScioli and Krishna 2013). For example, Battaglini and Mechtenberg (2015) used a similar game in experiments in which two groups of citizens chose between two policies. The larger group first selected the institution (majority rule or proportional rule) before everyone voted, and the results showed that the larger group was more likely to offer proportional rule when the smaller group could punish them.

At the same time, the policy game is obviously a stark simplification of political realities, just as the prisoner's dilemma and public goods game are simplifications of the complex phenomena they are used to study. The 2x2 policy game purposely models the simplest case and does not imply that other factors are not important. Many critical sources of political behavior and political dynamics are not represented in the game. For instance, a choice between only two policies does not allow majority preferences to cycle among alternatives, and it does not allow strategic voting or agenda-setting (Arrow 1950; Condorcet 1785; Munger and Munger 2015). Nonetheless, it is valuable to study the simplest cases to provide a foundation for adding incremental complexity, following the successes of analogous experimental work on cooperation.

### **The present experiments**

In a series of three experiments, we use the policy game to observe citizens' selfish and cooperative voting in a novel political environment with real payoffs at stake. In all games, one group faces the temptation of a policy that maximizes their own payoffs versus a policy that is better for society. We make these tempted citizens a majority so that they could actually implement a selfish policy in a majority-rule vote. We focus on these participants in the majority role and observe whether they vote selfishly or defer to the collective good.

To test the effects of self-interest, we compare participants who are randomly assigned to the majority to participants in the minority, who do not face a temptation since they earn most from the policy that has greater total payoffs for society (Table 1). The selfish voting hypothesis predicts an effect of role—the citizens in the majority will be more likely than those in the minority to choose the policy that maximizes the majority's payoffs. In contrast, the cooperative voting hypothesis predicts little or no effect of role because majority citizens will aim to achieve the collective good, aligning with the minority.

To test the effects of institutions, we manipulate the rule for aggregating citizens' choices. Recall that some researchers have argued that voting institutions elicit greater concern for the collective good (Sears et al. 1980). To test this idea, we compare voting to a lottery institution: Citizens write their choice on a ticket and one ticket is blindly selected to determine the policy. We chose a lottery as a baseline that is unlikely to evoke particular societal values. The cooperative voting hypothesis makes an additional complementary prediction about institutions, namely greater cooperation under voting than the lottery baseline, whereas selfish voting oppositely predicts less cooperation. In Experiments 2 and 3 we additionally compare to a leader institution in which one citizen is selected to decide for the group.

Finally, we vary the payoffs of the policy game across experiments to observe cooperative voting when different amounts of inequality and aggregate payoffs are at stake.

## Experiment 1

### Methods

We recruited participants online using Amazon's Mechanical Turk (Berinsky, Huber, and Lenz 2012). We excluded 13 participants for failing the comprehension check, yielding a sample of  $n = 287$  participants (41% female, age:  $M = 34$  yrs,  $SD = 11$  yrs). Participants earned 50 cents for completing the survey and could earn bonus money from the game ranging from 25 to 65 cents depending on participants' policy choices. These game payoffs are considered relatively substantial in the Mturk market and are similar to other economic games in brief online studies (e.g., Amir and Rand 2012; DeScioli and Krishna 2013; Thomas et al. 2014; Thomas et al. 2016).

Each participant was assigned to a group of 10 participants to make a collective choice based on a political scenario. Participants read that although the scenario was fictional, the other participants and the payoffs were real. Their payoffs from the game would be paid as Mturk bonuses, one cent per gold piece. Participants read a scenario about a village of artisans and farmers with an illustration of the group's composition and a table of policy payoffs (Figure 1).

We described the policy game to participants using a concrete scenario, rather than purely abstract language, to make the game accessible, easy to understand, and consistent with the



social context under study, namely a society's collective choice (for similar scenario-based economic games, see also, DeScioli and Krishna 2013; Thomas et al. 2014; Thomas et al. 2016). At the same time, we created a relatively neutral and unfamiliar political context by using labels (artisans or farmers, north or south) that do not refer to factions or issues in contemporary politics. Even so, the basic dilemma is a plausible political problem; the artisan and farmer factions are even reminiscent of Madison and Hamilton's historic disagreement about agrarian and manufacturing interests in the developing United States.

The scenario read:

*You live in a small village where the main industries are farming wheat and making clothing. The village has 10 people: 6 Artisans who weave clothing and 4 Farmers who grow wheat.*

*The village is deciding whether to build a new road going North or a new road going South. The road to the North would increase trade for clothing and wheat: Each Artisan and Farmer gains 50 gold. The road to the South would increase trade for clothing more than wheat: Each Artisan gains 65 gold and each Farmer gains 25 gold. The earnings are summarized in this table:*

The Village's Decision (each person's earnings in gold/cents)

	Number	North road	South road
Artisans	6	50	65
Farmers	4	50	25



Figure 1. The payoffs table and illustration of the village's composition that accompanied the scenario text.

Participants were randomly assigned to either the voting or lottery condition. In the voting condition, participants read:

*The village will make the decision by voting and selecting the choice with the most votes. Each village member will privately write their choice of North or South on a ticket and put their ticket in a box. One person will count the votes and the village will build the road that receives the most votes. (A tie will be settled by a coin flip.)*

In the lottery condition, they read:

*The village will make the decision by blindly drawing a ticket from a box. Each village member will privately write their choice of North or South on a ticket and put their ticket in a box. One person will blindly choose a ticket from the box and the village will build the road that is selected on the chosen ticket.*

Next, participants learned that their role was artisan or farmer, which was randomly assigned (in a 6 to 4 ratio). Participants made their choice by selecting either the north road with equal payoffs or the south road with higher payoffs for artisans. Participants then explained their decisions, answered a comprehension question, completed demographic items, and made general comments.

Participants were paid after completing the survey. To determine payoffs, we randomly sorted participants into groups of ten within the voting or lottery condition. (To make even groups of 10, a few participants were included in two groups and paid based on one of them.) The outcome of the majority-rule vote or lottery determined their bonus payments.

From a game theory perspective (assuming payoff-maximizing players), for artisans the policy choice of south weakly dominates north for majority rule and strictly dominates north for a lottery. Note that majority rule only allows weak dominance, not strict, because a voter's choice might not be decisive so they will be indifferent for some combinations of other voters' choices.

The selfish voting hypothesis predicts that participants randomly assigned to the artisan role will choose their payoff-maximizing policy, the south road, more often than participants assigned to the farmer role. The cooperative voting hypothesis predicts that artisans and farmers will both choose the policy that is best for society, the north road, and further that artisans will show greater cooperation in a voting institution compared to a lottery institution.

## Results

Figure 2 shows the results. In the voting condition, 64.3% of artisans chose the north road with equal payoffs, and 96.5% of farmers chose the north road, showing a significant effect of role,  $p < .001$ , Fisher's exact test. Thus, the artisans, who were tempted by higher payoffs, were less likely to choose the policy that is best for society than the farmers, whose interests were aligned with society. Nonetheless, despite being less likely than farmers to do so, more than half of artisans still chose the road that was best for society ( $p < .05$ , binomial test against 50%).

In the lottery condition, 59.3% of artisans chose the north road, and 98.3% of farmers chose the north road, showing a significant effect of role,  $p < .001$ , Fisher's exact test. Unlike the voting case, the proportion of artisans who chose the best road for society did not statistically differ from chance ( $p = .11$ , binomial test against 50%).

Turning to the effect of institution, we find that artisans' choices in the voting condition did not differ from the lottery condition,  $p = .53$ , Fisher's exact test. Similarly, farmers' choices in the voting condition did not differ from the lottery condition,  $p = .61$ .

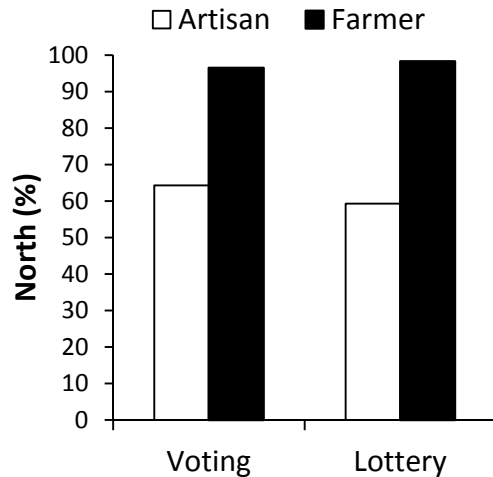


Figure 2. Participants' choices of the north road with equal payoffs in the voting condition for artisans ( $n = 84$ ) and farmers ( $n = 57$ ), and in the lottery condition for artisans ( $n = 86$ ) and farmers ( $n = 60$ ).

### Discussion

Overall, we observed a textured mix of selfish and cooperative voting among participants in the artisan role who faced a selfish temptation. The effect of randomly-assigned role, artisan or farmer, shows that self-interest shaped artisans' vote choices. Over a third of artisans voted for the policy that was better for themselves instead of choosing what was best for society, differing markedly from the farmers, whose interests were aligned with society. At the same time, however, more than half of artisans voted cooperatively for the policy that was better for society. Hence, in addition to self-interest, cooperation also shaped artisans' choices. Last, the institution of voting did not boost citizens' cooperative tendencies compared to the lottery baseline.

These results show that selfish voting is not as rare or empirically elusive as previously claimed by Sears et al. (1980), Kinder and Kiewiet (1981), Caplan (2007), Mansfield and Mutz (2009), and others. In our very first experiment in a controlled political environment, where researchers can know and manipulate the payoffs, we observed a clear and substantial effect of self-interest on voters' choices. Moreover, the voting institution, despite potential associations with democratic values, did not increase citizens' cooperation, conflicting with the argument by Sears et al. (1980) that familiar political contexts inspire greater concern for the collective good.

Simultaneously, these results also challenge the common assumption in political economy models that voters are selfish. Indeed, a simple self-interest model predicts that all of the electorates in this experiment would settle on the south road that benefits the majority at the minority's expense. Yet, the frequencies in the present data show that this prediction would nearly always miss the mark—35% selfish voting implies that a 60% majority group would rarely sway an election in the selfish direction. This observation reinforces growing efforts to integrate social preferences into political economy models (e.g., Benabou 2000; Edlin et al. 2007).

## Experiment 2

Experiment 2 extends our observations of cooperative voting in three ways. First, participants in Experiment 1 might have been especially drawn to the policy with perfectly equal payoffs of (50,50), which could account for much of the artisans' cooperation. Experiment 2 breaks the symmetry by making the north payoffs (45,50) (Table 2) so they are asymmetric and also relatively disadvantage the majority, providing a potential justification for the majority's selfish choices. Additionally, we modified the south payoffs to reduce the inequality from an original difference of 40 in Experiment 1 to a difference of 20, with south payoffs of (55,35). With these changes, the aggregate payoffs are identical across the two conditions, 470 in both, although if participants value equality at all, then the north road is better for society as a whole. (We test this among impartial observers in a follow-up study, confirming that they judge the north road to be better for society as a whole. See Online Appendix.) Overall, these changes in payoffs are designed to make the selfish choice more tempting to artisans. We expect this to generally increase artisans' selfishness, but more important, it allows us to test whether with a greater temptation to be selfish, voting might promote more cooperation than a lottery institution.

Second, we add a new institution in a leader condition. One citizen is assigned to be the leader to make the choice on behalf of the group. All participants decide what they will choose if they are assigned to be the leader. This condition is mechanically identical to the lottery, but participants' choices are framed as a leader's decision that is announced to the group. This mimics the accountability of a leader's decision, distinguishing it from anonymous votes or lottery entries. This allows us to test whether participants who decide as a leader are more or less cooperative than under a voting or lottery institution.

Third, we add several post-experiment measures of participants' prior political attitudes: political party, political ideology, and egalitarianism. We selected these measures because of their prominence in political behavior and because they are closely connected to the equality of payoffs. Namely, Democrats, liberals, and egalitarians typically claim that they highly value greater equality in payoffs. We test whether they are in fact more likely to choose cooperative policies when their own payoffs are on the line.

### Methods

We recruited participants online using Mturk. We excluded 31 participants for either failing the comprehension check or omitting responses, yielding a sample of  $n = 421$  participants (42% female; age:  $M = 35$  yrs,  $SD = 12$  yrs). Participants earned 50 cents for completing the survey and could earn bonus money from the game.

The design of Experiment 2 is identical to Experiment 1 except for three changes. First, the payoffs were changed to reduce the differences in inequality between the policies (Table 2). Specifically, the north payoffs are now slightly greater for farmers, instead of equal; and the south payoffs still favor artisans but by 20, instead of by 40.

Table 2

The Village's Decision (each person's earnings in gold/cents)

	Number	North road	South road
Artisans	6	45	55
Farmers	4	50	35

Second, we added a condition with a leader institution; the relevant portion of the scenario read:

*One of the ten village members will act as the leader to make the decision. A respected elder from a neighboring village will appoint one person to be the leader. The leader will decide which road to build and announce the decision to the whole village.*

Participants answered which choice they will make if they are selected as the leader. They read that after completing the survey, one participant in their group would be selected to be the leader and their decision would determine the group's choice.

Last, participants completed an additional post-experiment survey about their political ideology, political partisanship, and egalitarianism (Online Appendix). Payment procedures were the same as Experiment 1. In the leader condition, one participant in each group was randomly selected to be the leader and their decision determined their group's bonus payments.

### **Results**

Figure 3 shows the results. In the voting condition, 47.1% of artisans chose the north road, and 91.1% of farmers chose the north road, showing a significant effect of role,  $p < .001$ , Fisher's exact test. Further, artisans' choices did not significantly favor either policy ( $p = .67$ , binomial test against 50%).

In the leader condition, 56.6% of artisans chose the north road, and 91.1% of farmers chose the north road, showing a significant effect of role,  $p < .001$ , Fisher's exact test. Again, artisans' choices did not significantly favor either policy ( $p = .27$ , binomial test).

In the lottery condition, 47.0% of artisans chose the north road, and 96.6% of farmers chose the north road, showing a significant effect of role,  $p < .001$ , Fisher's exact test. And again, artisans' choices did not differ significantly favor either policy ( $p = .66$ , binomial test).

We find no effects of institution on participants' choices. For artisans, the proportion choosing north did not significantly differ between voting and lottery, leadership and lottery, or voting and leadership, all  $ps > .20$ , Fisher's exact test. Similarly for farmers, the proportion choosing north did not differ between any pair of conditions, all  $ps > .20$ .

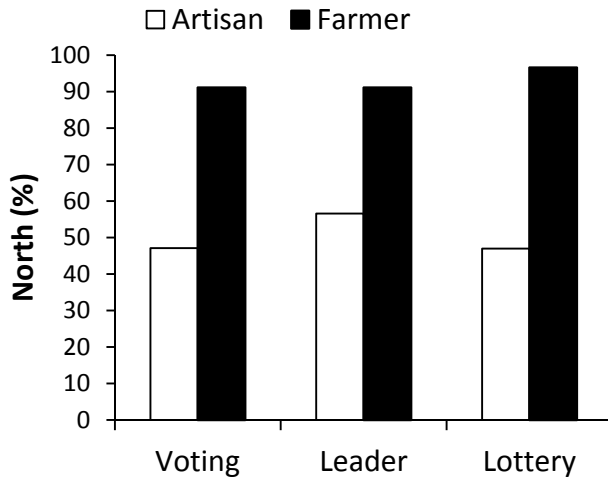


Figure 3. Participants' choices of the north road in the voting condition for artisans ( $n = 85$ ) and farmers ( $n = 56$ ), in the leader condition for artisans ( $n = 83$ ) and farmers ( $n = 56$ ), and in the lottery condition for artisans ( $n = 83$ ) and farmers ( $n = 58$ ).

**Prior political attitudes and impartial observers.** We found that participants' partisanship, political ideology, and egalitarianism did not predict their cooperative choices (see Online Appendix). This observation raises questions about how these measures relate to participants' choices when real payoffs are at stake. For instance, if egalitarianism really reflects individual differences in how citizens divide wealth, then it should predict a simple choice between policies with greater and less inequality. Finally, in an additional follow-up study, we found that participants who were impartial observers judged that the north road was best for society as a whole (Online Appendix).

### Discussion

As in Experiment 1, we found that participants' randomly-assigned self-interest shaped their vote choices. Specifically, the artisans were considerably less likely than farmers to vote for the north road, consistent with their respective payoffs. This again shows a potent effect of self-interest on voters' choices. Also similar to Experiment 1, we found no effects of institution—neither voting nor leadership altered artisans' cooperative choices compared to the lottery.

As expected, the revised payoffs tended to push artisans toward selfishness compared to Experiment 1, since they no longer had a perfectly equal option of (50, 50) and instead the more equal policy (north) favored the other group (45, 50). In the voting conditions, artisans chose north less often in Experiment 2 (47%) than Experiment 1 (64%),  $p < .05$ , Fisher's exact test. Even so, roughly half of artisans still made the cooperative choice, whereas simple self-interest predicts that no one would do so.

### Experiment 3

Experiment 3 examines cooperative voting when a majority's selfish choices would lead to considerably less aggregate payoffs. When there is a large divide between a citizen's own

interests and the collective good, citizens might be more cooperative, and political institutions might have greater influence over cooperation.

To investigate this possibility, we change the payoffs (Table 3) so that the south payoffs now drastically disadvantage the minority at (55,10). This means that the south has much worse aggregate efficiency, a total of 370 compared to 470 for the north road (27% greater). All other aspects of the experimental design, measures, and procedures are identical to Experiment 2.

Consistent with social preference models, we generally expect greater cooperation in Experiment 3 because there is greater efficiency at stake. More important, we aimed to test whether the different political institutions affect cooperation when there are considerable aggregate payoffs at stake.

### Methods

We recruited participants online using Mturk. We excluded 38 participants for failing the comprehension check, yielding a sample of  $n = 412$  participants (49% female, age:  $M = 36$ ,  $SD = 11$ ). The design of Experiment 3 is identical to Experiment 2 except the farmers' payoffs for the south road were decreased to 10 (instead of 35). The full payoffs are shown in Table 3.

Table 3  
The Village's Decision (each person's earnings in gold/cents)

	Number	North road	South road
Artisans	6	45	55
Farmers	4	50	10

### Results

Figure 4 shows the results. In the voting condition, 78.8% of artisans chose the north road with more equal payoffs, and 98.1% of farmers chose north, showing a significant effect of role,  $p < .001$ , Fisher's exact test. Although less than farmers, more than half of artisans still chose the road that was best for society ( $p < .001$ , binomial test against 50%).

In the leader condition, 89.2% of artisans chose the north road, and 96.1% of farmers chose north, which did not significantly differ,  $p = .20$ , Fisher's exact test. Again, artisans favored the north road ( $p < .001$ , binomial test).

In the lottery condition, 76.2% of artisans chose the north road, and 98.2% of farmers chose north, showing a significant effect of role,  $p < .001$ , Fisher's exact test. And again, artisans favored the north road ( $p < .001$ , binomial test).

Turning to the effect of institution, we find that artisans' choices of north did not differ between voting and lottery,  $p = .72$ , Fisher's exact test, or between voting and leadership,  $p = .09$  (although this comparison showed a marginally significant trend). However, artisans were more likely to choose north in the leadership condition than in the lottery condition,  $p < .05$ . Farmers' choices of north did not differ between any pairs of institutions, all  $ps > .60$ .

Finally, we found little or no effects of participants' political party, political ideology, or egalitarianism on their choices, even when considerable aggregate payoffs were at stake (for details, see Online Appendix).

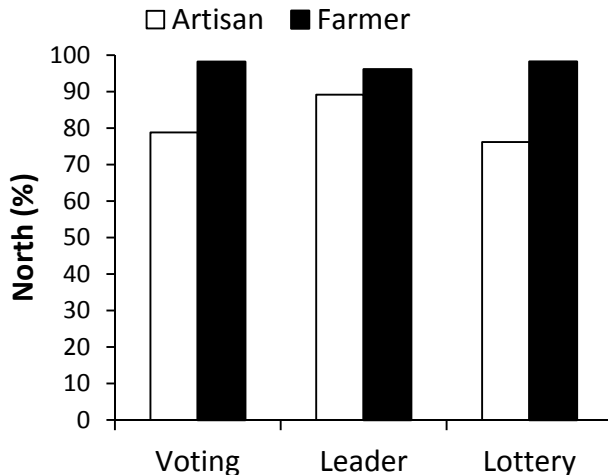


Figure 4. Participants' choices of the north road in the voting condition for artisans ( $n = 85$ ) and farmers ( $n = 54$ ), in the leader condition for artisans ( $n = 83$ ) and farmers ( $n = 51$ ); and in the lottery condition for artisans ( $n = 84$ ) and farmers ( $n = 55$ ).

## Discussion

In sum, we found that participants who were randomly assigned to the artisan role were less likely to choose the policy that was best for society than those in the farmer role, again showing the influence of self-interest on vote choices. Interestingly, with greater aggregate payoffs on the line, citizens were more cooperative under the leadership institution than the lottery institution. Also, artisans were generally more cooperative than in Experiments 1-2, as expected since greater aggregate payoffs were at stake. In the voting conditions, artisans chose north more often in Experiment 3 (79%) than in Experiment 1 (64%) or Experiment 2 (47%),  $ps < .05$ , Fisher's exact test. In absolute terms, Experiment 3 found that when sufficient aggregate payoffs were on the line, most artisans were willing to cooperate, selecting the policy that paid them less in order to benefit society as a whole.

## General Discussion

In all three experiments, we found unambiguous evidence of selfish voting, consistent with the warnings of Madison, Hamilton, and other Founders of the United States. Participants who were randomly assigned to the artisan role were more likely to choose the policy that earned more money for artisans, compared to participants in the farmer role who had the opposite interests. This selfish voting occurred even though the artisans' payoff-maximizing policy was worse for society as a whole and even when it was considerably worse. Crucially, however, we also observed substantial levels of cooperative voting. In Experiments 1 and 3, significantly more than half of artisans voted for the policy that earned less money for themselves in order to benefit others in society.

This coexistence of selfish and cooperative motives is broadly consistent with previous research on other forms of cooperation, such as sharing money in the dictator game, bargaining in the ultimatum game, and consuming reserves in the common pool resource game (reviewed in



Camerer 2003; Kagel and Roth 2016; McDermott 2002; Ostrom 2006). It is also consistent with theories of voting that incorporate social preferences (Dawes, Loewen, and Fowler 2011; Edlin, Gelman, and Kaplan 2007; Fowler 2006; Sauermann and Kaiser, 2010; Rogers and Tyszler, 2016).

In contrast, the present results are not consistent with the common claim that voters' choices are rarely self-interested (Caplan 2007; Kinder and Kiewiet 1981; Mansfield and Mutz 2009; Sears et al. 1980). In a controlled environment in which the researcher can know and manipulate the payoffs—a precondition for discerning selfish versus cooperative choices—we immediately observed selfish voting: Participants' choices depended on the randomly assigned role that determined their self-interest. Related, some researchers have argued that sociotropic voting emerges precisely when voters are uncertain or uninformed about policy payoffs (Gomez and Wilson 2001; Mansfield and Mutz 2009). We do not find support for this claim either: Even though the payoffs were clear, many voters in the majority knowingly selected the policy that earned them less money to benefit society. Finally, the present results are inconsistent with political economy models that assume purely selfish voters (Acemoglu and Robinson 2006). Applied to these experimental elections, the traditional models incorrectly predict the outcome of a majority-rule vote nearly every time. In sum, the present experiments indicate that these different strands of literature underestimate both how selfish *and* how cooperative voters are.

For institutions, we did not find that voting promoted cooperation more than a lottery institution, challenging the idea that the act of voting itself inspires greater concern for the common good. We did however find greater cooperation when the policy choice was framed as a leader's sole decision and, additionally, there were considerable aggregate payoffs at stake (Experiment 3). Artisans were more likely to cooperate as leaders than in the lottery, even though the lottery institution was actually mechanically identical to the leader institution, differing only in framing.

Finally, we observed little or no relationship between participants' cooperative choices and their political party, political ideology, or egalitarianism. This observation raises questions about whether people's espoused political values really reflect deeply held principles, if they are unrelated to a simple choice between selfish and egalitarian payoffs. Alternatively, political attitudes could reflect social affiliations that could readily change in a new environment. Or, citizens could apply political principles strategically and hypocritically, rather to guide their own behavior (Aarøe and Petersen 2013; DeScioli et al. 2014; Weeden and Kurzban 2014).

Overall, these studies offer a complementary experimental approach to longstanding questions about how voters make tradeoffs between their own and society's interests. Experiments have particular strengths and weaknesses relative to other methods such as observational studies or formal models. Although the present experiments differ in many ways from real-world elections, they share a common underlying structure described by the policy game, including an electorate of voters who collectively choose between policies that have consequences for everyone. This underlying payoff structure can make these types of economic games good model systems for scientific study, similar to how other sciences use mice, fruit flies, test tubes, or wind tunnels to develop and test theories (Camerer 2003; Kagel and Roth 2016; Ostrom 2006; McDermott 2002; Morton and Williams 2010; Palfrey 2016; Smith 1982).

Importantly, the results of experiments do not automatically generalize to other environments. A plane that is stable in a wind tunnel will not necessarily hold up in a real storm. Further, the traditional scientific method holds that we improve knowledge by testing theories, often under peculiar conditions and in unusual samples, rather than by generalizing from a sample to a population (Popper 1959). A theory gains credibility by withstanding numerous tests, including artificial and extreme challenges, rather than through inductive generalization. From this perspective, model systems provide a valuable testing ground for theories. When the results of experiments do not fit previous theories or observational findings, this points researchers to critical areas for further scrutiny through various methods.

One promising direction for future research is studying how the size of the electorate affects cooperative voting. The current experiments use electorates of ten citizens which most resembles voting in small committees. In larger groups, voters might be more cooperative since their choice is unlikely to affect the outcome (Caplan 2007). Or, they might be more selfish if they use voting to express their desires (Brennan and Hamlin 1998), if they feel less responsibility in larger groups (Darley and Latane 1968), or if they feel less altruism toward a multitude of anonymous others (Small and Loewenstein 2003).

Another future direction is studying how a history of relations between interest groups in society affects cooperative voting. James Madison argued that over time different groups tend to clash which makes citizens “much more disposed to vex and oppress each other than to cooperate for their common good,” (Federalist 10, Hamilton, Madison, and Jay 1788). In polarized and hostile politics, voters might be more selfish. If found in experiments, this would support the assumption of selfish voting in political economy models, but by adding a critical precondition: hostility between factions in society. Alternatively, different groups might build rapport over time that fosters cooperation. These hypotheses can be tested in experiments by pitting groups against each other in difficult conflicts before they vote on policies.

In sum, the results of these experiments challenge two opposite views found in political science, one claiming that voters are rarely selfish and another assuming that they always are. Instead, the findings support theories in which voters have a mixture of selfish and cooperative motives. Moreover, they underscore the need for more experimental research on the factors that enhance or diminish each motive, as well as how they interact with other social motives such as envy, spite, dominance, and loyalty. This knowledge can ultimately help policymakers manage the fundamental problem so clearly articulated by Madison in Federalist No. 10: when a government should follow the majority’s wishes and when it should restrain them.

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## Online Appendix

### Experiment 2, Additional Methods and Results

**Political attitude measures.** Participants reported their political ideology on a 6-point scale by choosing whether they are very, moderately, or slightly liberal or conservative. Participants reported their political party on a 6-point scale by choosing whether they are strong, moderate, or weak Democrats or Republicans. To measure participants' egalitarianism, we used six items from the American National Election Study that are commonly used to measure egalitarianism (Feldman & Johnston, 2014). Participants rated agreement on a 7-point scale (strongly disagree to strongly agree) with six statements: 1. "If people were treated more equally in this country we would have fewer problems," 2. "We have gone too far pushing equal rights in this country," 3. "It is not really that big a problem if some people have more of a chance in life than others," 4. "This country would be better off if we worried less about how equal people are," 5. "One of the big problems in this country is that we don't give everyone an equal chance," 6. "Our society should do whatever is necessary to make sure that everyone has an equal opportunity to succeed." We coded responses from -3 to +3 while reverse coding items 2, 3, and 4 so that greater scores reflect greater egalitarianism. We averaged the six items to calculate participants' egalitarianism scores.

**Prior political attitudes.** Participants were 69.6% Democrat and 30.4% Republican, their ideologies were 66.3% liberal and 33.7% conservative, and their egalitarianism scores were  $M = 1.23$ ,  $SD = 1.44$ . To analyze the associations between political attitudes and choices, we aggregate the data across voting, leader, and lottery institutions. (The conclusions did not differ when broken down by institution.) We start with partisanship. For the artisan role, we find that 52.8% of Democrats and 44.0% of Republicans chose the north road, which did not statistically differ,  $p = .22$ , Fisher's exact test. For the farmer role, 93.2% of Democrats and 92.5% of Republicans chose the north road, which did not differ,  $p = 1.00$ . Next we look at ideology. Among artisans, we find that 53.8% of liberals and 42.7% of conservatives chose the north road, which did not differ,  $p = .11$ , Fisher's exact test. For farmers, 91.8% of liberals and 95.0% of conservatives chose the north road, which did not differ,  $p = .54$ . Last, we test whether participants' egalitarianism scores were associated with choices of north by using logistic regressions for each role. The results show that participants with higher egalitarianism scores were not more likely to select the policy with more equal payoffs: For artisans, the odds ratio for egalitarianism was 1.18 ( $z = 1.80$ ,  $p = .072$ ), and for farmers, the odds ratio was 1.22 ( $z = 1.05$ ,  $p = .29$ ).

**Follow-up Study.** In Experiment 2, aggregate efficiency was the same for the two policies but one policy was more equal. We conducted a follow-up study to confirm our assumption that objective observers would view the more equal policy as better for society. We asked a separate group of participants to read the same scenario as impartial observers and tell us what policy they thought was best for society. (The scenario did not specify how the collective choice would be made.) We recruited participants on MTurk. We excluded five participants for failing the comprehension check, yielding a sample of  $n = 85$  participants (33% female, age:  $M = 37$ ,  $SD = 12$ ). As impartial observers, 93% of participants chose the north road as the best for society,

which differs from chance,  $p < .001$  (binomial test). These results confirm our assumption that the more equal option is better for society, even if overall efficiency is the same. The results also provide baseline data to confirm that in the main experiment (voting condition) it was artisans' vote choices that deviated from an impartial observer (47% of artisans chose north versus 93% of observers chose north),  $p < .001$ , Fisher's exact test, whereas farmers' choices did not differ from an impartial observer (91% versus 93% north, respectively),  $p = 1.00$ .

### **Experiment 3, Additional Results**

**Prior political attitudes.** Participants were 66.5% Democrats and 33.5% Republicans, and their ideologies were 61.7% liberal and 38.3% conservative. Participants' average egalitarianism scores were  $M = 1.11$ ,  $SD = 1.47$ . To examine associations between political attitudes and choices, we pooled the data from all three institution conditions. (The conclusions did not differ when broken down by institution.) First, we examine political parties. For artisans, we find that 84.5% Democrats and 75.0% Republicans chose the north road; this difference was not significant,  $p = .086$ , Fisher's exact test (although it showed a marginally significant trend). For farmers, 97.2% of Democrats and 98.1% of Republicans chose the north road, showing no effect of political party,  $p = 1.00$ , Fisher's exact test. Next, we look at ideology. Among artisans, we find that 83.9% of liberals and 77.3% of conservatives chose the north road, showing no effect of ideology,  $p = .24$ , Fisher's exact test. For farmers, 97.0% of liberals and 98.4% of conservatives chose the north road, showing no effect of ideology,  $p = 1.00$ , Fisher's exact test. Last, we examined the association between participants' egalitarianism and their choice of north using logistic regression. The results show that participants with higher egalitarianism scores were not more likely to select the policy with more equal payoffs: For artisans, the odds ratio for the effect of egalitarianism was 1.16 ( $z = 1.36$ ,  $p = .18$ ). For farmers, the odds ratio for the effect of egalitarianism was 0.65 ( $z = -1.02$ ,  $p = .31$ ).

### **Appendix References**

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