



Teacher Guide to Voter Turnout and Abstention

Laboratory implementation, theoretical foundations,
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



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<https://beer-lab.org/>

How to use this guide

This guide supports preparation, implementation, and classroom discussion of the voter-turnout and abstention family developed by the Behavioral and Experimental Economics Research Lab (BEER Lab), Department of Economics, Tecnológico de Monterrey. It is written for instructors in economics, political science, public policy, and related fields, including readers with no previous experience with oTree or formal participation games.

One document covers the basic modes and eight extensions. The opening chapters are sufficient to launch a session without technical expertise.

The conceptual chapters develop the calculus of voting, the participation problem, strategic predictions, and experimental evidence. Each extension explains only what changes, what to predict, and how to read the report. Every screenshot comes from the working application.

Author

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For the instructor

The guide follows the English interface. Spanish configurations reproduce the same logic. Project only aggregated, anonymous results; never associate participant codes with names, student IDs, real political preferences, or seats.

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Quick implementation guide

1.1 Access through the updated laboratory website

Start at <https://beer-lab.org/en/>. Select **CLASSROOM** in the top navigation menu; it opens <https://teaching.beer-lab.org/en/>. In the **Classroom experiments** catalog, use the search box to locate the activity by name. You can also filter by **Topic** or **JEL code**. Clear any filters left from an earlier search before looking for another game.

Each family's card distinguishes **Español** and **English** access links. The **Show extended version** checkbox selects that edition before following a link. Catalog language and session language are separate choices: verify both. Students use the room specified by the instructor; the instructor prepares and monitors the session through this family's own administrative pages.

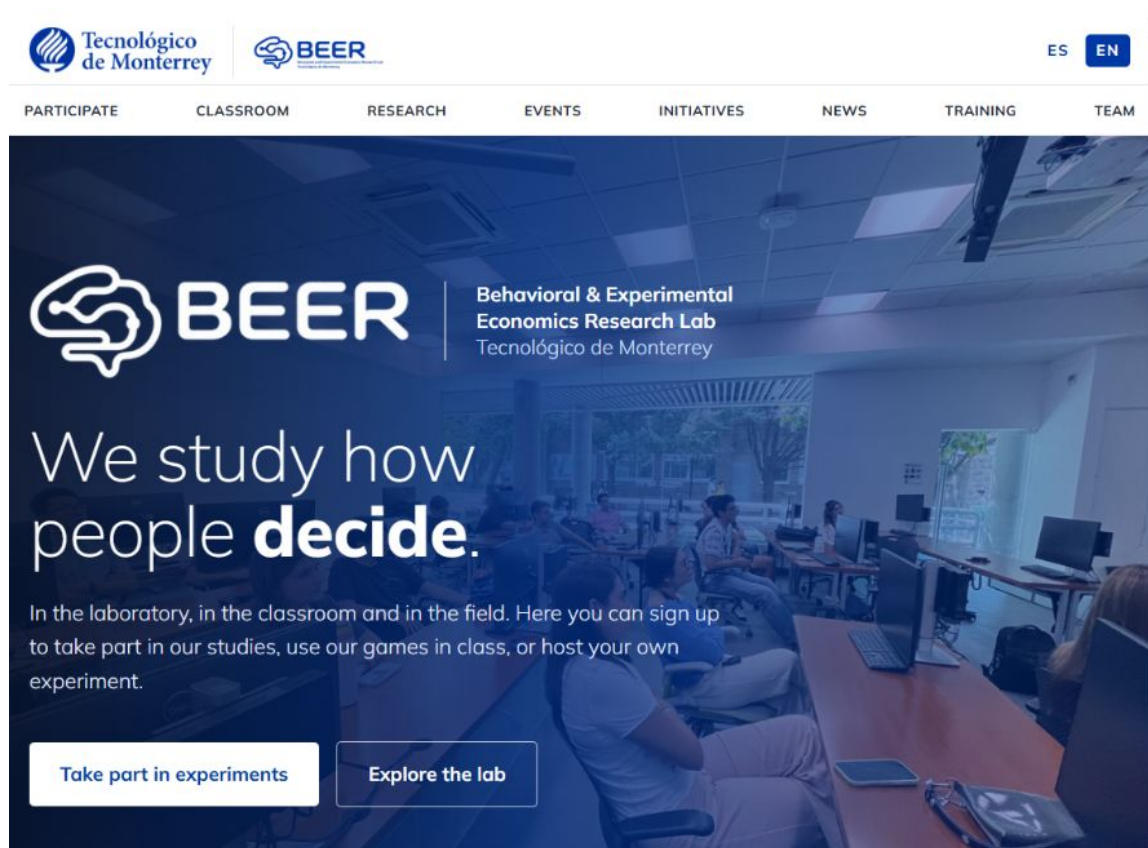


Figure 1.1: Current institutional website. Select CLASSROOM in the top navigation menu to open the teaching experiments. Captured on October 7, 2026.



Figure 1.2: Current catalog: search by title, topic, or JEL code. Then locate this family's card and select language and edition. Captured on October 7, 2026.

Checking resources, comprehension, and participant requirements

Before opening the room, check the selected configuration and the number of students present. The session-creation form states the group size and minimum required by that configuration. An individual activity accepts any positive participant count; an interactive activity must satisfy its stated requirement: complete groups when size is fixed, or a minimum participant count when size is flexible. Requirements may change across treatments, for example when adding a third party or changing an institution's size. If you edit a grouping parameter, check the requirement for the edited configuration, rather than relying only on the demo's suggested count.

In the instructions, ensure that students can identify what each role receives, what they can decide, and how the outcome is calculated. An initial account, a distributable budget, and final earnings need not be the same amount. Refer to the resources panel and the example for the selected treatment. Do not carry the basic edition's endowment into a treatment that changes accounts or introduces additional positions.

ECU stands for *Experimental Currency Units*: the activity's unit of account. An outcome of 100 ECU does not automatically equal 100 pesos or 100 dollars. Conversion depends on the session configuration. Before announcing a payment, confirm with the laboratory whether money is paid, the conversion rate, and which decisions count for payment. In hypothetical modules, describe amounts as outcomes in the stated situation.

When a comprehension check is included, an incorrect response receives an explanation beside that question, identifying the submitted answer and the correct answer. Other answers remain in the form. Ask the student to return to the example, locate the relevant rule, and redo the calculation before correcting the response. Avoid revealing answers to the entire class for an individual error, and do not interpret a comprehension mistake as an economic choice in the game.

electoral — una elección	Participación electoral y abstención / Voter Turnout and Abstention — BEER Lab Seleccione una variante de este juego. Select a version of this game.
electoral — 10 elecciones, mismo electorado	
electoral — 10 elecciones, electorados reasignados	
ut — one election	
ut — 10 elections, same electorate	
ut — 10 elections, reassigned electorates	
electoral extendida — referencia competitiva	
electoral extendida — ventaja amplia	
electoral extendida — costo alto	
electoral extendida — deber cívico	
electoral extendida — voto obligatorio	
electoral extendida — encuesta pública	
electoral extendida — movilización	
electoral extendida — electorado grande	
oter Turnout — competitive reference	
oter Turnout — landslide	
oter Turnout — high cost	
oter Turnout — civic duty	
oter Turnout — compulsory voting	
oter Turnout — public poll	
oter Turnout — mobilization	
oter Turnout — large electorate	

Figure 1.3: Demo contains only the configurations of this game family, in both languages and editions.

Rooms

Current rooms:

[ES] Participación electoral
[EN] Voter Turnout
[ES] Participación electoral: extendida
[EN] Voter Turnout: extended

Figure 1.4: Rooms contains the four rooms for this family: basic and extended editions in Spanish and English.

Room: [EN] Voter Turnout

Create a new session

Session Config

[EN] Voter Turnout — one election

Number of participants

Complete groups of 9 participants. Use a multiple of 9; minimum 9.

Create

[Configure session](#) ⚙️

App sequence

voter_turnout_game (10 rounds)

A participation game with costly voting, abstention, and two fixed alternatives.

Figure 1.5: Session-creation form for the basic English room. Check the selected configuration and participant requirement before creating the session.

Downloading a session with several rounds

For the instructor

Open **Data** within the relevant session and use that session's CSV or CSV-for-Excel download link. The general export has one row per participant and columns for the different rounds. Ten rounds do not necessarily mean ten rows per person. When the family provides its own long-format export, observations may instead be organized by participant and round or another unit defined by the design.

Save the original file together with the configuration name, session code, and active-round count. Check that columns for the last active round are present and that the data belong to the selected session. Empty cells can represent inactive rounds, a pending decision, or a field that does not apply to a role; do not automatically recode them as zeros. To compare learning, preserve round and group identifiers alongside participant identifiers. Share only anonymous aggregates in class, and record session incidents before constructing derived tables.

1.2 At a glance

Purpose	Study costly voting, abstention, strategic participation, and differences between majority and minority turnout.
Unit	Experimental currency units (ECU).
Electorate	Nine participants in regular conditions and fifteen in the large-electorate condition.
Duration	25–40 minutes for one election; 55–80 minutes for ten elections and debrief.

Requirement	Total attendance must be divisible by nine, or by fifteen for the large electorate.
Participants	turnout.beer-lab.org/room/voter_turnout_en .
Instructor	turnout.beer-lab.org/demo .
Results	Overall, A/B, majority/minority turnout; distribution, evolution, winners, costs, and earnings.
Experimental unit	Interactions in groups of 9, 15 participants, depending on treatment.
Basic edition	one election; 10 elections, same electorate; 10 elections, reassigned electorates.
Extended edition	competitive reference; landslide; high cost; civic duty; compulsory voting; public poll; mobilization; large electorate.
Decision	Decide whether to vote, paying the stated cost, or abstain.
Outcome	Turnout, votes, electoral outcome, and payoffs net of voting costs.
Topics	voter turnout; abstention; cost of voting; strategic voting; political economy.
JEL	C92; D72.

Attention

The hostname and routes are proposed for lab deployment. The code defines all four rooms and 22 configurations, but public availability depends on DNS and server deployment. For local validation use <http://localhost:8050/demo>.

1.3 Learning outcomes

Students should be able to separate preference for an alternative from the decision to participate; explain why voting can be privately costly even when the collective outcome matters; recognize that pivotality depends on others' choices; and compare mechanisms that change cost, civic duty, sanctions, public information, or electorate size. They should also learn that a turnout rate is an equilibrium outcome shaped by incentives and beliefs, rather than an automatic measure of democratic commitment.

The activity separates objects that observational data often blur. Electorate composition records how many people prefer A and B. The vote count includes only participants. A preference majority can lose when it mobilizes less than the minority. That possibility turns an individual action into a participation game. The report displays both denominators so the class does not confuse support, votes, and turnout.

1.4 Minimum sequence

1. Confirm attendance and select a configuration whose group size divides the total exactly.
2. Open beer-lab.org, continue to teaching.beer-lab.org, and select the voter-turnout family.
3. Enter **Rooms**, choose language and edition, and create the session with the correct number.
4. Keep **Monitor** and **Report** in separate tabs. The report stays hidden while elections are pending.

5. Share only the room link. Ask for silence and prevent participants from announcing preference or choice.
6. Wait until everyone passes comprehension. Do not announce what a rational person should select.
7. Before revealing results, collect predictions about total turnout and the majority–minority gap.
8. Reveal, describe the evidence first, and only then compare it with theory and treatment.
9. Export the data if the class will use them in assignments or cross-session comparisons.

Checkpoint

Before opening the room, verify language, edition, treatment, electorate size, and active rounds. If one is wrong, create a fresh session rather than recycling the record.

1.5 A 75-minute plan

Allow ten minutes for access, rules, and comprehension; fifteen for predictions and the first election; twenty for remaining rounds; and thirty for debrief. With one election, use the spare time to derive the calculus of voting and work through counterfactuals. With ten, avoid interrupting after every result. Let learning occur and display the evolution table at the end.

Before revealing, ask: What share voted? Which side participated more? Did the preference majority win? What would a higher cost change? Record answers. Prior commitments make the report evidence rather than decoration.

Access, isolation, and session creation

2.1 Institutional route

The path begins at beer-lab.org. The teaching section leads to teaching.beer-lab.org, where each family has a dedicated entry. The proposed instance is turnout.beer-lab.org. Its **Demo**, **Rooms**, **Sessions**, and **Data** pages must show only the 22 configurations and four rooms in this family. Trust, public goods, auctions, and other families must not be launchable from this hostname.

Isolation is pedagogical and operational. A non-specialist instructor sees a bounded menu, is less likely to launch the wrong activity, and exports data from one family. Visible names state language, edition, and treatment. If other families appear, the instance was not started with `GAME_FAMILY=turnout`; do not share links until it is corrected.

2.2 Four rooms

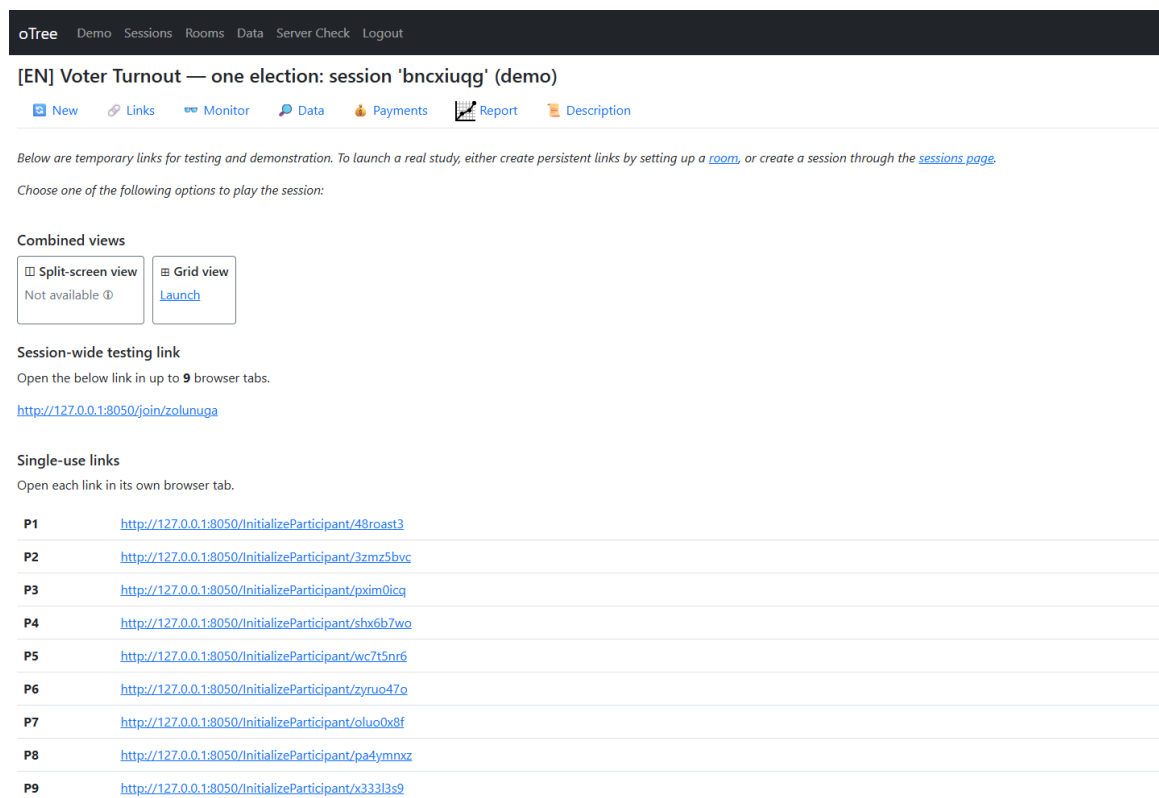
Room	Options	Use
<code>participacion_electoral_es</code>	3	One election, ten fixed-electorate elections, or ten reassigned-electorate elections in Spanish.
<code>voter_turnout_en</code>	3	The same basic modes in English.
<code>participacion_electoral_extendida</code>	8	Eight extended treatments in Spanish.
<code>voter_turnout_extended</code>	8	Eight extended treatments in English.

The room is the stable student link. Instructors may create sessions from **Demo** for rehearsal, but **Rooms** is preferable in class: participants enter a common address, receive an anonymous code, and join the current session. Basic configurations vary repetition and rematching. Extended configurations use ten elections so adaptation can be observed.

2.3 Create, monitor, and close

After selecting the configuration and participant count, oTree provides links, monitor, data, payments, and report. Use the monitor to see where each person is. Waiting can be normal: every

member of the electorate must decide. Before intervening, check whether someone is reading, disconnected, or entered twice.



oTree Demo Sessions Rooms Data Server Check Logout

[EN] Voter Turnout — one election: session 'bncxiuqg' (demo)

New Links Monitor Data Payments Report Description

Below are temporary links for testing and demonstration. To launch a real study, either create persistent links by setting up a [room](#), or create a session through the [sessions page](#).

Choose one of the following options to play the session:

Combined views

Split-screen view
Not available ⓘ

Grid view
[Launch](#)

Session-wide testing link

Open the below link in up to 9 browser tabs.

<http://127.0.0.1:8050/join/zolunuga>

Single-use links

Open each link in its own browser tab.

P1	http://127.0.0.1:8050/initializeParticipant/49roast3
P2	http://127.0.0.1:8050/initializeParticipant/3zmz5bvc
P3	http://127.0.0.1:8050/initializeParticipant/pxim0lcq
P4	http://127.0.0.1:8050/initializeParticipant/shx6b7wo
P5	http://127.0.0.1:8050/initializeParticipant/wc715nr6
P6	http://127.0.0.1:8050/initializeParticipant/zyruo47o
P7	http://127.0.0.1:8050/initializeParticipant/oluo0x8f
P8	http://127.0.0.1:8050/initializeParticipant/pa4ymnxz
P9	http://127.0.0.1:8050/initializeParticipant/x333l3s9

Figure 2.1: Links and instructor tools for a nine-person session.

Keep the instructor browser open. A participant who disconnects can return through the same link. At the end, verify that everyone reached the final summary, reveal the report, and export data. Label the file with course, date, and treatment, without names. The custom export contains A/B preferences and voting decisions but relies on oTree codes.

For the instructor

Open the report before the first decision. It should display the expected number of elections and a waiting notice. The reveal button remains disabled until all active group-rounds complete, preventing feedback while anyone is still choosing.

Participant experience

3.1 Welcome and rules

The cover identifies the BEER Lab and Tecnológico de Monterrey, explains the educational purpose, and sets rules about silence, privacy, and attention. Participants must acknowledge the rules. The activity does not ask about party identification, ideology, or real voting. A, B, majority, and minority are experimental roles; emphasizing neutrality reduces political pressure and expressive responding.

Instructions state the preferred option, known composition or public information, voting cost, and accounting rule. Participants may vote only for their preferred option or abstain. This restriction focuses the activity on participation and excludes crossover voting, which would add a separate electoral-coordination problem.

3.2 Comprehension

Three items verify cost, ballot content, and the rule determining the winner. Correct answers are treatment-specific: high cost requires eight and mobilization requires one. The platform returns precise messages and records attempts without exposing them to classmates.

Frequent errors are diagnostic. The class may be confusing composition with votes, assuming abstention erases a preference, or conflating cost and fine. Pause only for a broad pattern. Restate rules without recommending a choice, because strategic uncertainty is part of the exercise.

3.3 Decision

One panel contains the necessary information: preferred option, composition or signal, voting cost, civic benefit, abstention fine, and four contingent earnings. Students compare voting and abstention under two states: their preferred option wins or loses. Voting cost reduces both voting payoffs; the outcome bonus depends on the winner; civic duty is added when voting; the fine is subtracted when abstaining.

What participants will see

The interface does not ask participants to calculate a pivotal probability. It displays monetary consequences and lets each person form a belief about others. During debrief, the instructor can translate that intuition into the pB term of the calculus of voting.



Welcome to the BEER Lab

The **Behavioral and Experimental Economics Research Lab** of the Department of Economics at Tecnológico de Monterrey is a space for learning about economic decisions through controlled activities.



Voter turnout and abstention

This activity studies when people vote or abstain and how costs, competition, and institutions change turnout, outcomes, and welfare.

General laboratory rules

- Remain quiet and do not talk with other participants.
- Make decisions only on your own computer.
- Do not reveal your preference or attempt to coordinate ballots.
- If you need help, raise your hand and wait for the instructor.

☐ I understand and accept the laboratory rules.

Begin

Powered by [oTree](#)

Figure 3.1: The beginning of the English experience. Institutional welcome and lab rules.



Basic version · one election

How the election works

Each person prefers A or B. You decide whether to pay the participation cost and vote for your preferred option, or abstain.

Resources and unit of account

Monetary base of your account per round: 40 ECU. The outcome adds income or bonuses and deducts the costs or losses specified in the instructions.

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

Competitive reference election

Nine voters, 5–4 preferences, a 4 ECU cost, and voluntary voting.

Sequence within a round

1. Learn your preferred option and public information.
2. Compare the earnings from voting and abstaining.
3. Decide privately.
4. Only cast ballots determine the outcome.
5. Observe the result and your ECU.

ECU accounting

You begin with 40 ECU and receive 20 more if your preferred option wins. Voting can have a cost, and some treatments add a benefit or an abstention penalty.

$$\text{ECU} = 40 + 20 \times \text{preferred option wins} - \text{voting cost} + \text{civic-duty benefit} - \text{abstention penalty}$$

Your preferred option

B

Electorate composition

The known composition is A: 5 and B: 4.

A
5

B
4

Turnout
?

Ballots for A or B and abstention are recorded anonymously. The instructor report shows aggregates.

Continue

Powered by [oTree](#)

Figure 3.2: Current basic-edition instructions, with initial resources and experimental units.



Review the marked questions. Each shows your answer and an explanation; your other answers are retained.



Basic version

Comprehension questions

Answer correctly before making your decision.

Resources and unit of account

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

Competitive reference election

Nine voters, 5–4 preferences, a 4 ECU cost, and voluntary voting.

How many ECU does voting cost in this configuration?

Your answer: 5. The correct answer is 4. Review the rule: voting costs 4 ECU.

If you participate, which option receives your ballot?

My preferred option ▼

What determines the winner?

The ballots actually cast ▼

Continue

Powered by [aTree](#)

Figure 3.3: Current comprehension check with an incorrect answer, its specific explanation, and retained responses.



Round 1 of 1

 **Vote or abstain?**
Compare the possible earnings and confirm one decision.

Competitive reference election Nine voters, 5–4 preferences, a 4 ECU cost, and voluntary voting.

Your preferred option **A**

The known composition is A: 5 and B: 4.

Voting cost 4 ECU	Civic-duty benefit 0 ECU	Abstention penalty 0 ECU
-----------------------------	------------------------------------	------------------------------------

☐ **Vote for A**

If my preferred option wins 56 ECU	If my preferred option loses 36 ECU
--	---

☐ **Abstain**

If my preferred option wins 60 ECU	If my preferred option loses 40 ECU
--	---

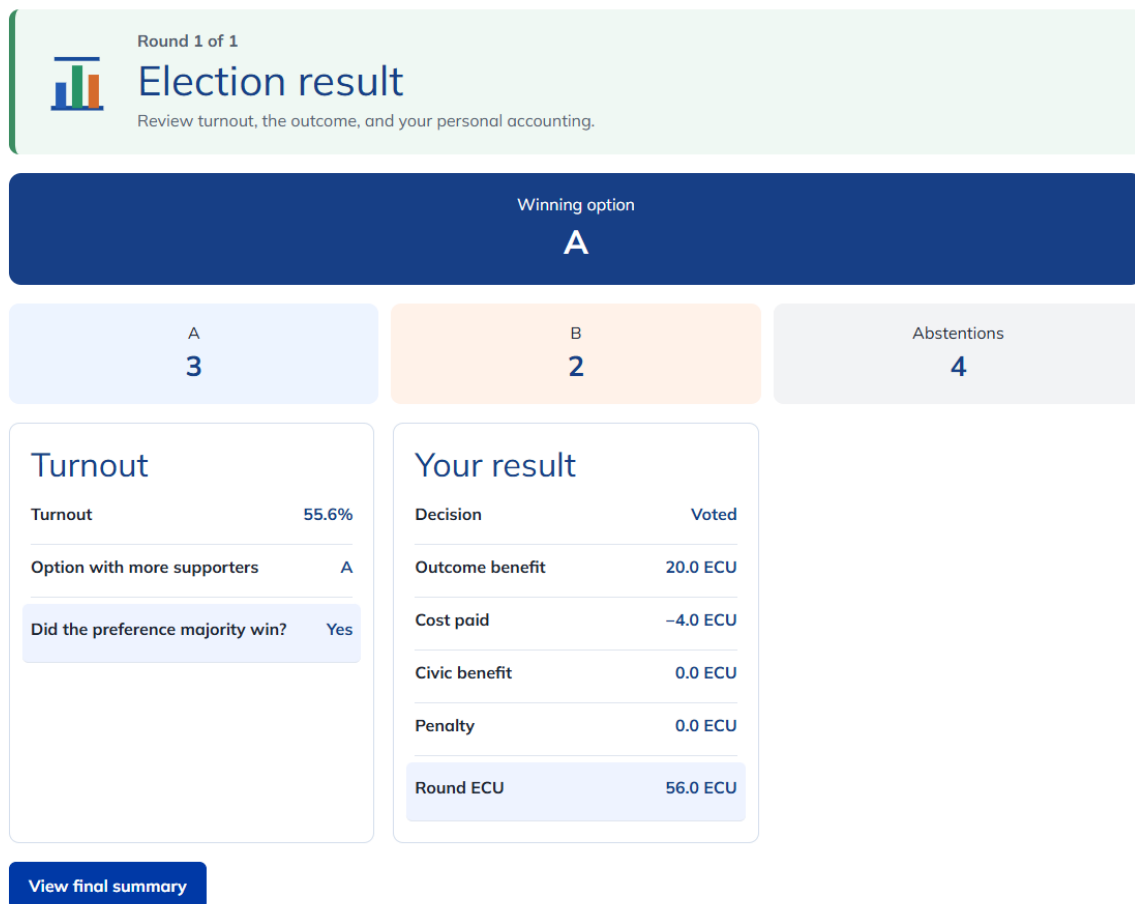
Confirm decision

Powered by [oTree](#)

Figure 3.4: Reference decision: vote for the preferred option or abstain.

3.4 Outcome and closure

Once everyone decides, the result shows A votes, B votes, abstentions, turnout, winner, and whether the preference majority won. Personal accounting separates outcome benefit, voting cost, civic reward, fine, and round ECU, allowing every payment to be reconstructed.



Powered by [oTree](#)

Figure 3.5: Collective outcome and individual accounting.

If A and B have equal cast votes, the system uses an equal-probability tie break and says so. Abstentions do not count as votes. The final summary reports rounds, votes cast, personal turnout, preferred-option victories, and cumulative ECU. It prevents the abrupt “No more pages left” ending and provides a final checkpoint before discussion.

Mechanism and accounting

4.1 Collective rule

The reference electorate has nine people: five prefer A and four prefer B. Everyone simultaneously votes for the preferred option or abstains. The alternative with more cast votes wins. A tie is broken randomly with one-half probability. The preference majority has a potential advantage, but it must be converted into turnout.

The 5–4 composition makes the election close. One ballot can convert a win to a tie or a tie to a win, yet participants do not observe others' actions. The incentive therefore depends on a subjective pivotal probability. Preferences stay fixed so changes in turnout can be separated from changes in underlying support.

4.2 Earnings

Each round begins with 40 ECU. A preferred-option victory adds 20. Voting subtracts cost C , may add civic benefit D , and avoids abstention fine F :

$$\pi_i^V = 40 + 20 \mathbf{1}\{W = P_i\} - C + D.$$

Abstaining yields

$$\pi_i^A = 40 + 20 \mathbf{1}\{W = P_i\} - F.$$

Reference parameters are $C = 4$, $D = 0$, and $F = 0$. High cost sets $C = 8$; mobilization sets $C = 1$; civic duty sets $D = 5$; compulsory voting leaves abstention feasible but sets $F = 10$.

4.3 Worked examples

Suppose an A supporter votes, A wins, and cost is four. Earnings are $40 + 20 - 4 = 56$. Voting and losing yields 36. Abstaining and winning yields 60; abstaining and losing yields 40. Holding the winner fixed, abstention saves four. Voting pays only by changing the winner probability or through duty or a fine.

Under compulsory voting, abstaining and winning yields $40 + 20 - 10 = 50$ while voting and winning yields 56. Voting monetarily dominates abstention because it avoids a ten-unit fine at a cost of four. Under civic duty, voting adds five and costs four, so it dominates by one before pivotality. These conditions are useful controls because they isolate a transparent incentive change.

Checkpoint

Explain earnings by comparing vote and abstention while holding the winner fixed. Then introduce the possibility that a ballot changes the winner. This order prevents students from counting the 20-unit outcome benefit twice.

4.4 Common accounting mistakes

The first mistake is subtracting cost only when the preferred option loses. Cost is paid for casting a ballot regardless of the winner. The second is adding 20 for voting; the outcome benefit also reaches an abstainer whose preferred option wins. The third is applying the abstention fine to the whole electorate. It applies only to abstainers in the relevant treatment.

Have the class reconstruct four cells before interpreting behavior: vote and win, vote and lose, abstain and win, abstain and lose. Add duty or a fine only afterwards. This table separates direct payoff differences from effects operating through the winner. If a displayed amount looks surprising, return to the accounting identity before assuming a software problem.

Accounting also prepares welfare analysis. Mean ECU combines outcome value, participation costs, rewards, and fines. A regime may raise turnout while lowering net earnings when it uses costly instruments. The application reports private ECU; institutional welfare claims must also consider resources required to administer mobilization, rewards, or sanctions.

Theory of participation

5.1 The calculus of voting

A classic representation writes the expected net return from voting as

$$R = pB + D - C,$$

where p is the probability the ballot changes the outcome, B is the benefit from the preferred result, D is an expressive or duty return, and C is cost. Here $B = 20$ and treatments manipulate C or an explicit version of D . An abstention fine raises the relative payoff from voting.

The equation organizes reasoning; it is not a direct measurement of motives. The application observes choices and environments but does not separately identify subjective p or psychological duty. Different motivations can yield the same action. The instructor should discuss explanations compatible with the pattern rather than claim to read participants' minds.

5.2 The paradox of voting

In large elections, a person usually has a tiny chance of being decisive. With $D = 0$ and positive cost, the simplest instrumental model predicts little turnout. Yet many people vote. This discrepancy is the paradox of voting and motivates theories of duty, expression, norms, information, identity, and bounded optimization.

The nine-person experiment does not reproduce the numerical pivotal probability in a national election. It magnifies pivotality so the mechanism is visible. The fifteen-person variant supports a size comparison: each person is a smaller part of the electorate and relevant ties may become less likely. The correct extrapolation concerns the mechanism, not the magnitude.

Theoretical foundation

“My vote does not matter” combines two claims. Every cast ballot enters the tally; the strategic question is the probability it changes the winning probability given everyone else's actions. Marginal pivotality is distinct from moral or legal relevance.

5.3 Participation as a game

The pivotal probability is not fixed. It depends on turnout among A and B supporters. If everyone else votes, an additional majority ballot may secure a lead. If many allies abstain, a mobilized

minority can win. Each choice changes the environment for others even though decisions are simultaneous.

Equilibrium may involve mixed participation. Indifference requires the expected pivotal benefit to equal net cost. Higher cost generally depresses turnout, but majority and minority can react differently because their pivotal opportunities differ. A majority faces free riding: each member can hope others secure victory. A minority may feel urgency and coordinate, or may become discouraged.

5.4 Majority, minority, and underdog effects

A naive intuition says the majority votes more because it expects to win. Strategic participation can imply the opposite. Majority members are numerous and each may be less necessary; minority members are scarce and each potential ballot carries more weight within the coalition. Rates, rather than counts, reveal the distinction: three of four B supporters is 75 percent while three of five A supporters is 60.

Experimental findings connect group size, closeness, and turnout without reducing them to one universal rule. The 7–2 landslide makes the margin salient: the majority may relax; the minority may be discouraged or intensely mobilized. Classroom evidence determines which force dominates in a particular session.

5.5 Learning and repetition

One election captures initial beliefs under unfamiliar rules. Ten elections allow updating and behavioral regularities. With a fixed electorate, participants may infer the style of their partners even though individual choices remain private. Stratified reassignment preserves A/B roles while changing group members, reducing personal continuity but retaining population-level learning.

A time trend is not pure experience. It may reflect treatment adaptation, fatigue, interface learning, or reactions to outcomes. Use the round table to propose mechanisms. Strong causal inference would require randomized conditions and multiple independent sessions.

Predictions and analysis strategy

6.1 Ex ante predictions

Reference predictions are qualitative: turnout below 100 percent when voting is costly; a negative response to higher cost; more voting when the action provides a direct benefit or avoids a fine; and responses to competitiveness, information, and size. The majority–minority gap is empirical because free riding, discouragement, beliefs, and learning push in different directions.

Ask students for numerical predictions before play. A useful prediction specifies unit and denominator: “65 percent of the electorate will vote,” “70 percent of B and 55 percent of A will participate,” or “the preference majority will win eight of ten elections.” Avoid unmeasurable statements such as “turnout will be high.”

6.2 Core indicators

Overall turnout divides cast ballots by electorate size. A turnout divides A votes by A supporters; B turnout does the same for B. Majority and minority are defined from preferences before voting, not from the winner. The majority-win frequency measures how often preference advantage becomes an electoral outcome. Mean paid cost averages over everyone and falls when abstention rises.

The election-level distribution protects against misleading averages. Two classes can average 60 percent: one may have every election near 60, another may mix 20 and 100. Evolution reveals convergence, cycles, or breaks. The last-round table joins composition, votes, abstentions, and winner for each group.

6.3 Claims to avoid

High turnout does not prove stronger civic duty; it may result from costs, sanctions, pivotality, or imitation. A minority victory does not establish that a system is antidemocratic; it shows that cast ballots and latent preferences diverged under the rule. A null difference in one class does not refute a literature: the independent unit is usually the electorate, sample sizes are small, and a teaching session is not necessarily powered for inference.

Use proportional language: “our groups showed” and “the pattern is consistent with.” Reserve “caused” for well-randomized comparisons with enough independent units. When pooling classes, document treatment, date, group size, course, and disruptions.

Instructor report and debrief

7.1 Controlled reveal

The report begins with participants, group-round elections, completions, and pending outcomes. While one election is incomplete, it displays a notice and disables reveal. Once all are done, the instructor controls projection and may hide the panel again.

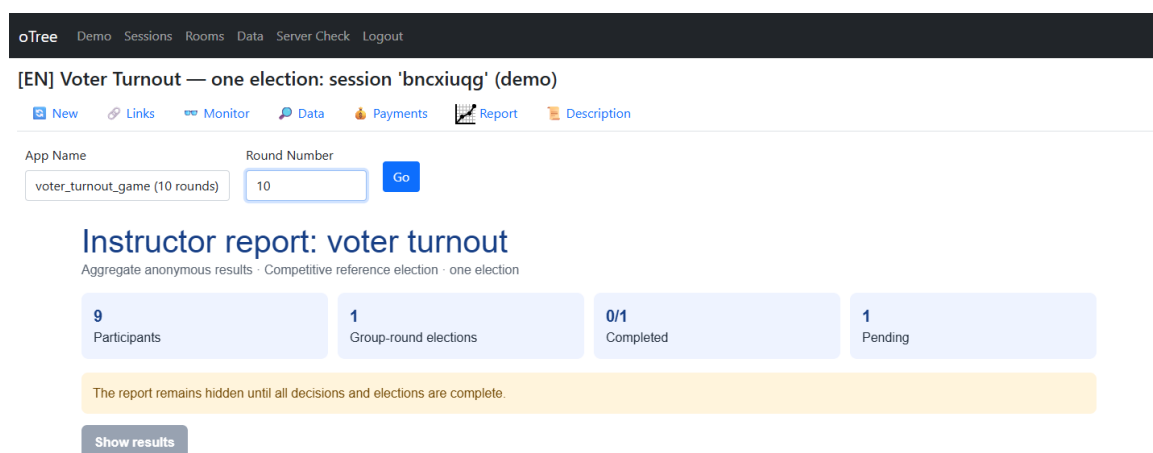


Figure 7.1: Instructor control over feedback timing. Protected report during active play.

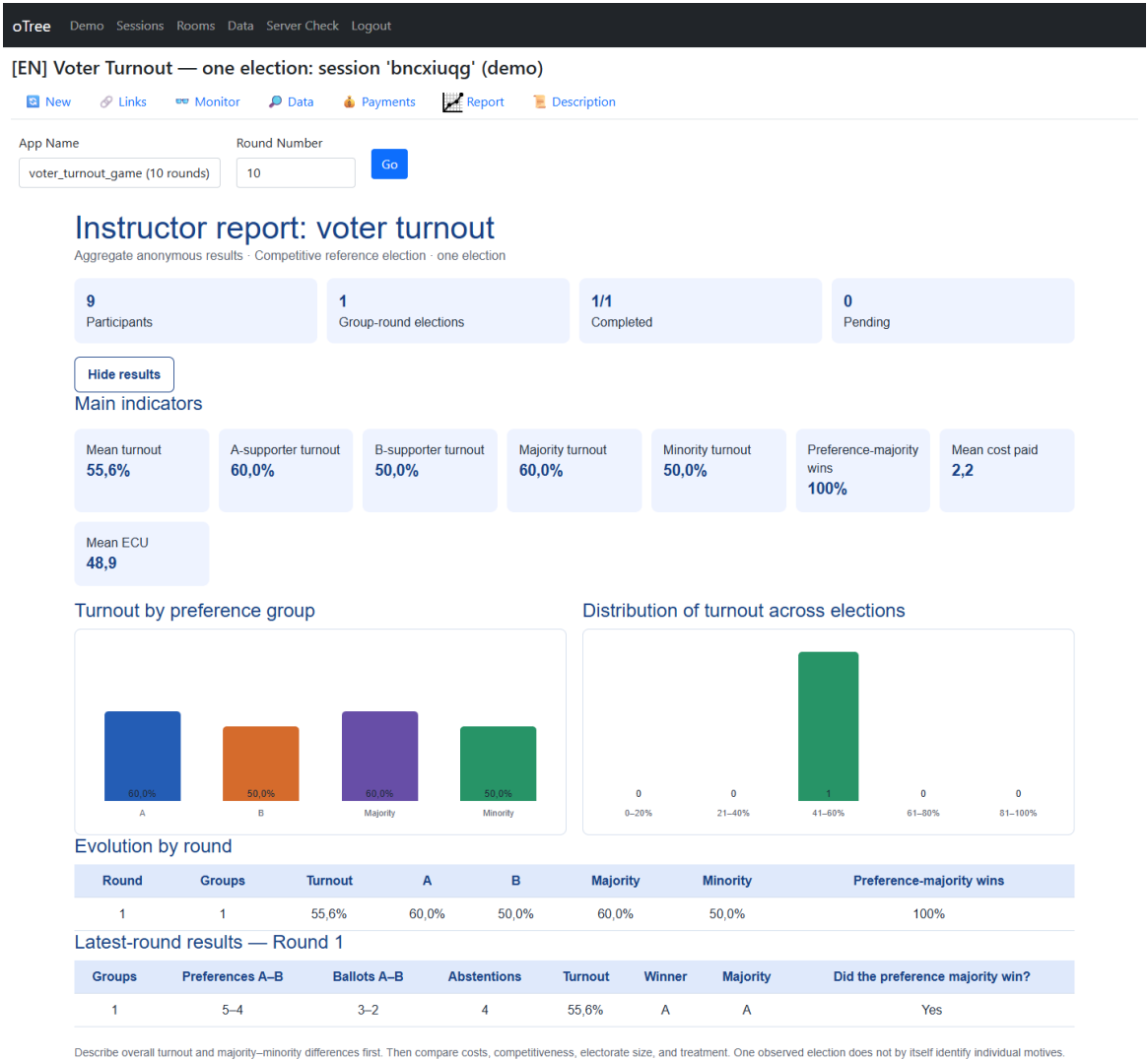
7.2 Reading order

Start with mean turnout. Move to A and B, then reorganize by majority and minority. Compare preference advantage with majority-win frequency. Inspect the histogram for heterogeneity. With repeated elections, read evolution before explaining. End with the last-round table and reconstruct a concrete case.

The A/B and majority/minority views are intentionally separate. A is the majority in current configurations, but labels have no normative meaning. Majority comparisons connect to theory; A/B comparisons support role tracking and exports. Both remain necessary if future code permits changing compositions.

Feedback script

1. **Describe.** How many voted? How were A votes, B votes, and abstentions distributed?
2. **Normalize.** What share of each preference group participated?



3. **Connect.** Did the preference majority win? Which actions were potentially pivotal?
4. **Compare.** What changed relative to the prediction or another condition?
5. **Explain.** Offer two compatible mechanisms and a design that distinguishes them.
6. **Generalize cautiously.** What is learned about the mechanism, and what cannot be claimed about real elections?

7.3 A reconstruction

Suppose the result is A:3, B:2, with four abstentions and 5–4 preferences. Overall turnout is 55.6 percent. If three A and two B supporters voted, side rates are 60 and 50. A won, while two A and two B supporters abstained. One additional B vote would create a 3–3 tie and a lottery; that ballot would have been pivotal by changing a sure loss into a half chance.

Do not say that four abstentions jointly “caused” the outcome. Evaluate individual counterfactuals. Do not assume every abstainer performed the exact calculation. Reconstruction identifies objective incentives conditional on others, while motivation requires further evidence.

Three basic modes

8.1 One election

The one-election mode introduces the paradox without learning or history. It preserves initial responses and leaves time for formal derivation. Its limitation is strategic noise. Use distributions across groups and avoid treating one- or two-ballot differences as stable facts.

A useful flow is predict, play, reveal, calculate one counterfactual, and finish with $pB + D - C$. Nine participants suffice for a case, while 18 or 27 provide more independent electorates. With one group, explicitly call the result a case study.

8.2 Ten elections, fixed electorate

Fixed repetition displays adaptation. Preferences and partners remain stable. Previous group outcomes are public, but individual actions remain anonymous. Turnout may stabilize, cycle, or alternate between free riding and mobilization.

Before showing evolution, ask whether turnout rose or fell. Decline might reflect cost learning, confidence, or discouragement; increase might follow close results or regret. Compare each story with winners and the majority–minority gap.

8.3 Ten elections, reassigned electorates

Reassignment redistributes participants after each round while preserving a 5–4 composition. Preferences do not change. The mode reduces partner-specific continuity but does not remove general learning. At least 18 participants are needed for meaningful reassignment.

Compare fixed and reassigned sessions only when other features match. Different attendance also changes the number of groups. In informal use, call the comparison exploratory and ask what additional design would separate reputation from composition.

Extended variants

9.1 Competitive reference

The reference repeats ten nine-person elections with 5–4 preferences, a four-unit cost, and voluntary voting. It is the baseline for other treatments. Expect incomplete turnout and round variation. The central question is whether cost generates free riding and whether majority or minority turnout is higher.



Ronda 1 de 10

¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Elección competitiva de referencia Nueve votantes, preferencias 5–4, costo de 4 ECU y voto voluntario.

Su alternativa preferida **B**

La composición conocida es A: 5 y B: 4.

Costo de votar

4 ECU

Beneficio por deber cívico

0 ECU

Sanción por abstenerse

0 ECU

☐ **Votar por B**

Si gana mi preferida **56 ECU**

Si pierde mi preferida **36 ECU**

☐ **Abstenerme**

Si gana mi preferida **60 ECU**

Si pierde mi preferida **40 ECU**

Confirmar decisión

Powered by oTree

Figure 9.1: Extended competitive reference.

During debrief, calculate the four-unit saving from abstention if the outcome stays unchanged, then identify cases in which a vote would change it. This reveals why the incentive varies. Run

the baseline before normatively framed conditions to avoid contaminating beliefs.

9.2 Landslide

Composition changes to 7–2 while cost and earnings remain fixed. The treatment separates competitiveness from cost. A large majority may lower turnout through confidence; the minority may mobilize because each supporter is scarce or abstain because victory seems unlikely.



Ronda 1 de 10

¿Votar o abstenerse?
Compare los posibles pagos y confirme una sola decisión.

Ventaja amplia Las preferencias se distribuyen 7–2; la elección es menos competitiva.

Su alternativa preferida **B**

La composición conocida es A: 7 y B: 2.

Costo de votar 4 ECU	Beneficio por deber cívico 0 ECU	Sanción por abstenerse 0 ECU
--------------------------------	--	--

☐ **Votar por B**

Si gana mi preferida 56 ECU	Si pierde mi preferida 36 ECU
---------------------------------------	---

☐ **Abstenerme**

Si gana mi preferida 60 ECU	Si pierde mi preferida 40 ECU
---------------------------------------	---

Confirmar decisión

Powered by oTree

Figure 9.2: Seven-to-two potential preference advantage.

Compare rates, not counts. A can cast more ballots while B has higher participation. Ask what would have to happen for B to win, then contrast with 5–4. One session cannot establish a general law, but it makes coalition size and mobilization visibly distinct.

9.3 High cost

Voting cost rises from four to eight and nothing else changes. Instrumental calculus predicts lower turnout because the pivotality threshold needed to justify a ballot doubles. The interface updates payoffs so students need not rely on memory.

Compare total and side-specific rates. If turnout does not fall, consider non-incentivized duty, error, close-election beliefs, or classroom selection. Do not infer cost irrelevance from one group. With $B = 20$ and $D = 0$, the minimum p is 0.2 at cost four and 0.4 at cost eight.



Ronda 1 de 10

 ¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Costo alto de participación Votar cuesta 8 ECU en lugar de 4.

Su alternativa preferida **A**

La composición conocida es A: 5 y B: 4.

Costo de votar 8 ECU	Beneficio por deber cívico 0 ECU	Sanción por abstenerse 0 ECU
--------------------------------	--	--

☐ Votar por A

Si gana mi preferida 52 ECU	Si pierde mi preferida 32 ECU
---------------------------------------	---

☐ Abstenerme

Si gana mi preferida 60 ECU	Si pierde mi preferida 40 ECU
---------------------------------------	---

Confirmar decisión

Powered by [oTree](#)

Figure 9.3: High cost: a ballot subtracts eight ECU.

9.4 Civic duty

Voting adds five ECU and costs four, producing a direct net gain of one even if it does not affect the winner. The monetary prediction is full turnout absent errors. This treatment converts D into an explicit incentive; it does not claim that real civic duty is money.



Ronda 1 de 10

¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Beneficio por deber cívico Quien vota recibe 5 ECU adicionales, independientemente del ganador.

Su alternativa preferida B

La composición conocida es A: 5 y B: 4.

Costo de votar

4 ECU

Beneficio por deber cívico

5 ECU

Sanción por abstenerse

0 ECU

☐ **Votar por B**

Si gana mi preferida

61 ECU

Si pierde mi preferida

41 ECU

☐ **Abstenerme**

Si gana mi preferida

60 ECU

Si pierde mi preferida

40 ECU

Confirmar decisión

Powered by [oTree](#)

Figure 9.4: Five-ECU direct benefit from voting.

Use it to separate reduced-form motivation from social meaning. Higher turnout demonstrates response to a direct return described in the rules. A framing claim would require comparing the same payment under a different label.

9.5 Compulsory voting with a fine

Abstention remains available but subtracts ten ECU. Voting costs four. The direct voting advantage is six, so it monetarily dominates. Preserving abstention makes noncompliance observable. Do not interpret behavior as normative support for compulsory voting.

Compare with civic duty. Both favor voting, but one rewards action and the other penalizes inaction. Net incentives differ, one versus six, so their difference does not identify reward versus punishment framing. A future study would equalize net amounts.



Ronda 1 de 10

 ¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Voto obligatorio con sanción Abstenerse permanece posible, pero resta 10 ECU.

Su alternativa preferida **A**

La composición conocida es A: 5 y B: 4.

Costo de votar 4 ECU	Beneficio por deber cívico 0 ECU	Sanción por abstenerse 10 ECU
--------------------------------	--	---

☐ Votar por A

Si gana mi preferida 56 ECU	Si pierde mi preferida 36 ECU
---------------------------------------	---

☐ Abstenerme

Si gana mi preferida 50 ECU	Si pierde mi preferida 30 ECU
---------------------------------------	---

Confirmar decisión

Powered by [oTree](#)

Figure 9.5: Abstention remains feasible with a ten-ECU fine.

9.6 Public poll

Exact composition is hidden. A common poll reports 5–4 correctly in 75 percent of rounds and reverses it otherwise. Everyone sees the same signal. The condition introduces information uncertainty and permits discussion of polling, coordination, and participation.






Ronda 1 de 10

¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Encuesta pública

La composición exacta es privada y una encuesta común acierta con probabilidad de 75%.

Su alternativa preferida

B

Composición del electorado

La composición exacta está oculta. La encuesta pública reporta A: 4 y B: 5; acierta en 75% de las rondas.

Costo de votar
4 ECU

Beneficio por deber cívico
0 ECU

Sanción por abstenerse
0 ECU

☐

Votar por B

Si gana mi preferida
56 ECU

Si pierde mi preferida
36 ECU

☐

Abstenerme

Si gana mi preferida
60 ECU

Si pierde mi preferida
40 ECU

Confirmar decisión

Powered by [oTree](#)

Figure 9.6: A public signal with known 75-percent accuracy.

Do not reveal true composition until the end. Ask whether an announced lead mobilized the apparent loser or induced complacency among the apparent winner. Polls can have opposing effects. The export links signal, turnout, and winner; the report summarizes without identifying people.

9.7 Mobilization

Voting cost falls to one ECU. The change can represent transportation, reminders, nearby polling, or administrative help. Higher turnout is predicted. Mobilization is universal here rather than targeted, so it identifies general accessibility.

Compare the three-unit cost reduction with observed response. A small increase may reflect a ceiling, low pivotality, or nonmonetary choice. Ask students to design targeted mobilization and state the new question it answers.



Ronda 1 de 10

 ¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Movilización y menor costo Una intervención reduce el costo efectivo de votar de 4 a 1 ECU.

Su alternativa preferida **B**

La composición conocida es A: 5 y B: 4.

Costo de votar 1 ECU	Beneficio por deber cívico 0 ECU	Sanción por abstenerse 0 ECU
--------------------------------	--	--

☐ Votar por B

Si gana mi preferida 59 ECU	Si pierde mi preferida 39 ECU
---------------------------------------	---

☐ Abstenerme

Si gana mi preferida 60 ECU	Si pierde mi preferida 40 ECU
---------------------------------------	---

Confirmar decisión

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Figure 9.7: General mobilization: one-ECU voting cost.

9.8 Large electorate

Group size rises to fifteen with 8–7 preferences and cost four. The election remains close, but each participant represents a smaller share. It approximates a scale effect without pretending to be a mass election.



Ronda 1 de 10

¿Votar o abstenerse?

Compare los posibles pagos y confirme una sola decisión.

Electorado grande

Quince votantes con preferencias 8–7 permiten estudiar el efecto del tamaño.

Su alternativa preferida

B

La composición conocida es A: 8 y B: 7.

Costo de votar

4 ECU

Beneficio por deber cívico

0 ECU

Sanción por abstenerse

0 ECU

☐

Votar por B

Si gana mi preferida

56 ECU

Si pierde mi preferida

36 ECU

☐

Abstenerme

Si gana mi preferida

60 ECU

Si pierde mi preferida

40 ECU

Confirmar decisión

Powered by [oTree](#)

Figure 9.8: Fifteen-person electorate with 8–7 preferences.

Compare percentages and tie frequency, not vote counts alone. Size also affects independent observations: 45 students create five nine-person groups but only three fifteen-person groups. Mention this loss of precision when evaluating treatment differences.

Experimental evidence and literature

10.1 From individual calculus to a participation game

[Riker and Ordeshook \(1968\)](#) developed an influential calculus that explicitly included civic duty. [Palfrey and Rosenthal \(1983\)](#) showed why turnout is strategic: relevant probabilities depend on other voters. The application translates that distinction into class. Cost, outcome benefit, and direct reward are separate, while pivotal probability remains embedded in composition and beliefs.

[Schram and Sonnemans \(1996a\)](#) studied turnout as a participation game and documented roles for group organization and experience. [Schram and Sonnemans \(1996b\)](#) connected laboratory evidence to explanations for voting. These papers motivate repeated rounds and the fixed-versus-reassigned comparison.

10.2 Size and competitiveness

[Levine and Palfrey \(2007\)](#) tested comparative statics of turnout games: electorate size, closeness, and majority or minority status alter incentives. Their design directly informs the 5–4, 7–2, and 8–7 comparisons. The teaching objective is not to reproduce a published coefficient; it is to understand which variable changes and which denominator is needed.

Close contests may mobilize by increasing perceived pivotality. Polls can also discourage the expected loser or let a majority free ride. [Großer and Schram \(2010\)](#) examined polls and turnout, showing why public information need not have one mechanical effect. The imperfect-signal variant separates true composition, belief, and action.

10.3 Norms and social pressure

[Gerber, Green, and Larimer \(2008\)](#) found that social pressure increased turnout in a field experiment. The civic-duty treatment here is not a replication: it pays a direct return. The contrast teaches construct validity. A monetary voting reward captures a direct payoff; observability activates reputation and norms. Both may raise turnout through different mechanisms.

[Feddersen \(2004\)](#) reviews turnout models and the voting paradox. It helps instructors locate instrumental, ethical, and informational explanations. The application fixes preferences and omits private information acquisition, so abstention should not be attributed to ignorance. An information extension would need an additional stage.

10.4 What counts as a test

A classroom session is disciplined evidence, not a publication replication. State directional predictions before observing, treat electorates as units, and show distributions. Repeated courses can create a cumulative database if protocols remain stable. Record parameter changes and never pool treatments under one label.

When data depart from prediction, inspect implementation and comprehension first. Then consider learning, beliefs, social preferences, error, or expressive motives. Theory constrains explanations. Each account should imply a measurement or treatment that can distinguish it from alternatives.

Class designs and assignments

11.1 Module A: the voting paradox

Run one reference election. Before play, collect anonymous intentions and reasons. After the report, calculate $pB - C$ for hypothetical values of p . With $B = 20$ and $C = 4$, voting requires $p > 0.2$ absent duty. Compare this with intuition about a national election and explain why the lab makes pivotality larger.

Ask for a short memo separating the instrumental prediction from observed behavior. Grade derivation and limits, not whether a student voted. The exercise teaches that optimal action depends on beliefs.

11.2 Module B: majority free riding

Randomly assign groups to competitive reference and landslide. Before reveal, predict majority and minority rates. Compare proportions rather than counts. Teams must give two explanations for any gap and design a treatment that distinguishes confidence from discouragement.

If simultaneous conditions are infeasible, compare sessions on different dates and acknowledge cohort differences. Historical anonymous data can supplement. The learning goal is comparison design rather than a preferred story.

11.3 Module C: policy instruments

Compare high cost, mobilization, civic duty, and compulsory voting. Build a matrix of net incentive, mechanism, prediction, and social cost. The platform measures private experimental payoffs, not administrative expenses or distributional effects. Students add those considerations to a policy recommendation.

Separate effectiveness from desirability. A fine that raises turnout is not automatically fair; a subsidy that works is not necessarily cheap. The lab identifies behavioral response inside the mechanism and prepares a welfare discussion.

11.4 Module D: polls and beliefs

Use the poll variant. Observers record each signal and predict which side mobilizes. Export data and relate signal accuracy, turnout, and winner. Discuss how polls may inform, coordinate,

discourage, or induce strategic reactions.

Do not reveal inaccurate rounds during play. Early disclosure changes learning about reliability. Afterwards, ask what 55, 90, or 100 percent accuracy would do.

11.5 Integrative product for the four modules

Assign a two-page report using one report figure, one equation, and one counterfactual. The first part describes a regularity without causal language. The second applies $pB + D - C$. The third proposes a design that changes exactly one feature and explains the comparison that would assess the mechanism.

The assignment connects theory, interface, and data. A strong answer separates individual participation from the group outcome, names each percentage denominator, and acknowledges that beliefs are unobserved. A weak answer lists winners, assigns motives without evidence, or generalizes from one election to a country.

Use the rubric in the next chapter. If teams share one session, assign different angles: cost, composition, polling, repetition, or policy. The collective close compares explanations and shows that one dataset can support multiple hypotheses, but not arbitrary stories.

Advanced debrief cases

12.1 Case 1: majority wins with low turnout

With 5–4 preferences, A wins 2–1 and six abstain. Overall turnout is 33.3 percent; A participation is 40 and B is 25. The outcome matches the preference majority without mass mobilization. Ask whether the system “worked” and distinguish preference correspondence, turnout, and representation.

One additional B voter creates a tie rather than a sure win. One additional A voter enlarges the margin without changing the winner. Marginal value differs by others’ actions. Low turnout does not automatically imply a minority outcome.

12.2 Case 2: minority victory

Suppose A casts two and B three, with four abstentions. B participation is 75 percent and A is 40. One additional A ballot creates a tie; two reverse the result. Mobilization converted minority status into victory.

Do not claim B “wanted it more.” The experiment observes incentivized actions, not emotional intensity. Candidate mechanisms include pivotal beliefs, coordination, learning, or noise. The case explains participation bias without attributing fixed traits to groups.

12.3 Case 3: full turnout despite cost

If all nine vote at cost four, A wins five to four. Holding others fixed, every participant would save cost by abstaining in many realized positions. Can this be an equilibrium? The answer requires ex ante beliefs and deviations, not only ex post regret.

Ask students to separate choice under uncertainty from evaluation with complete information. A ballot can be reasonable ex ante and unnecessary ex post, a distinction that transfers to insurance and investment.

12.4 Case 4: tie and random resolution

With a 2–2 vote and five abstentions, the system randomizes. Any abstainer could have broken the tie for the preferred side. Changing a half chance into a sure win is worth ten ECU when win versus loss differs by 20. At cost four, the observed ex post deviation would pay.

This does not prove irrationality because the voter did not know the tie. It clarifies that B is multiplied by a probability change, here one-half, rather than always by one.

12.5 Case 5: no high-cost effect

Imagine both reference and high cost yield 65 percent turnout. Before claiming insensitivity, inspect composition, groups, comprehension, and distribution. High-cost groups may have happened to experience closer outcomes and higher perceived pivotality, or nonmonetary duty may set a floor.

A better test randomly assigns several groups simultaneously, holds information and size constant, and accumulates sessions. The case teaches why two means without uncertainty or balance can mislead.

12.6 Case 6: incomplete compliance under a fine

Two people abstain under compulsory voting despite losing ten ECU. The action is monetarily dominated under current parameters. Possible accounts include error, norm resistance, inattention, or nonmonetary utility from abstention. Choice alone cannot select among them.

Propose post-task measures that do not alter the main game: a final comprehension item, legitimacy scale, or regime choice. Discuss experimenter demand and privacy. Additional measurement needs a reason and must remain separate from incentivized outcomes.

12.7 Case 7: inaccurate poll

The poll reports B:5, A:4 while truth is A:5, B:4. If B free rides on apparent strength and A mobilizes, the signal helps the apparent loser. If A becomes discouraged, the opposite occurs. The sign is strategic.

Reconstruct signal, belief, participation, and result. The application observes signal and action, not beliefs. Design an incentivized probability report and discuss whether elicitation itself changes behavior.

12.8 Case 8: scale and independent units

A class of 45 yields five nine-person electorates or three fifteen-person electorates. The large condition has fewer independent groups even with the same number of individuals. The interaction unit is the electorate, not each row.

Compute group means and participant-level means. Explain how the latter may treat correlated decisions as independent. The case connects the activity to cluster-aware inference and experimental design.

12.9 Case-synthesis activity

Give each team two cases with the same overall turnout but different vote composition. Require three ordered steps: description, counterfactual, and explanation. The team identifies one additional

measure needed to discriminate mechanisms. A second team reviews the answer and marks every leap from correlation to individual intention.

Finish with an evidence map. One column lists observed variables: assigned preference, choice, winner, signal, and earnings. Another lists unobserved constructs: pivotal belief, intrinsic duty, confidence, and legitimacy. Arrows between columns must state testable hypotheses rather than automatic conclusions.

The map prepares later projects. An added question, cost change, or private signal must be justified by the hypothesis it identifies. Cases thereby become design exercises rather than anecdotes.

Data, assessment, and extensions

13.1 Export and a minimum data dictionary

The export records session, participant, round, language, edition, treatment, matching, group, size, preference, composition, poll, decision, voting, counts, abstentions, winner, majority, rates, costs, rewards, fines, ECU, and comprehension attempts. Keep an anonymous raw copy and a separate implementation log.

For descriptive work, aggregate first at group-round. Count turnout and winner once per election. Individual analysis should account for clustering by electorate or session. Reassignment creates crossed dependence because people and groups change; an undergraduate assignment may stay descriptive while explaining the dependence.

13.2 Short rubric

Criterion	Evidence	Strong performance
Comprehension	Defines support, vote, turnout	Uses correct denominators and separates preference from action.
Theory	Applies $pB + D - C$	Identifies pivotality, cost, and direct return without double counting.
Data	Reads report and distribution	Describes groups, rounds, and heterogeneity before explanation.
Design	Compares treatments	States manipulation, independent unit, and threats.
Interpretation	Connects theory and evidence	Uses proportionate language and proposes discriminating tests.
Ethics	Protects privacy	Does not infer real ideology or identify participants.

13.3 Future extensions

The family could add private information, costly information acquisition, expressive participation without instrumental benefits, targeted mobilization, social networks, vote observability, campaign contributions, or more than two options. Each extension should retain one clear question; changing several features at once prevents attribution.

A belief extension would elicit probabilities before voting and reward accuracy. Another would vary the outcome benefit to study intensity. A third would allow crossover voting and introduce coalition strategy. These are future designs; the current guide should not claim the application measures variables it does not collect.

Responsible operation and troubleshooting

14.1 Neutrality, privacy, and accessibility

Use A and B as abstract alternatives. Do not ask for party, ideology, real vote, or registration. Discussion may connect to institutions but should focus on mechanisms and aggregates. Offer an equivalent analytical task to anyone uncomfortable with a political discussion without exposing their choice.

The interface uses text, color, and labels, so A/B are not color-only. Read rules aloud when accessibility requires it without recommending actions. Allow zoom and adequate time. Never project individual links or codes.

14.2 Waiting pages

If the interface says “Please wait,” inspect Monitor. The whole electorate must submit. Check duplicate tabs, network loss, and incomplete comprehension. Do not use administrative advancement to invent a choice unless the course protocol explicitly permits it and the event is documented.

If someone entered twice before decisions, create a new session. If discovered late, document the duplicated seat and omit the affected election from comparative analysis. Never silently replace observations.

14.3 Report will not reveal

Reveal activates only when completed equals expected. In ten rounds, one departure blocks that group. Inspect the round. If class must end, export complete rounds and label them partial; do not present a partial session as complete.

If bars are blank, hard-refresh to load current styles. If Demo displays other families, inspect `GAME_FAMILY=turnout`. If a room lists the wrong number of options, review the explicit family definition in `game_family.py` and the four room entries in `settings.py`; do not add ad hoc prefix filters.

14.4 Closing checklist

1. Verify that everyone sees the final summary.

2. Record treatment, language, rounds, and incidents.
3. Reveal only aggregated results.
4. Export and label data with date and course.
5. Close the session after debrief.
6. Keep no mapping from codes to identity.
7. Record future improvements without altering completed sessions.

14.5 Short recovery protocol

If an incident prevents completion, preserve monitor evidence, export complete rounds, and record the time. Do not reset the database or reuse the same code in front of the class. Open a clean session only when there is time to restart from instructions; otherwise close with a clearly labeled demonstration dataset.

After class, determine whether the cause was network, participant count, local schema, or configuration. Reproduce the case with test links and document the diagnosis in the repository. Validate a technical correction with bots and one manual session in both languages before the next course.

When a failure affects a guide or screenshot, update the source, PDF, and institutional copy in the same change. Instructors need the route, image, and behavior to agree. Maintaining that chain prevents stale guidance from appearing to be a student error.

Configurations, routes, and glossary

15.1 Basic configurations

Configuration	Content
<code>participacion_electoral_es_1_eleccion</code>	Spanish, one nine-person reference election.
<code>participacion_electoral_es_10_grupo_fijo</code>	Spanish, ten elections with a fixed electorate.
<code>participacion_electoral_es_10_grupos_reasignados</code>	Spanish, ten elections with stratified reassignment.
<code>voter_turnout_en_one_election</code>	English, one reference election.
<code>voter_turnout_en_10_fixed_group</code>	English, ten elections, fixed electorate.
<code>voter_turnout_en_10_reassigned_groups</code>	English, ten elections, reassigned electorates.

Extended Spanish configurations use `participacion_electoral_extendida_` plus `referencia`, `ventaja_amplia`, `costo_alto`, `deber_civico`, `voto_obligatorio`, `encuesta_publica`, `movilizacion`, or `electorado_grande`. English configurations use `voter_turnout_extended_` and the suffixes in the design file.

15.2 Glossary

Abstention: not casting a ballot in a round. **Support or preference:** assigned alternative that generates the win benefit. **Turnout:** share casting ballots. **Pivotality:** marginal ability to change the winner probability. **Majority:** larger preference group before voting. **Minority:** smaller preference group. **Free riding:** relying on others to incur a cost for a shared result. **Poll:** imperfect public signal about composition. **Mobilization:** lower voting cost. **Electorate:** group whose votes are tallied together.

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