Web Appendix to:
Experimental Study of Cursed Equilibrium in a Signaling Game

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1 Election Game

This section calculates the conditions under which the near-revelation and ambiguity equilibria occur. It is straightforward to see that these are the only two possible equilibria. It is a dominant strategy for centrists to announce and for extremists to take no position; equilibria can only differ in the behavior of mainstream candidates. Similarly, the voter clearly prefers a centrist to no position and prefers no position to an extremist. Since a candidate can implement his preferred policy, receiving higher utility than if the other party's candidate implemented a different policy, by winning the election, each candidate chooses the strategy that gives him a better chance of winning the election. This hinges on whether the voter prefers a mainstream candidate to one who took no position, given equilibrium strategies. We consider each possible equilibrium in turn.

1.1 Near-revelation equilibrium

Suppose that only extremists take no position.

A Bayesian voter would hold the following beliefs about a candidate who took no position:

$$\pi_{E|\emptyset} = \frac{\pi_E}{\pi_E + \gamma\left(1-\pi_E\right)}$$
$$\pi_{M|\emptyset} = \frac{\gamma\pi_M}{\pi_E + \gamma\left(1-\pi_E\right)}$$
$$\pi_{C|\emptyset} = \frac{\gamma\pi_C}{\pi_E + \gamma\left(1-\pi_E\right)}$$

A cursed voter would hold the following beliefs about a candidate who took no position:

$$\tilde{\pi}_{E|\emptyset} = \chi\pi_E + \frac{\left(1-\chi\right)\pi_E}{\pi_E + \gamma\left(1-\pi_E\right)} = \frac{\pi_E\left[1-\chi\left(1-\pi_E\right)\left(1-\gamma\right)\right]}{\pi_E + \gamma\left(1-\pi_E\right)}$$
$$\tilde{\pi}_{M|\emptyset} = \chi\pi_M + \frac{\left(1-\chi\right)\gamma\pi_M}{\pi_E + \gamma\left(1-\pi_E\right)} = \frac{\pi_M\left[\chi\pi_E\left(1-\gamma\right)+\gamma\right]}{\pi_E + \gamma\left(1-\pi_E\right)}$$
$$\tilde{\pi}_{C|\emptyset} = \chi\pi_C + \frac{\left(1-\chi\right)\gamma\pi_C}{\pi_E + \gamma\left(1-\pi_E\right)} = \frac{\pi_C\left[\chi\pi_E\left(1-\gamma\right)+\gamma\right]}{\pi_E + \gamma\left(1-\pi_E\right)}$$

The voter would choose a candidate who announced mainstream over a candidate who took no position if and only if

$$
\begin{aligned}
u(6) \geq \frac{\pi_E\left[1-\chi\left(1-\pi_E\right)(1-\gamma)\right]}{\pi_E+\gamma\left(1-\pi_E\right)} u(4)+\frac{\pi_M\left[\chi \pi_E(1-\gamma)+\gamma\right]}{\pi_E+\gamma\left(1-\pi_E\right)} u(6)+\frac{\pi_C\left[\chi \pi_E(1-\gamma)+\gamma\right]}{\pi_E+\gamma\left(1-\pi_E\right)} u(8) \\
\Leftrightarrow\left(\pi_E+\gamma\left(1-\pi_E\right)\right) u(6) \geq \pi_E\left[1-\chi\left(1-\pi_E\right)(1-\gamma)\right] u(4)+\pi_M\left[\chi \pi_E(1-\gamma)+\gamma\right] u(6) \\
+\pi_C\left[\chi \pi_E(1-\gamma)+\gamma\right] u(8) \\
\Leftrightarrow \pi_E(u(6)-u(4))-\gamma \pi_C(u(8)-u(6)) \geq \chi \pi_E(1-\gamma)\left[\left(1-\pi_E\right)(u(6)-u(4))+\pi_C(u(8)-u(6))\right] \\
\chi \leq \frac{\pi_E(u(6)-u(4))-\gamma \pi_C(u(8)-u(6))}{\pi_E(1-\gamma)\left[\left(1-\pi_E\right)(u(6)-u(4))+\pi_C(u(8)-u(6))\right]} \qquad (1)
\end{aligned}
$$

If this equation holds, then mainstream candidates have no incentive to deviate. Otherwise, mainstream candidates can increase their probability of winning by taking no position. Therefore, the near-revelation equilibrium exists if and only if equation 1 holds.

1.2 Ambiguity equilibrium

Suppose that mainstream candidates and extremists take no position.

A Bayesian voter would hold the following beliefs about a candidate who took no position:

$$
\begin{aligned}
\pi_{E|\emptyset} &= \frac{\pi_E}{\pi_E+\pi_M+\gamma \pi_C} = \frac{\pi_E}{1-\pi_C(1-\gamma)} \\
\pi_{M|\emptyset} &= \frac{\pi_M}{\pi_E+\pi_M+\gamma \pi_C} = \frac{\pi_M}{1-\pi_C(1-\gamma)} \\
\pi_{C|\emptyset} &= \frac{\gamma \pi_C}{\pi_E+\pi_M+\gamma \pi_C} = \frac{\gamma \pi_C}{1-\pi_C(1-\gamma)}
\end{aligned}
$$

A cursed voter would hold the following beliefs about a candidate who took no position:

$$
\begin{aligned}
\tilde{\pi}_{E|\emptyset} &= \chi \pi_E+\frac{(1-\chi) \pi_E}{1-\pi_C(1-\gamma)} = \frac{\pi_E\left[1-\chi \pi_C(1-\gamma)\right]}{1-\pi_C(1-\gamma)} \\
\tilde{\pi}_{M|\emptyset} &= \chi \pi_M+\frac{(1-\chi) \pi_M}{1-\pi_C(1-\gamma)} = \frac{\pi_M\left[1-\chi \pi_C(1-\gamma)\right]}{1-\pi_C(1-\gamma)} \\
\tilde{\pi}_{C|\emptyset} &= \chi \pi_C+\frac{(1-\chi) \gamma \pi_C}{1-\pi_C(1-\gamma)} = +\frac{\pi_C\left[\chi(1-\gamma)\left(1-\pi_C\right)+\gamma\right]}{1-\pi_C(1-\gamma)}
\end{aligned}
$$

The voter would choose a candidate who took no position over a candidate who announced mainstream if and only if

$$
\begin{aligned}
\frac{\pi_E\left[1-\chi \pi_C(1-\gamma)\right]}{1-\pi_C(1-\gamma)} u(4)+\frac{\pi_M\left[1-\chi \pi_C(1-\gamma)\right]}{1-\pi_C(1-\gamma)} u(6)+\frac{\pi_C\left[\chi(1-\gamma)\left(1-\pi_C\right)+\gamma\right]}{1-\pi_C(1-\gamma)} u(8) \geq u(6) \\
\Leftrightarrow \chi \pi_C(1-\gamma)\left[\left(1-\pi_C\right)(u(8)-u(6))+\pi_E(u(6)-u(4))\right] \geq \pi_E(u(6)-u(4))-\gamma \pi_C(u(8)-u(6)) \\
\chi \geq \frac{\pi_E(u(6)-u(4))-\gamma \pi_C(u(8)-u(6))}{\pi_C(1-\gamma)\left[\left(1-\pi_C\right)(u(8)-u(6))+\pi_E(u(6)-u(4))\right]} \qquad (2)
\end{aligned}
$$

Table 1: Parameters and equilibria for experiment conditions

Condition	π^E	π^M	π^C	γ	$\rho = 0$ Near-revelation equilibrium	$\rho = 0$ Ambiguity equilibrium	$\rho = 1.18$ Near-revelation equilibrium	$\rho = 1.18$ Ambiguity equilibrium
1	0.3	0.3	0.4	0.1	$\chi \leq 0.88$	$\chi \geq 0.80$	$\chi \leq 1.05$	$\chi \geq 1.08$
2	0.3	0.3	0.4	0.3	$\chi \leq 0.78$	$\chi \geq 0.71$	$\chi \leq 1.08$	$\chi \geq 1.12$
3	0.2	0.3	0.5	0.1	$\chi \leq 0.64$	$\chi \geq 0.48$	$\chi \leq 0.82$	$\chi \geq 0.69$
4	0.3	0.2	0.5	0.4	$\chi \leq 0.46$	$\chi \geq 0.42$	$\chi \leq 0.90$	$\chi \geq 0.88$
5	0.2	0.2	0.6	0.2	$\chi \leq 0.36$	$\chi \geq 0.28$	$\chi \leq 0.63$	$\chi \geq 0.54$
6	0.2	0.3	0.5	0.3	$\chi \leq 0.27$	$\chi \geq 0.20$	$\chi \leq 0.63$	$\chi \geq 0.54$
7	0.2	0.2	0.6	0.3	$\chi \leq 0.10$	$\chi \geq 0.08$	$\chi \leq 0.48$	$\chi \geq 0.41$

Notes: If χ is between the two thresholds for a condition, then both equilibria exist.

If this equation holds, then mainstream candidates have no incentive to deviate. Otherwise, mainstream candidates can increase their probability of winning by announcing their preferred policy. Therefore, the ambiguity equilibrium exists if and only if equation 2 holds.

1.3 Equilibria

Table 1 calculates the thresholds that determine which equilibria exist, for the parameter values used in the experiment. The first set of calculations assume risk neutrality and are reported in the main text. The last two columns assume CRRA with $\rho = 1.18$, which corresponds to the upper bound on the median level of risk aversion shown in the experimental risky choice task described below.

2 Experimental Design

2.1 Belief incentivization procedure

In the S-B and P-NI treatments, each belief question was associated with a lottery. The probability that a subject wins the associated lottery depends on how close the subject's reported probability of some action being taken is to the empirical probability in that session. For example, one lottery was based on the subject's reported probability that a candidate who prefers B would choose to announce his preferred policy in round 5. Let $p \in [0, 100]$ be the percentage of subjects in the session who, in a given choice, chose action 1 of two possible actions. Let $r \in [0, 100]$ be a subject's reported belief that a player making that choice would choose action 1. The probability that the subject wins the lottery associated with that choice is $1 - \left(\frac{p}{100} - \frac{r}{100}\right)^2$.

Assuming that subjects treat each belief question in isolation, a subject's expected utility from reporting r is

$$\begin{aligned}
&\left(1-\left(\frac{p}{100}-\frac{r}{100}\right)^2\right)u\left(\text{win lottery}\right)+\left(\frac{p}{100}-\frac{r}{100}\right)^2u\left(\text{lose lottery}\right)\\
&=u\left(\text{win lottery}\right)-\left(\frac{p}{100}-\frac{r}{100}\right)^2\left(u\left(\text{win lottery}\right)-u\left(\text{lose lottery}\right)\right)
\end{aligned}$$

The derivative with respect to r is:

$$\begin{aligned}
&-2\left(\frac{p}{100}-\frac{r}{100}\right)\left(-\frac{1}{100}\right)\left(u\left(\text{win lottery}\right)-u\left(\text{lose lottery}\right)\right)\\
&=\frac{1}{5000}\left(p-r\right)\left(u\left(\text{win lottery}\right)-u\left(\text{lose lottery}\right)\right)
\end{aligned}$$

Expected utility is maximized when $r=p$.

If subjects do aggregate questions, then a subject's expected utility (setting $u\left(0\right)=0$) from reporting a vector $r=\left[r_1,...r_{21}\right]$ is

$$\begin{aligned}
&\sum_{k=1}^{21}\Pr\left(\text{win } k \text{ lotteries}\right)u\left(\frac{k}{21}\left(3\right)\right)\\
&=\sum_{k=1}^{21}\Pr\left(\text{win } k \text{ lotteries}\right)u\left(\frac{k}{7}\right)
\end{aligned}$$

To see why incentive compatibility is no longer independent of risk preferences, consider a simpler example, with just 2 belief questions instead of 21. A subject's expected utility is

$$\begin{aligned}
&\left(1-\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\right)\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2u\left(1.50\right)\\
&+\left(1-\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2\right)\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2u\left(1.50\right)\\
&+\left(1-\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\right)\left(1-\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2\right)u\left(3\right)\\
&=\left(\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2-2\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2+\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\right)u\left(1.50\right)\\
&+\left(1-\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2-\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2+\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2\right)u\left(3\right)\\
&=-\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2\left(u\left(3\right)-u\left(1.50\right)\right)-\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\left(u\left(3\right)-u\left(1.50\right)\right)\\
&+u\left(3\right)-\left(\frac{p_1}{100}-\frac{r_1}{100}\right)^2\left(\frac{p_2}{100}-\frac{r_2}{100}\right)^2\left(2u\left(1.50\right)-u\left(3\right)\right)
\end{aligned}$$

A risk-averse or risk-neutral subject will still maximize utility by setting $r_1=p_1$ and $r_2=p_2$. Therefore, the procedure is incentive-compatible if subjects are risk-averse or risk-neutral over the range of zero to three dollars, or if subjects treat each belief question in isolation.

Table 2: Risk aversion task decisions

Decision	\$4	\$6	\$8	EV	maximum ρ
1	0.4	0.3	0.3	5.8	-0.86
2	0.4	0.25	0.35	5.9	-0.4
3	0.3	0.4	0.3	6	0
4	0.35	0.25	0.4	6.1	0.39
5	0.3	0.3	0.4	6.2	0.84
6	0.4	0	0.6	6.4	1.18
7	0.3	0.2	0.5	6.4	1.48
8	0.3	0.1	0.6	6.6	2
9	0.2	0.3	0.5	6.6	2.63

Notes: For each decision made in the risk aversion task, this table gives the probability that the lottery assigns to each dollar amount. The safe amount was always \$6. The EV column gives the expected value of the lottery. The maximum ρ is the highest value of the CRRA parameter consistent with choosing the lottery.

2.2 Risky decision task

Table 2 shows the probabilities used in each decision and the associated expected value of the lottery. The final column shows the highest CRRA parameter value consistent with choosing the lottery in that decision, assuming $u(x) = \frac{x^{1-\rho}-1}{1-\rho}$.

Decisions in the risk aversion task were not recorded for one subject. In each treatment, the median subject chose the lottery in five out of the nine decisions. If we assume that those were the five decisions with the least risk, this implies that $0.39\rho < 0.84$. Another approach is to recognize that the task did not impose consistency; a subject may have chosen the lottery five times, but one of those may have been a mistake in which he chose the lottery in the riskiest decision. Alternatively, we can record the safest decision in which the subject chose the safe option. For more risk-averse subjects, this number will be higher. The median subject did not choose the safe option beyond decision 5, implying that $\rho < 1.18$. Similarly, we can look for the riskiest decision in which each subject chose the lottery (lower number for less risk-averse subjects). The riskiest decision in which the median subject chose the lottery was decision 4, implying that $\rho > 0$. We can therefore conclude that the average subject showed a small degree of risk aversion.

2.3 Demographic questionnaire

Table 3: Demographics

	All	S-NB	S-B	P-NI	P-I
Age	20.4	20.3	21	20.1	20.4
	(2.66)	(3.16)	(3.32)	(1.55)	(2.02)
Female	0.63	0.56	0.61	0.65	0.72
	(0.49)	(0.50)	(0.50)	(0.49)	(0.45)
White	0.45	0.38	0.48	0.52	0.44
	(0.50)	(0.49)	(0.51)	(0.51)	(0.51)
Asian	0.33	0.25	0.27	0.45	0.36
	(0.47)	(0.44)	(0.45)	(0.51)	(0.49)
Hispanic	0.06	0.16	0.03	0.03	0.00
	(0.23)	(0.37)	(0.17)	(0.18)	(0.00)
Black	0.07	0.09	0.12	0.00	0.08
	(0.26)	(0.30)	(0.33)	(0.00)	(0.28)
More than 1 race	0.08	0.13	0.09	0.00	0.12
	(0.28)	(0.34)	(0.29)	(0.00)	(0.33)
Undergraduate	0.84	0.84	0.79	0.90	0.84
	(0.37)	(0.37)	(0.42)	(0.30)	(0.37)
Grad/prof student	0.12	0.13	0.18	0.06	0.12
	(0.33)	(0.34)	(0.39)	(0.25)	(0.33)
Staff	0.03	0.03	0.03	0.03	0.04
	(0.18)	(0.18)	(0.17)	(0.18)	(0.20)
Economics/business major	0.25	0.13	0.39	0.17	0.29
	(0.43)	(0.34)	(0.50)	(0.38)	(0.46)
Science major	0.29	0.39	0.15	0.34	0.29
	(0.46)	(0.50)	(0.36)	(0.48)	(0.46)
Engineering/math major	0.26	0.19	0.27	0.34	0.21
	(0.44)	(0.40)	(0.45)	(0.48)	(0.41)
Humanities major	0.21	0.29	0.18	0.14	0.21
	(0.41)	(0.46)	(0.39)	(0.35)	(0.41)
Took game theory	0.02	0	0.03	0.03	0.04
	(0.16)	(0)	(0.17)	(0.18)	(0.20)
Course used game theory	0.32	0.25	0.45	0.26	0.32
	(0.47)	(0.44)	(0.51)	(0.44)	(0.48)
Familiar with game theory	0.28	0.31	0.24	0.26	0.32
	(0.45)	(0.47)	(0.44)	(0.44)	(0.48)
No game theory knowledge	0.37	0.44	0.27	0.45	0.32
	(0.49)	(0.50)	(0.45)	(0.51)	(0.48)

Table 3 –continued from previous page

	All	S-NB	S-B	P-NI	P-I
Took probability/stats	0.58	0.50	0.73	0.45	0.64
	(0.50)	(0.51)	(0.45)	(0.51)	(0.49)
Course used probability	0.24	0.28	0.18	0.19	0.32
	(0.43)	(0.46)	(0.39)	(0.40)	(0.48)
Comfortable with probability	0.11	0.09	0.09	0.19	0.04
	(0.31)	(0.30)	(0.29)	(0.40)	(0.20)
Uncomfortable with probability	0.07	0.13	0	0.16	0
	(0.26)	(0.34)	(0)	(0.37)	(0)
Liberal	0.66	0.72	0.58	0.61	0.76
	(0.48)	(0.46)	(0.50)	(0.50)	(0.44)
Moderate	0.24	0.19	0.30	0.29	0.16
	(0.43)	(0.40)	(0.47)	(0.46)	(0.37)
Conservative	0.10	0.09	0.12	0.10	0.08
	(0.30)	(0.30)	(0.33)	(0.30)	(0.28)
Democrat	0.51	0.53	0.45	0.52	0.56
	(0.50)	(0.51)	(0.51)	(0.51)	(0.51)
Republican	0.15	0.19	0.15	0.10	0.16
	(0.36)	(0.40)	(0.36)	(0.30)	(0.37)
Voted in Presidential	0.37	0.28	0.45	0.29	0.48
	(0.49)	(0.46)	(0.51)	(0.46)	(0.51)
Voted in Congressional	0.04	0.06	0.03	0.03	0.04
	(0.20)	(0.25)	(0.17)	(0.18)	(0.20)
Voted in state	0.17	0.19	0.18	0.13	0.20
	(0.38)	(0.40)	(0.39)	(0.34)	(0.41)
Voted in local	0.17	0.22	0.18	0.13	0.16
	(0.38)	(0.42)	(0.39)	(0.34)	(0.37)
Ever voted in U.S.	0.44	0.38	0.55	0.35	0.48
	(0.50)	(0.49)	(0.51)	(0.49)	(0.51)
Not a U.S. citizen	0.15	0.22	0.15	0.13	0.08
	(0.36)	(0.42)	(0.36)	(0.34)	(0.28)
Number of Subjects	121	32	33	31	25

Notes: Table entries are means for each variable, with standard deviations in parentheses. Responses to the demographic questionnaire were not recorded for 6 subjects in the P-I treatment due to a technical problem.

3 Results

Table 4: Votes for no position over mainstream

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
P-NI	0.117***	0.118***	0.131***	0.131***	0.117***	0.117***	0.131***	0.131***
	(0.042)	(0.041)	(0.046)	(0.045)	(0.042)	(0.041)	(0.046)	(0.045)
S-B	0.086**	0.086**	0.109**	0.108**	0.086**	0.086**	0.109**	0.110**
	(0.042)	(0.040)	(0.046)	(0.044)	(0.042)	(0.040)	(0.047)	(0.045)
S-NB	0.134***	0.133***	0.043	0.040	0.134***	0.132***	0.043	0.041
	(0.042)	(0.041)	(0.047)	(0.045)	(0.042)	(0.041)	(0.047)	(0.045)
γ		0.860***		0.877***		0.867***		0.882***
		(0.136)		(0.136)		(0.136)		(0.138)
EV		0.200***		0.203***		0.204***		0.202***
		(0.062)		(0.063)		(0.063)		(0.063)
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Pseudo R^2	0.008	0.04	0.05	0.09	0.008	0.04	0.05	0.09
N	1762	1762	1622	1622	1762	1762	1622	1622
Subject-rounds	881	881	811	811	881	881	811	811

Notes: The dependent variable is a dummy equal to 1 if the voter voted for a candidate who took no position when the opponent announced mainstream and equal to 0 if she voted for the opponent. Models in the left and right panels are estimated using probit and logit, respectively. Coefficients shown are average marginal effects. Standard errors clustered at the subject-round level. *, **, and *** indicate that a coefficient is statistically different from zero at the 10%, 5%, and 1% level, respectively.

Table 5: Choice regressions including coefficients on control variables

	Voter chooses no position over mainstream		Mainstream candidate announces	
S-NB	0.054	0.052		
	(0.048)	(0.046)		
S-B	0.115**	0.116***	0.048	0.049
	(0.047)	(0.045)	(0.057)	(0.055)
P-NI	0.136***	0.136***		
	(0.047)	(0.046)		
γ		0.877***		-1.016***
		(0.141)		(0.211)
EV		0.197***		-0.278***
		(0.063)		(0.096)
Age	0.011	0.011	0.042***	0.042***
	(0.010)	(0.009)	(0.013)	(0.013)
Female	-0.044	-0.044	-0.018	-0.017
	(0.036)	(0.034)	(0.059)	(0.057)
White	-0.138***	-0.139***	0.060	0.060
	(0.046)	(0.044)	(0.063)	(0.061)
Asian	-0.043	-0.045	0.160*	0.160*
	(0.055)	(0.054)	(0.086)	(0.084)
Undergraduate	-0.060	-0.059	0.337***	0.338***
	(0.068)	(0.064)	(0.109)	(0.108)
Economics/business major	-0.146***	-0.145***	0.013	0.013
	(0.052)	(0.051)	(0.084)	(0.083)
Science major	0.003	0.004	0.133*	0.132*
	(0.049)	(0.048)	(0.071)	(0.069)
Engineering/math major	-0.128***	-0.128***	-0.137*	-0.137*
	(0.050)	(0.048)	(0.080)	(0.078)
Took course with game theory	-0.033	-0.033	0.069	0.069
	(0.038)	(0.037)	(0.056)	(0.055)
Probability/stats course	-0.039	-0.039	0.095*	0.094*
	(0.034)	(0.033)	(0.057)	(0.054)
Liberal	-0.016	-0.014	0.031	0.032
	(0.044)	(0.044)	(0.071)	(0.069)
Conservative	-0.198***	-0.198***	-0.197	-0.197
	(0.074)	(0.072)	(0.133)	(0.125)
Democrat	0.033	0.033	0.046	0.045
	(0.040)	(0.039)	(0.068)	(0.067)
Republican	0.034	0.035	0.168	0.169*
	(0.071)	(0.071)	(0.106)	(0.099)
Voted in U.S. election	-0.073**	-0.073**	-0.002	-0.003
	(0.037)	(0.035)	(0.059)	(0.057)
Not a U.S. citizen	0.050	0.049	-0.118	-0.118
	(0.055)	(0.055)	(0.082)	(0.080)
Constant	0.396	-1.103**	-0.789**	1.263*
	(0.262)	(0.482)	(0.357)	(0.736)
R^2	0.07	0.12	0.07	0.13
N	1622	1622	447	447
Subject-rounds	811	811	447	447

Notes: The dependent variable in the first two columns is a dummy equal to 1 if the voter chose a candidate who took no position when the opponent announced mainstream and equal to 0 if she chose the opponent. In the second two columns, the dependent variable is a dummy equal to 1 if a mainstream candidate announced and 0 if he took no position. Models estimated using OLS. Standard errors clustered at the subject-round level in the voter model. *, **, and *** indicate that a coefficient is statistically different from zero at the 10%, 5%, and 1% level, respectively.

Table 6 adds to the main model in the main text controls for risk aversion. The number of lotteries variable is the number of times the lottery was chosen; higher values indicate less risk aversion. Higher numbers for the riskiest lottery and the safest safe bet chosen indicate lower levels of risk aversion (because higher numbered decisions were safer). Only the safest safe measure was significant; using that measure, less risk-averse subjects were more likely to vote for a candidate who took no position when the opponent announced mainstream.

Table 6: Votes for no position over mainstream with controls for risk

	(1)	(2)	(3)
S-NB	0.135***	0.128***	0.139***
	(0.041)	(0.041)	(0.041)
S-B	0.096**	0.088**	0.096**
	(0.041)	(0.041)	(0.040)
P-NI	0.114***	0.107**	0.105**
	(0.041)	(0.042)	(0.041)
γ	0.855***	0.855***	0.856***
	(0.138)	(0.139)	(0.138)
EV	0.197***	0.197***	0.197***
	(0.063)	(0.063)	(0.063)
# lotteries	-0.007		
	(0.007)		
Riskiest lottery		0.007	
		(0.007)	
Safest safe			0.016***
			(0.006)
Constant	-1.136***	-1.190***	-1.250***
	(0.410)	(0.409)	(0.408)
R^2	0.06	0.06	0.06
N	1750	1750	1750
Subject-rounds	875	875	875

Notes: The dependent variable is a dummy equal to 1 if the voter voted for a candidate who took no position when the opponent announced mainstream and equal to 0 if she voted for the opponent. Each model includes a different measure of risk aversion discussed in the text. Models estimated using OLS. Standard errors clustered at the subject-round level. *, **, and *** indicate that a coefficient is statistically different from zero at the 10%, 5%, and 1% level, respectively.

Table 7: Belief regressions including coefficients on control variables

	Probability mainstream candidate announces		Probability voter chooses mainstream over no position
P-NI	-0.065**	-0.065**	
	(0.028)	(0.028)	
γ		-0.179	-0.129
		(0.110)	(0.126)
EV		-0.147***	-0.165***
		(0.046)	(0.061)
Age	0.003	0.003	0.032***
	(0.007)	(0.007)	(0.007)
Female	-0.015	-0.015	-0.080**
	(0.029)	(0.028)	(0.036)
White	0.042	0.042	0.079
	(0.036)	(0.035)	(0.056)
Asian	0.044	0.045	0.117*
	(0.041)	(0.040)	(0.065)
Undergraduate	0.066	0.066	0.291***
	(0.052)	(0.051)	(0.059)
Economics/business major	0.061	0.061	0.031
	(0.038)	(0.038)	(0.051)
Science major	-0.018	-0.018	0.215***
	(0.039)	(0.038)	(0.050)
Engineering/math major	0.023	0.023	0.061
	(0.039)	(0.039)	(0.053)
Took course with game theory	-0.002	-0.002	0.059*
	(0.027)	(0.027)	(0.034)
Probability/stats course	-0.032	-0.032	0.028
	(0.027)	(0.027)	(0.036)
Liberal	-0.080***	-0.080***	-0.118*
	(0.030)	(0.029)	(0.064)
Conservative	-0.139	-0.139	-0.173**
	(0.107)	(0.113)	(0.086)
Democrat	0.134***	0.134***	0.183***
	(0.034)	(0.033)	(0.066)
Republican	0.226**	0.226**	0.244***
	(0.102)	(0.109)	(0.075)
Voted in U.S. election	-0.038	-0.038	-0.076**
	(0.031)	(0.031)	(0.035)
Not a U.S. citizen	-0.125***	-0.125***	-0.113**
	(0.040)	(0.040)	(0.045)
Constant	0.372*	1.376***	0.630
	(0.190)	(0.360)	(0.470)
R^2	0.096	0.124	0.287
N	433	433	226

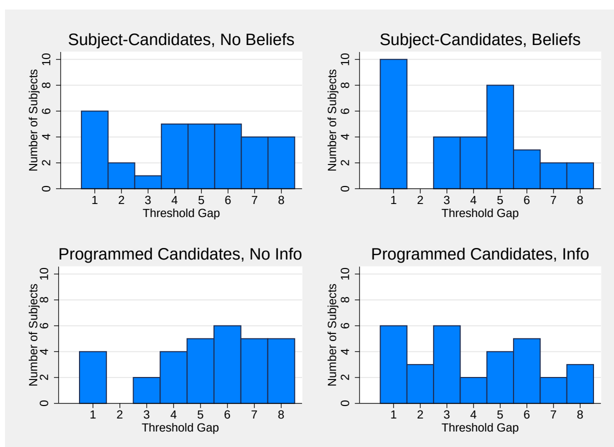
Notes: The dependent variable in the first two columns is the voter's reported probability that she believes a mainstream candidate will announce. In the second two columns, the dependent variable is the probability that a mainstream candidate believes that a voter will choose mainstream over no position. Models estimated using OLS. Standard errors clustered at the subject-round level in the voter model. *, **, and *** indicate that a coefficient is statistically different from zero at the 10%, 5%, and 1% level, respectively.

4 Subject-level analysis

Data analysis at the subject level reveals a good deal of noise in individual choices. While the aggregate analysis found that subjects responded to changes in γ and π as predicted by the theory on average, only 20% of subjects made consistent choices between a mainstream candidate who announced and a candidate who took no position across conditions. Given that the conditions were presented sequentially and in random order, it is not particularly surprising that subjects were not able to figure out the effects that changing these parameters should have on their strategies with perfect accuracy. Additionally, having subjects make two payoff-equivalent choices in each condition provides evidence on how sure subjects were of the optimal strategy. A subject is said to ‘’split a round” if, in the same condition, she votes for mainstream Candidate 1 when Candidate 2 took no position, but votes for Candidate 1 who took no position when Candidate 2 announced mainstream (or vice versa). 38% of subjects never split a round, 35% split one round, 18% split two rounds, and the remaining 9% split at least three rounds.

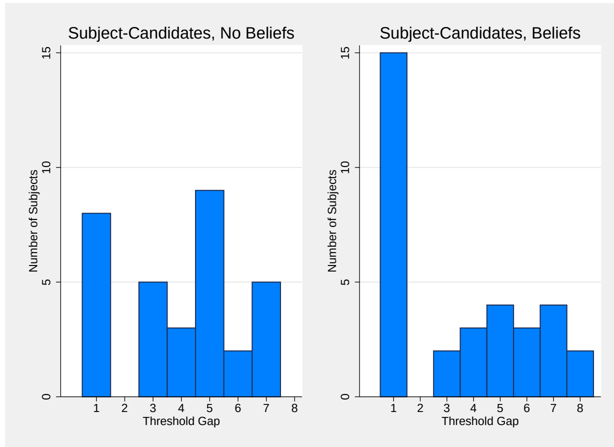
All but two subjects who made consistent choices either always chose the candidate who announced mainstream (nineteen subjects) or always chose the candidate who took no position (five subjects). For the remaining subjects, I construct a measure of how consistent their choices were.

Figure 1: Voter consistency



For each subject, I construct two thresholds–one for consistently voting for a candidate who announced mainstream and another for consistently voting for a candidate who took no position. The first threshold identifies the highest condition (ordered from one to seven as in table 1) in which the voter consistently chose the candidate who announced mainstream. For example, if a voter always chose the candidate who announced mainstream in conditions 1-2, split the round for condition 3, and always chose the candidate who took no position in conditions 4-7, her mainstream-threshold would be 2. The second threshold selects the lowest condition in which the voter consistently chose the candidate who took no position. The example voter described above would have a “no

Figure 2: Candidate consistency



position"-threshold of four. The mainstream-threshold ranges from 0-7, taking a value of 0 if the voter never consistently voted for the candidate who announced mainstream. The "no position"-threshold ranges from 1-8, with the value of 8 given to voters who never consistently voted for the candidate who took no position.

The consistency measure takes the difference between these two thresholds and takes integer values between 1 and 8. If consistency equals 1, then there exists a range of values for χ that can rationalize all of the voter's choices. If, at the other extreme, consistency equals 8, then neither threshold could be constructed for that voter; the mainstream-threshold equals 0 and the "no position"-threshold equals 8. For intermediate values of the consistency measure, the voter's choices were somewhat consistent across conditions but the voter either flipped back and forth between mainstream and no position or split a round.

Figure 1 shows the distributions of the consistency measure for each treatment. There is a spike at 1, mostly representing subjects who never changed their behavior. The remaining subjects have varying degrees of consistency. An analogous measure can be constructed for candidates, based on their decision to announce or take no position when in the role of a mainstream candidate. Distributions of this measure appear in figure 2. In the treatment when candidates were first asked for their beliefs about how voters would respond, the spike at 1 is particularly noticeable, representing about half of subjects.

Together, these figures show a good deal of inconsistency in subjects' choices. However, one must note that the calculations that ordered the conditions by the degree of cursedness that a particular vote choice implies were made under the assumption of no choice error. If one allows for choice error, as in the structural model described in the next section, then the choice probabilities do not follow a monotonic relationship across conditions for some values of χ. Interpreting individual-level data while allowing for choice error is thus very complicated without explicitly modeling that error process.

5 Structural estimation

Table 8: Parameter estimates

Treatment	QRE	CE	Heterogeneous CE	Level-k
Programmed candidates no info	$-LL = 747$ $\lambda = 9.76$ (0.236)	$-LL = 680$ $\lambda = 11.19$ (0.295) $\chi = 0.60$ (0.017)	$-LL = 652$ $\lambda = 11.75$ (0.328) $\chi = 0$: 0.14 (0.040) $\chi = 0.25$: 0.37 (0.092) $\chi = 0.5$: 0.12 (0.070) $\chi = 0.75$: 0.00 (0.001) $\chi = 1$: 0.38 (0.022)	$-LL = 753$ $\lambda = 12.68$ (0.373) $\tau = 1.83$ $L0 = 0.16$ (0.003) $L1 = 0.29$ $L2 = 0.27$ $L3 = 0.16$ $L4 = 0.08$
Subject-candidates Beliefs	$-LL = 1244$ $\lambda = 8.54$ (0.272)	$-LL = 1244$ $\lambda = 8.54$ (0.272) $\chi = 0.00$ (0.000)	$-LL = 1244$ $\lambda = 8.54$ (0.272) $\chi = 0$: 1.00 (0.000) $\chi = 0.25$: 0.00 (0.000) $\chi = 0.5$: 0.00 (0.000) $\chi = 0.75$: 0.00 (0.000) $\chi = 1$: 0.00 (0.000)	$-LL = 1240$ $\lambda = 12.74$ (0.292) $\tau = 1.92$ $L0 = 0.15$ (0.011) $L1 = 0.28$ $L2 = 0.27$ $L3 = 0.17$ $L4 = 0.08$
Subject-candidates No beliefs	$-LL = 1219$ $\lambda = 8.31$ (0.216)	$-LL = 1219$ $\lambda = 8.30$ (0.216) $\chi = 0.00$ (0.000)	$-LL = 1219$ $\lambda = 8.31$ (0.216) $\chi = 0$: 1.00 (0.000) $\chi = 0.25$: 0.00 (0.000) $\chi = 0.5$: 0.00 (0.000) $\chi = 0.75$: 0.00 (0.000) $\chi = 1$: 0.00 (0.000)	$-LL = 1197$ $\lambda = 12.95$ (0.396) $\tau = 1.96$ $L0 = 0.14$ (0.009) $L1 = 0.28$ $L2 = 0.27$ $L3 = 0.18$ $L4 = 0.09$
Programmed candidates with info	$-LL = 730$ $\lambda = 10.05$ (0.296)	$-LL = 725$ $\lambda = 10.24$ (0.318) $\chi = 0.17$ (0.024)	$-LL = 703$ $\lambda = 10.78$ (0.365) $\chi = 0$: 0.67 (0.049) $\chi = 0.25$: 0.09 (0.065) $\chi = 0.5$: 0.05 (0.032) $\chi = 0.75$: 0.00 (0.022) $\chi = 1$: 0.19 (0.023)	$-LL = 836$ $\lambda = 12.17$ (0.540) $\tau = 1.82$ $L0 = 0.16$ (0.009) $L1 = 0.30$ $L2 = 0.27$ $L3 = 0.16$ $L4 = 0.07$

Notes: Estimation assumes $\rho = 1.18$.

Table 9: Parameter estimates for alternative models

Treatment	2 λs QRE	CE	Best-respond to empirical strategies QRE	CE
Subject-candidates Beliefs	$-LL = 966$ $\lambda = 1.43$ (0.028) $\lambda_C = 8.81$ (0.442)	$-LL = 964$ $\lambda = 1.45$ (0.030) $\lambda_C = 9.64$ (0.518) $\chi = 0.13$ (0.021)	$-LL = 1037$ $\lambda = 1.52$ (0.035)	$-LL = 1033$ $\lambda = 1.54$ (0.036) $\chi = 0.17$ (0.018)
Subject-candidates No beliefs	$-LL = 963$ $\lambda = 1.38$ (0.026) $\lambda_C = 7.73$ (0.417)	$-LL = 959$ $\lambda = 1.41$ (0.028) $\lambda_C = 8.87$ (0.454) $\chi = 0.18$ (0.025)	$-LL = 1034$ $\lambda = 1.48$ (0.033)	$-LL = 1028$ $\lambda = 1.49$ (0.033) $\chi = 0.19$ (0.027)

Notes: Estimation assumes $\rho = 0$. In the best-response model, the distribution of empirical strategies is constructed separately for each subject, based on the strategies chosen by all other subjects (not including himself) in the same treatment.