

Online Appendix for “Choice vs. Action: Candidate Ambiguity and Voter Decision Making”

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Appendix 1: Experimental Instructions for Main Experiment

Introduction

Thank you for participating in today’s experiment. I will be reading from a script to ensure that every session of this experiment receives the same instructions. Feel free to ask questions if you require clarification. These instructions explain the nature of today’s experiment as well as how to navigate the computer interface you will be working with. We ask that you please refrain from talking or looking at the monitors of other participants during the experiment. If you have a question or a problem, please raise your hand and one of us will come to you.

In the instructions that follow, all earnings are denominated in tokens. At the end of the experiment, your earnings in tokens will be translated into dollars at the rate of 1 token equals one cent. So, if you end with a balance of 1,000 tokens, you would be paid \$10 plus the \$10 show up fee for a total of \$20. We will pay you by check at the end of the experiment.

The experiment takes place in four parts with each part lasting five periods. You will be paid based on a randomly chosen period in each part. Each period will consist of a contest between two computer generated candidates, Candidate A and Candidate

B. Each candidate holds a position on a seven point scale. You will also be assigned a position on the seven point scale. Your pay in each period is determined by the absolute distance between your point on the scale and the winning candidate's point on the scale. The closer you are to the winning candidate the more money you will earn for that period.

Please turn to your computer screens. We have prepared several demonstration screens to help you get familiar with the actual screens you will see during the experiment.

Part One

SCREEN ONE On left side of every screen, you will see a table displaying what you will be paid depending on the distance between you and the winning candidate. As you can see, if you hold the same position as the winning candidate, you will receive 400 tokens. As the distance between you and the winning candidate increases, you will earn less money. The first screen you see in each period will be similar to this. The position of Candidate A will be displayed on the left. The position of Candidate B will be right. In this section, you will know one of the candidate's positions, but the other candidate's position is uncertain. In this case, Candidate B's position is equally likely to be any of the three positions listed. Candidate B could hold any position from five to seven. Your position for this example is four. So, while you know Candidate A will pay you 250 tokens, Candidate B could pay you 350 tokens, 300 tokens, or 250 tokens. All possibilities are equally likely. You are asked which candidate would you prefer: Candidate A or Candidate B. Please, select one of the two candidates and then click OK.

SCREEN TWO The second screen of every period will remind you of the candidate positions and who you chose. On this screen, we ask if you want to pay 100 tokens to

cast a vote. In this first part of the experiment, if you choose to vote, you get paid based on the position of the candidate you chose minus the 100 tokens you paid to vote. If you choose not to vote, one of the candidates is chosen randomly; both are equally likely to be chosen. If you do not vote, you are paid based on that randomly chosen candidate and you do not pay the 100 tokens for voting. Decide whether or not you want to vote and then click OK.

SCREEN THREE On this screen, the results for this period are revealed. It tells you how much you were paid for the election and then if you paid to vote, it reveals your total payoff. This part of the experiment will consist of five periods just like this. You will be paid based on one randomly chosen period.

This concludes the demonstration screens. We are now ready to begin the actual experiment. The candidate positions and your position could be different in the actual experiment. We ask that you follow the rules of the experiment. Anyone who violates the rules may be asked to leave the experiment with only the \$10 show up fee. Are there any questions before we start?

Part Two

We are about to begin the second part of the experiment. In this part of the experiment, your single vote does not decide the outcome of the election. Instead, you are grouped with six of your fellow participants. Each participant has a unique position on the seven point scale. Again, you will first choose a candidate, then decide whether or not you want to pay 100 tokens to vote for that candidate. The candidate who receives the most votes wins the election and all seven participants are paid based on that candidates' position. If the election results in a tie, then the winning candidate will be chosen at random. This part of the experiment will consist of five periods like this. Again you will be paid based on one randomly chosen period. We are about to begin Part Two of the

experiment. Are there are any questions before we start?

Part Three

We are about to begin the third part of the experiment. Please, look at your screens. In this section, you will know both of the candidate's positions. In this example, Candidate A has a position of 1 and Candidate B has a position of 6. As it says in the middle of the screen, you have a position of 4. Hence, you are three places away from Candidate A and two places away from Candidate B. Thus, Candidate A would pay you 250 tokens and Candidate B would pay you 300 tokens.

Again, you are asked to choose which candidate you prefer first. Then you will be asked whether or not you want to pay 100 tokens to vote. As in part one, whichever candidate you choose will be declared the winner of the election if you pay the 100 tokens to vote. If you don't the winning candidate will be chosen at random. This part of the experiment will consist of five periods like this. Again you will be paid based on one randomly chosen period. We are about to begin Part Three of the experiment. Are there are any questions before we start?

Part Four

We are about to begin the final part of the experiment. As in the previous part, you will know one of the candidate's positions, but the other candidate's position is uncertain. In this part, your vote does not decide the outcome of the election. Instead, you are grouped with six of your fellow participants—the same six as in Part Two. Each participant has a unique position on the seven point scale. Again, you will first choose a candidate, then decide whether or not you want to pay 100 tokens to vote for that candidate. The candidate who receives the most votes wins the election and all seven

participants are paid based on that candidates' position. If the election results in a tie, then the winning candidate will be chosen at random. This part of the experiment will consist of five periods like this. Again you will be paid based on one randomly chosen period.

We are about to begin Part Four of the experiment. After this part of the experiment, we will ask you a few questions about yourself. And then you will be paid. Are there any questions before we start?

Appendix 2: Screen Shots

Figure 1: Screen shots from the main experiment.

Screen 1

Difference	Payoff
0	400
1	350
2	300
3	250
4	200
5	150
6	100

Candidate A's position is... Candidate B's position is...

or or

Your position is 1.

If I voted, I would vote for: ☐ CANDIDATE A
☐ CANDIDATE B

Screen 2

Difference	Payoff
0	400
1	350
2	300
3	250
4	200
5	150
6	100

Candidate A's position is... Candidate B's position is...

or or

Your position is 1.

You chose Candidate A.

If you decide to vote it will cost you 25 cents.

Do you want to pay vote?: ☐ YES
☐ NO

Screen 3

Difference	Payoff
0	400
1	350
2	300
3	250
4	200
5	150
6	100

Candidate A won the election!

Candidate A's position is 5.

Your position is 1.

You paid 25 to vote.

Your pay for this election is 175.

Appendix 3: Replication On a Different Population

In this section, we report the results of a replication of the paper's main study. We replicate the study for three reasons. First, it serves as a check on the external validity of the results as the subjects are drawn from a different population. In this case, the 63 subjects were recruited with the assistance of the University of Hamburg.¹ Second, our theory argues that individuals who choose the ambiguous candidate will do so quickly, but not confidently. That lack of confidence should result in a lower propensity to act on their choice. We cannot check this possibility with the previous data, but in this experiment we ask subjects, "How confident are you in [your] choice?" This four point variable ranges from 1 ("Not at all confident") to 4 ("Very confident").

Finally, subjects in the main experiment could have fallen into patterns because they were deciding between one ambiguous candidate and one precise candidate in every period. The random intercepts in the analysis should allow us to control for those subjects who made the same decision in every instance. In this experiment, we lessen the pattern possibility, but including two distractor treatments: there is a 25% probability both candidates are precise and a 25% probability that both candidates are ambiguous. In this section, we only analyze the remaining 50% of the cases that match the previous experiment: one candidate precise and one candidate who is ambiguous. In addition to the differences noted above, all subjects were in the equivalent of the low cost and not pivotal conditions.

As the first row of Table 1 shows, as in the previous experiment the ambiguous candidate held an advantage when it comes to the costless choice with subjects choosing

¹Subjects were recruited using the hroot program (Bock, Baetge and Nicklisch, 2014). They received 5 euros plus their earnings in their experiment for their participation. Subjects pay screens were the same as in the American experiment with a two dollars equals one euro conversion.

Table 1: Differences between European subjects who chose the ambiguous candidate and those who chose the precise candidate.

	Ambiguous	Precise	p-value
Choices	60.2%	39.8%	0.002
Actual Votes	54.6%	45.4%	0.165
Time to Choice (seconds)	14.1	15.9	.034
Choice Confidence	3.0	3.3	.001

Total observations is 266 with standard errors adjusted for clustering on 63 subjects. P-value for "Choices" and "Actual Votes" tests whether percent of ambiguous is greater than 50%. P-values are one-tailed calculated from t-tests with standard errors adjusted to account for the multiple observations on subjects.

the ambiguous candidate 60% of the time. The advantage disappears once we look at how many votes were actually cast in the ambiguous candidates favor. In this case, only 54% of the actual votes cast were for the ambiguous candidate. Importantly, the 54% vote percentage is not statistically distinguishable from 50%.

Rows three and four of Table 1 analyze what separates those who chose the ambiguous candidate from the precise candidate. As we expected, individuals who chose the ambiguous candidate decided in 1.8 seconds less time than those who chose the precise candidate. We also see that those individuals who chose the ambiguous candidate were less confident than those who chose the precise candidate. The table shows the mean confidence levels, but we can also look at the percent of the time that subjects said they were "very confident" in their choice. Among those who chose the precise candidate, 53% said they were very confident, but only 38% of those who chose the ambiguous candidate were very confident.

What determines if a subject chooses to pay the cost of voting? We address the questions in Table 2. The logit models in this table are similar to the logit models we used to estimate which subjects paid to vote in the main experiment with a couple of

Table 2: When do the European subjects pay to vote?

	Coef.	Std. Err.	Coef.	Std. Err.
Ambiguous Choice	-0.684	0.327	-0.600	0.343
Ease	0.696	0.163	0.651	0.167
Logged Time	—		-0.040	0.377
Choice Confidence	—		0.348	0.202
Period	-0.039	0.051	-0.044	0.057
Constant	0.049	0.429	-0.884	1.545
ρ		.278		.304
A.I.C.		336.02		336.51
N (Subjects)		266 (63)		266 (63)

Logit models with random intercepts for subjects. Dependent variable is coded 1 if subject paid to vote and 0 if the subject did not.

exceptions. First, we added the *Choice Confidence* variable to test whether individuals who were less confident in their choice were less likely to turnout. Second, we do not include interaction effects in these models as the product terms were not statistically significant and their inclusion did not improve model fit. We have a smaller sample size with this data and the larger standard errors that come with interaction effects might make it impossible to statistically discern conditional effects with the sample.

The first model only includes the *Ambiguous Choice* with controls for the ease of the decision and the period. The model shows, not surprisingly, subjects are more likely to turnout if they have a easy choice. Important for our argument, they are sixteen percentage points less likely to turnout if they chose the ambiguous candidate. The second model adds the possible mechanism indicators: *Logged Time* and *Choice Confidence*. The coefficient for *Ambiguous Choice* is smaller, but still statistically significant (at the .05 level in a one-tailed test). This suggests that our mechanisms are part (but not all) of the reason subjects who choose the ambiguous candidate do not pay to vote. In terms of the mechanisms, *Choice Confidence* does a better job explaining the decision to vote

as it is statistically significant at the .05 level in a one-tailed test. A subject who very confidently chose the ambiguous candidate has a 61.7% probability of paying to vote. If the subject is not all confident in the choice of an ambiguous candidate, the probability of voting drops to 36.2%.

Why does the *Logged Time* variable not predict paying to vote with this population when it did in the previous experiment? In the case of this experiment, *Logged Time* does not just measure the time it took the subject to make a choice. It measures how much time it took make a choice and answer how confident the subject is in that choice. Subjects, therefore, could quickly choose the ambiguous candidate and then pause to consider the implications of this choice when asked how confident they are in their choice. Instead of considering the costs on the turnout screen, they consider the costs when asked how confident they are. Hence, in this case, the confidence question is a better indicator of the mechanism that explains the same conclusion in both experiments. That conclusion: if there are advantages to ambiguity in candidate choice, those advantages do not appear to extend to the decision to actually turn out in support of that candidate.

We can also use the Hamburg data to test another possibility: that the mere existence of an ambiguous candidate lowers a voter's confidence making the voter less likely to pay to vote. We can investigate this possibility using the two treatments that we have ignored up to this point: the zero ambiguous and two ambiguous candidates treatments.

In Table 3, we include two logit models: one looks at the probability that the voter said they were "very confident" and the other looks at whether the voter paid to vote. The models include an interaction between *Ease* and a dummy variable, *Both Precise*, coded 1 if there were no ambiguous candidates and 0 if there were one or two ambiguous candidates. Figure 2, presents the marginal effects of *Both Precise* for the

Table 3: Does the lack of an ambiguous candidate increase confidence and turnout?

	Very Confident		Pay to Vote	
	Coef.	Std. Err.	Coef.	Std. Err.
Both Precise	0.803	0.413	-0.476	0.379
Ease	0.651	0.120	0.687	0.110
Both Precise * Ease	-0.129	0.200	0.280	0.203
Constant	-1.430	0.350	-0.558	0.243
ρ	.555		.300	
A.I.C.	682.28		734.32	
N (Subjects)	630 (63)		630 (63)	

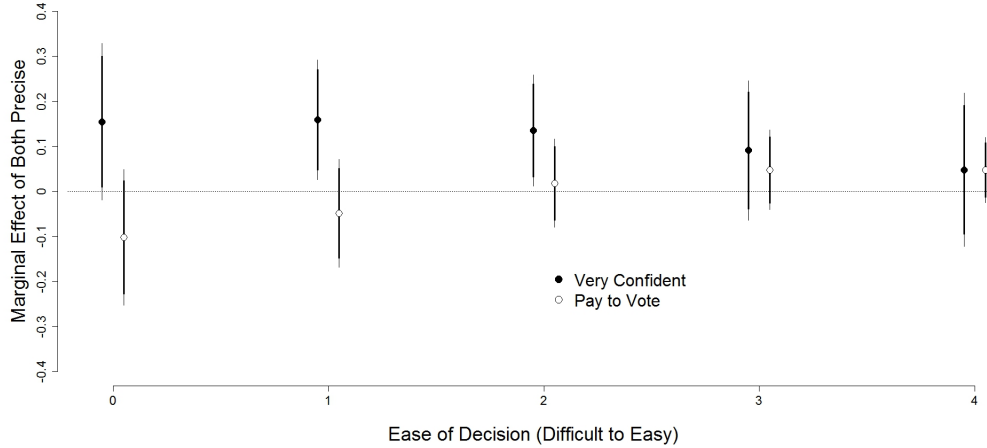
Logit models with random intercepts for subjects.

various values of *Ease*. The effects for confidence suggest that when the candidates offer similar payoffs to the voters, there is more confidence when both candidates are precise. But whatever effect exists for confidence fails to manifest itself with turnout. In that model, the absence of an ambiguous candidate has no effect on the probability that the subject will turnout to vote. Hence, it appears actually choosing an ambiguous candidate matters.

Appendix 4: A Survey Experiment Replication

To demonstrate that our main findings related to choice and turnout are externally valid to abstract costs of voting, we conducted a similar study on a national sample of adults using YouGov (N=800). This sample was drawn from YouGov's panel of participants that includes more than two million Americans; these participants are randomly invited to take part in political and non-political studies. A given sample is drawn through a process called "sample matching" to obtain national-representativeness (see Rivers (2006) for a discussion of this process). Numerous scholars (e.g., Barabas and Jerit, 2010; Brooks, 2011; Huber, Hill and Lenz, 2012) and surveys such as the Coop-

Figure 2: Marginal effect of *Both Precise* on subject confidence and willingness to pay to vote by *Ease*.



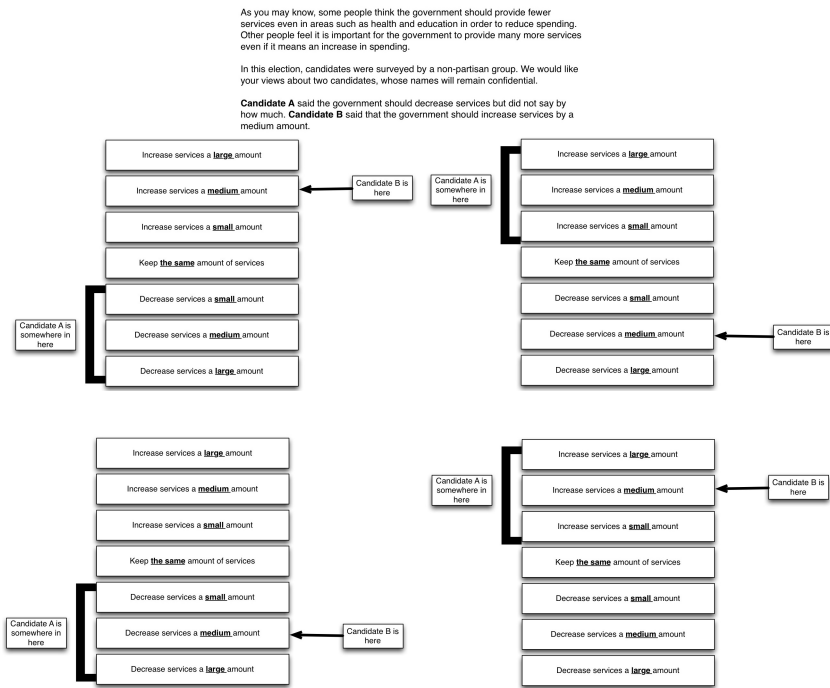
Predictions from model in Table 3 with error bars indicating 95% confidence intervals.

erative Congressional Election Study and the Cooperative Campaign Analysis Project (Jackman and Vavreck, 2009) have relied on YouGov. Scholars suggest that the YouGov technique produces samples of similar or higher quality to traditional telephone surveys (Berrens et al., 2003; Sanders et al., 2007). We include the demographic breakdown of our sample in the Supplemental Information; we also compare our sample to other nationally-representative samples and the US Census.

In this third study, we ask subjects to place themselves on a seven-point scale concerning whether the government should increase or decrease the amount of goods and services it provides.² Subjects are then randomly assigned to one of four treatments. In each treatment, there is one ambiguous candidate and one precise candidate which produces a 2x2 design where the ambiguous candidate's position always lays between 1 and 3 or between 5 and 7 while the precise candidate's position is always either 2 or 6. The four possible treatments are presented in Figure 3. A randomization check shows

²This wording comes from Tomz and Van Houweling (2009).

Figure 3: The four treatments from the YouGov survey.



that demographic subject characteristics measured pre-treatment — partisanship, political interest — did not affect group assignment.

As in our laboratory experiment, subjects in this study are asked to choose a candidate, however this choice is not incentivized in any way.³ Subjects are not paid based on their choice and they do not have to pay any actual cost to vote. Hence, this experiment can also test the bounds of the previous experiment in regards to how sensitive those results are to the cost of voting. In elections outside of a lab, the benefits one receives from an outcome and the costs of voting are both nebulous and likely low unlike in the incentivized experiment. In this experiment, however, subjects cannot decide the outcome of the election and the costs are close to zero. The subject needs only think

³We also did not time how long it took subjects to respond to the question and are unable to test the impulsivity with which subjects chose a candidate with this data.

Table 4: Predicting turnout in the YouGov survey by candidate choice and difficulty.

	Coef.	Std. Err.
Ambiguous Choice	0.388	0.284
Difficulty	-0.230	0.064
Ambiguous Choice* Difficulty	-0.303	0.105
Education	0.411	0.061
Constant	-0.752	0.265
AIC	952.37	
N	779	

Logit models with dependent variable coded 1 if the subject is highly likely to turnout and 0 otherwise.

about how much effort it would take to vote in a standard election and then decide whether or not they want to pay that price. Hence, if we get a similar result in this experiment, this would strongly suggest that our argument is robust to a low cost and low benefit situation that may be more like most elections.

Across conditions where subjects had a candidate who was closer to their own position, subject picked that candidate about 92% of the time regardless of whether that candidate was ambiguous or precise. Subjects who were assigned to the "Reflected Tie" conditions — those subjects who hold the moderate position of keeping levels the same — and thus are indifferent between the candidates chose the ambiguous candidate 54% of the time. Subjects who were of "Straddle Tie" type favored the ambiguous candidate only 27% of the time. This is much lower than in the incentivized experiment, but similar to Tomz and Van Houweling (2009). After making their choice, subjects were asked how likely it is that they would vote in an election between these two candidates. We trace the effect of ambiguity on choice and turnout by estimating a model of turnout likelihood (Table 4).

In Table 4 we estimate the likelihood that a subject was "highly" likely to vote.⁴ In

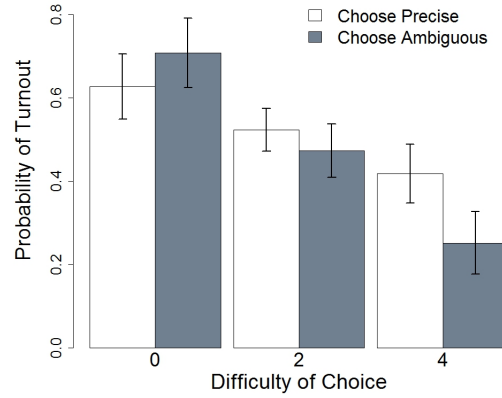
⁴Fifty-three percent of respondents say they are "highly likely to vote." Although

this model, the key independent variables follow from our previous analysis: *Ambiguous Choice*, *Difficulty*, and the interaction between those two variables. We also control for the subject's level of education. We rely on education as it is often considered the most critical determinant in a person's willingness to either vote or self-report turnout likelihood (Belli, Traugott and Beckmann, 2001; Katosh and Traugott, 1981).

As Table 4 shows, the coefficient on the interaction effect is statistically significant and in the expected direction. To demonstrate the substantive meaning of these effects, we plot the predicted values of the reported likelihood of voting in Figure 4. The only realized *Difficulty* values based on this experimental design are 0, 2, and 4 and *Difficulty* increases as one reads the figure from left to right. As the figure shows, there is no statistically distinguishable difference in turnout until *Difficulty* reaches its highest value. In this case, voters who chose the ambiguous candidate were eighteen percentage points less likely to vote. Hence, even when we remove an actual cost of voting, subjects were less likely to say they would vote for an ambiguous candidate.

our initial measure of turnout is in five points (see the Supplemental Information), we dichotomize the measure such that it is coded one if the subject said they were "highly likely" to vote and zero if they said they were "somewhat" or less likely to vote. In categorizing the measure we follow Druckman and Nelson (2003) and Krosnick and Brannon (1993). Specifically, Druckman and Nelson (2003) argue that categorizing these types of measures reduces measurement error.

Figure 4: Probability of turnout by candidate choice and difficulty.



Predictions from model in Table 4 with error bars indicating 95% confidence intervals.

Appendix 5: Demographics of YouGov Sample

Table 5: Comparison of YouGov Sample to ANES, Census.

	YouGov	ANES 2008	US Census
% Democrats	44.07%	43.22%	—
% Completed College	25.45%	29.12%	29.40%
% Living in South	32.72%	40.84%	36.74%
% White	75.14%	75.34%	79.7%
% Male	48.44%	44.03%	49.33%

Appendix 6: Pay to Vote Models with only Ambiguous Choice

Table 6: Does ambiguous choice only decrease turnout probability?

	Main Experiment		Hamburg		YouGov	
	Coef	Std. Err.	Coef	Std. Err.	Coef	Std. Err.
Ambiguous Choice	-0.541	0.136	-0.628	0.301	-0.153	0.164
Constant	-0.365	0.165	0.704	0.262	0.022	0.107
rho	0.424		0.205		——	
AIC	1700.3		355.58		1080.34	
N (Subjects)	1470 (147)		266 (63)		779(779)	

Logit models with dependent variable coded 1 if the subject is highly likely to turnout and 0 otherwise. Main Experiment and Hamburg models include random intercepts for subjects.

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