

# More is Less (Representation): Choice Set Size, Information Acquisition, and Correct Voting in Multimember Districts

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## **Abstract**

How does the number of candidates competing in an election affect voting decisions? Providing voters with more choice is generally thought to lead to more representative elections and elected bodies. However, selecting representatives from only a few candidates is very different from choosing between six, twelve, or fifty candidates. This paper presents results from an original survey experiment which randomly varies the number of candidates while tracking voters' information acquisition strategies and voting decisions. When presented with more candidates many voters are increasingly likely to ignore information about candidates' policy positions, rely on unreliable cues of candidate quality, reduce the dimensionality of the issue space, and make voting errors. These patterns suggest that the gains to representation of even modest increases in the amount of choice in elections may be lost on many voters.

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## Introduction

How do voters respond to more choice in elections? As more parties and candidates enter electoral competition, voters stand to reap substantial benefits. Elections with a greater variety of options will tend to include a wider range of policy positions and candidate types – all of which should enhance substantive and descriptive representation. However, improved representation in elections does not necessarily translate into more representative elected bodies. Voters must first identify candidates who will be at least satisfactory, if not optimal representatives. This task becomes increasingly difficult as the number of candidates and parties increases.

In this paper, I argue that increasing the number of candidates fundamentally alters the way that voters evaluate their options and make voting decisions. Although some voters may thrive when presented with more candidates, others may seek to simplify voting decisions by relying on information shortcuts, reducing the dimensionality of the issue space, or avoiding complex information entirely. As a result, although increasing the amount of choice in an election creates the conditions for improved representation, in many cases these improvements will not be realized. Many voters may benefit from elections with fewer options and a less burdensome choice-making environment that facilitates the acquisition of relevant information about candidate quality and a more careful consideration of the available options.

I test for a relationship between the number of candidates and voting decisions using a survey experiment which randomly varies the number of candidates while observing voting behavior. I administer this experiment on an original web-based survey interface that allows me to track voters' information seeking strategies and to estimate their preferences for various candidate attributes, and how those preferences may vary with the number of candidates. I focus on the probability that voters seek information about candidates' policy positions, the types of policy positions that are preferred, and reliance on information shortcuts. I also employ two measures of correct voting to test for variation in the quality of voting decisions as the number of candidates increases.

I find heterogeneous effects of the number of candidates on voting behavior across voter types. As the number of candidates increases, some voters acquire more information about candidates' policy positions and make good choices. Many other voters acquire less information about policy and rely instead on potentially unreliable cues of candidate quality when selecting representatives. Some other voters are more likely to avoid information about policy entirely as the number of candidates increases. As a result, a significant proportion of voters are more likely to vote incorrectly even with only a modest increase in the number of candidates. These results suggest that the ways voters' adapt their information-seeking and decision-making strategies may inhibit representation in elections with more than just a few parties or candidates.

In the next section I outline scholarly predictions for the quality of representation in systems with more choice. I then outline the research design and survey interface before presenting results from the experiment. The final section discusses the implications of my results for voters selecting representatives in multiparty or multi-candidate environments and for the study of political institutions.

## **Choice Set Size and Voting Behavior**

A substantial body of work in political science is devoted to understanding the consequences of electoral institutions. One central debate in this literature is the optimal number of parties and candidates that should compete in elections and hold seats in government. Systems that allow for more parties and candidates to compete in elections, generally by increasing district magnitude, are thought to provide greater proportionality and more representative elections and elected bodies. The logic is clear. In districts with more seats (higher magnitudes), more candidate and parties will enter competition. They will tend to compete by occupying more of the ideological spectrum and narrower ideological spaces, thereby reducing the average distance between any given voter and the candidate or party to whom they are most proximate (Cox, 1997; Persson and Tabellini, 2005). Proportional representation (PR) and higher

magnitude districts are therefore more likely to yield multiparty legislatures that represent a wider range of preferences (Powell, 2000; Taagepera and Shugart, 1989). Minority groups are also more likely to be represented in proportional systems with higher district magnitude (Taagepera and Shugart, 1989). These gains to representation are often associated with fairer or more just electoral outcomes (Powell, 2000; Lijphart, 1999).

Scholars debate whether these benefits outweigh the costs to governability and accountability that greater proportionality entails. There is little debate, however, that more choice in elections (at least at moderate levels) leads to more representative elected bodies.<sup>1</sup> Although few scholars advocate for very high magnitude districts with hundreds of candidates, it is generally assumed that expanding the choice set in elections will translate into improved representation, albeit with other costs.

Implicit and critical to this logic is the ability and willingness of voters to evaluate their options in elections and identify satisfactory if not optimal representatives. In order for more representative elections to translate into more representative elected bodies, voters must select candidates who are at least somewhat proximate to their preferences. In other words, although the availability of more options will virtually guarantee a closer fit for voters in elections, they can only achieve better representation if they can identify those candidates or parties who are closer fits to represent them in government. However, voters may not employ the same information acquisition strategies and decision rules with three candidates as they would if presented with six, twelve, or a hundred. As a result, although the availability of more options creates the conditions for better representation, in many cases those gains may go unrealized.

Increasing the number of parties or candidates in elections can fundamentally alter the way that voters evaluate candidates and making voting decisions. As the number of options in an election increases so too do information acquisition and processing costs. Not only does each additional candidate or party raise information costs, but if competition becomes

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<sup>1</sup>Taagepera and Shugart (1989) show that beyond a certain point very high magnitude systems may actually become less proportional because of a proliferation of small parties.

increasingly multidimensional, information costs may increase even more rapidly. While some voters may respond to information-rich environments by continuing to invest in information acquisition and carefully evaluating their options, others may adapt their decision-making processes to the electoral environment. In some cases, this may lead voters to abstain rather than bearing the increased costs of participation (Cunow, 2012). Other voters may continue to participate but will acquire less information than they would with fewer options and may be more likely to rely on information shortcuts to make voting decisions (Aguilar et al., 2012).

Surprisingly, the cognitive costs of the number of parties and candidates in elections have heretofore received little attention in political science, particularly in work on institutional design (Carey and Hix, 2011). Shugart, Valdini and Suominen (2005) show that the personal vote earning attributes that candidates supply vary with district magnitude. They identify voter demands for information shortcuts as one mechanism driving this variation. In high district magnitudes, strategic voting has been shown to be unlikely (Cox, 1997). Other work has argued that in systems that require voters to rank-order all candidates, the act of voting itself may be exceedingly difficult (Taagepera and Shugart, 1989). However, little work has tested how voters' information acquisition strategies and voting decisions vary with the number of parties and candidates. The exception is work in American politics which finds that in presidential elections, the presence of a third candidate decreases rates of correct voting (Lau and Redlawsk, 1997; Lau, Andersen and Redlawsk, 2008). Elsewhere, Lau and Redlawsk (2001) find mixed evidence of voter reliance on heuristics as the number of candidates increases – when presented with four candidate profiles rather than two, voters rely more on some heuristics but less on others.

It is especially surprising that the effects of choice set size in elections have not received more attention given the apparent sensitivity of voting decisions to myriad features of elections including candidates' appearances, the presence of irrelevant information or the outcomes of irrelevant events (Lawson et al., 2010; Huber, Hill and Lenz, 2012; Healy, Malhotra and Mo, 2010). Moreover, in non-political contexts, choice set size has been shown to have

a profound effect on choice-making. A number of experimental studies show that subjects presented with more options make poorer choices, are less satisfied with their choices, rely on easier information when making decisions, and in some cases avoid choice-making entirely. This “paradox of choice” has been identified in a variety of contexts including grocery shopping, dating, job hunting, investment decisions, and higher education (Iyengar, Wells and Schwartz, 2006; Lenton and Francesconi, 2010; Iyengar and Kamenica, 2010; Iyengar and Lepper, 2000). There is little reason to expect that political choices should not be subject to these same costs and that in elections voters would be immune to the challenges of navigating increasingly large choice sets that they face in so many other life decisions.

In this paper I test three hypotheses about the effects of choice set size on voting behavior. First, I focus on information acquisition. The costs of acquiring information about candidates’ policy positions increases with the number of candidates. As a result, many voters may be unwilling to bear the costs of learning about candidates’ policy positions when presented with more candidates. This may result in voters spending less time per candidate or even less time overall acquiring information about policy. In the extreme, some voters may prefer to rely entirely on non-programmatic candidate attributes as the number of candidates increases.

**Hypothesis 1** *As the number of candidates increases, voters will spend less time acquiring information about candidates’ policy positions.*

As the number of candidates in an election increases, voters may choose to rely on different types of information about candidates. Information shortcuts can provide voters with a means of learning about candidates without investing in more costly information about their policy positions (Lau and Redlawsk, 2001; Shugart, Valdini and Suominen, 2005). Other experimental work has shown that as the number of candidates increases, many voters are increasingly likely to rely on candidate race when voting (Aguilar et al., 2012). As a result, as the number of candidates increases, some voters will be more likely to turn to cues about candidate quality rather than acquiring information about policy. In non-political contexts, larger choice sets have been shown to lead choosers to rely on quick and easy cues when

making decisions (Lenton and Francesconi, 2010). The effectiveness of these shortcuts will vary considerably across elections. In some cases, candidate race, gender, ballot position, or other cues may be strong signals of candidate quality while in others they may be noisy, weak, or even misleading.

**Hypothesis 2** *As the number of candidates increases, voters are more likely to rely on information shortcuts when making voting decisions.*

In addition to increased acquisition costs, the cognitive burden of processing information and comparing candidates or parties increases with the amount of choice in an election. These increased processing costs combined with the acquisition of less information and greater reliance on potentially unreliable cues of candidate quality increase the probability that voters will make suboptimal or unsatisfactory choices as the number of candidates increases (Lau and Redlawsk, 1997; Lau, Andersen and Redlawsk, 2008). Correct voting should be less likely than as the number of candidates increases. The effect of choice set size on correct voting should be especially pronounced as information about policy becomes particularly costly and difficult to evaluate.

**Hypothesis 3** *As the number of candidates increases, voters are less likely to vote correctly.*

The next sections of the paper describe the experimental design and web-based survey platform used to test these hypotheses.

## Research Design

I employ a survey experiment to test for a relationship between the number of candidates in an election and voters' information seeking strategies and voting decisions. The survey has five stages. First, voters are asked to report their age, gender, education, income, political interest, party identification, and the state where they reside. Then, they are asked to rank twelve issue areas (corruption, crime, education, etc.) in order of their importance when selecting legislators. Respondents are then shown a set of candidate profiles and asked to

cast a vote for a candidate. After voting, respondents are shown the candidate they voted for and one other candidate and asked to indicate for whom they would vote if presented with only those two options. The final stage of the survey asks respondents to indicate how realistic the candidate profiles were and to report their satisfaction with their choice, with the candidates in their district in the last election, and with the quality of democracy in their country.<sup>2</sup> All the profiles used in the experiment are of hypothetical candidates with attributes created by the author. They are described in more depth below.

The key experimental manipulation in the survey is random variation in the number of candidate profiles with which respondents are presented. Respondents are randomly assigned to view 3, 6, or 12 candidate profiles. I leverage this variation to estimate the effect of the number of candidates on information seeking strategies and voting decisions by comparing aggregate difference in those behaviors across the three experimental conditions. For example, I compare rates of correct voting for respondents who saw three candidates to those for respondents presented with six or twelve. As is explained in more depth below, respondents' information seeking behavior and responses to the survey are recorded by the software used to administer the experiment.

An experiment is an ideal means of testing the hypotheses presented in this paper. It is nearly impossible to identify otherwise comparable elections that vary only in the number of candidates. Candidate entry is a function of institutional rules, structural factors, social cleavages, and voters' demands. As a result, the number of choices in an election varies not only with myriad factors that also impact voting behavior but may also be a function of voters' information-seeking strategies and previous voting decisions. Candidates' campaign strategies also vary with the number of other candidates in an election, making it difficult to isolate voters' responses from candidates' adaptations to different electoral contexts. In addition, accurately monitoring voters' information acquisition strategies is very challenging in an observational setting as voters may seek or be exposed to political information from any

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<sup>2</sup>A translated survey questionnaire is available in the Supplementary Information.

number of sources that cannot be monitored. Using an experiment, I can create variation in the number of candidates that is exogenous to candidate characteristics and voter preferences and also observe voting behavior to an extent that is not possible in an observational study.

## **MPH Survey Platform**

The experiment described in this paper was conducted using an original web-based survey platform. This platform (henceforth MPH) allows for more precise estimates of treatment effects in survey experiments using candidate profiles. MPH fully randomizes the candidate profile generation process and thus avoids a number of potential confounds often associated with experimental stimuli. In addition, it monitors respondents' information acquisition strategies as they evaluate the candidate profiles and allows candidates' policy positions to be a function of respondents' self-reported policy preferences.

As is described above, MPH first records respondents' answers to questions about themselves and their policy preferences. It then randomly assigns respondents to view 3, 6, or 12 candidate profiles – the three experimental conditions. Sample ballots are presented in Figure 1. Each candidate profile includes a name, a photograph, a brief biography (including information about the candidate's education, past professional experience, and family life), and policy positions on three valence issues.<sup>3</sup>

For each respondent, MPH generates a set of candidate profiles which it constructs from a pool of candidate attributes. This process works much like the process of assembling a Mr. Potato Head toy. Each profile begins as a blank slate upon which the profile is built. MPH has a pool of researcher-generated candidate names, biographies, and photographs which it selects at random to build the profiles. MPH builds the first candidate profile by randomly selecting a name, photograph, personal history, and ballot position for the profile. These attributes are drawn without replacement such that after the first candidate profile is created, subsequent profiles can be created on the same ballot without names, photographs,

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<sup>3</sup>All candidate are college-educated professionals and married with children.

Figure 1: Experimental Ballots (with English translations)

 <p><b>Vitória Ribeiro</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Carlos Gomes</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Patricio Barbosa</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>
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(a) 3 Candidate Ballot

 <p><b>Marcela Almeida</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Carla Gomes</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Daniel Rocha</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>
 <p><b>Gabriel Martins</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Cláudio Souza</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Luís Alves</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>

(b) 6 Candidate Ballot

 <p><b>Cláudia Souza</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Cristiano Correia</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Vítor Ribeiro</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>
 <p><b>Roberto Rodrigues</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Gabriela Martins</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Carlos Gomes</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>
 <p><b>Luís Alves</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Fernanda Dias</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Daniela Rocha</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>
 <p><b>Patricio Barbosa</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Paulo Santos</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>	 <p><b>Marcelo Almeida</b>          Biographies <a href="#">click HERE</a>          Issues <a href="#">click HERE</a>  <input type="radio"/> VOTE</p>

(c) 12 Candidate Ballot

or biographies appearing more than once for any respondent. MPH proceeds in this manner for each of the candidates until the ballot is full.<sup>4</sup>

MPH also randomly assigns race and gender to the candidate profiles, maintaining equal proportions of white male, black male, and white female candidates with  $\frac{1}{3}$  of the candidates being of each type regardless of the number of candidates on the ballot. Gender and race are assigned by varying the photograph used in the profile. Gender is also reflected in the candidates' names (e.g. Marcelo vs. Marcela) as well as in the gender of their spouses and other grammatical changes in their biographies. The final piece of the candidate profiles is the candidates' policy positions. Each candidate is randomly assigned a combination of three policy positions, based on the respondents' self-reported policy rankings.

Full randomization of the candidate profiles has a number of benefits. First, the profile generation process makes it possible to estimate voter preferences for all attributes of the candidate profiles. This approach is similar to recent work in political science which uses conjoint analysis, a technique originally employed in work on marketing (Hainmueller, Hopkins and Yamamoto, 2012; Green, Krieger and Wind, 2001). Because all attributes are assigned to each profile with equal probability, in the aggregate any differences in the vote shares of candidates possessing different attributes can be attributed to some effect of those attributes on voting decisions.

The candidate profile generation process employed by MPH also allows for less biased estimates of treatment effects than conventional experimental approaches. When some attributes of the experimental stimuli are held constant, treatment effects of attributes that are varied cannot be estimated independent from the other fixed attributes with which they appear. Only by fully randomizing all aspects of the experimental stimuli can treatment effects be estimated independent of the other features of the stimuli. Full randomization thus reduces potential sources of bias from interaction effects and confounds associated with multidimensional experimental stimuli.

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<sup>4</sup>Unlike Mr. Potato Head, the MPH candidate profiles cannot be assembled with parts in the wrong places or upside down.

Figure 2: Frame with Candidates' Policy Positions

<p><b>Marcela Almeida</b>            Marcela vai lutar por financiamento para a criação e promoção de produtos culturais.</p> <p>Marcela vai lutar para impedir a destruição do meio ambiente.</p> <p>Marcela vai trabalhar para criar empregos para que todos tenham a oportunidade de se sustentar.</p>	<p><b>Gabriel Martins</b>            Gabriel irá fornecer incentivos para a música, cinema e as artes.</p> <p>Gabriel vai melhorar a qualidade das escolas para que nossas crianças tenham uma educação melhor.</p> <p>Gabriel vai lutar para reduzir o desemprego e colocar as pessoas de volta ao trabalho.</p>	<p><b>Luís Alves</b> <span style="float: right;">✕</span>            Luís vai combater a poluição e proteger o meio ambiente.</p> <p>Luís vai trazer os valores da família de volta para o governo e a sociedade.</p> <p>Luís lutará contra o aumento dos preços para que as pessoas possam manter mais de seu dinheiro.</p>
<p><b>Vítor Ribeiro</b>            Vítor vai lutar para impedir a destruição do meio ambiente.</p> <p>Vítor vai trabalhar para corrigir nosso sistema de saúde e controlar os custos.</p> <p>Vítor combater a inflação e garantir que as pessoas consigam comprar o que precisam.</p>	<p><b>Carlos Gomes</b>            Carlos vai trabalhar no conserto do sistema de ensino e tornar as escolas melhores.</p> <p>Carlos vai se esforçar para proteger o meio ambiente e proteger o nosso patrimônio natural.</p> <p>Carlos vai dar às pessoas a oportunidade de trabalhar criando novos empregos.</p>	<p><b>Cristiana Correia</b>            Cristiana vai lutar pelos valores da família no governo e na sociedade.</p> <p>Cristiana vai dar às pessoas acesso a melhores cuidados de saúde a preços mais razoáveis.</p> <p>Cristiana vai colocar dinheiro de volta no bolso das pessoas pelo combate à inflação.</p>

Finally, MPH records the candidate attributes that are viewed by each respondent such that it is possible not only to determine the attributes used in the profile selected by respondents but also which profiles were foregone. The survey platform also monitors voters' information acquisition strategies as they evaluate the candidate profiles. As is shown in Figure 1, on each ballot respondents can click on links that open frames with information about the candidates' biographies or policy positions. Information about all candidates appears on each frame regardless of where on the ballot the link is located. A sample policy frame for six candidate profiles is shown in Figure 2. MPH tracks the amount of time respondents spend with the policy and biography frames open and respondents cannot proceed with the survey until these frames are closed. MPH thus makes it possible to track voters' information acquisition strategies and observe how these may vary with the number of candidates.

## Case Selection and Survey Implementation

Brazilian voters were recruited to participate in the survey from a large panel of respondents maintained by a private market research firm. Approximately 4,000 voters participated in the survey between June and August, 2013.<sup>5</sup> Respondents were told that they would be participating in an academic survey about political attitudes. They were compensated with “points” that can be redeemed to purchase a variety of products from the online store maintained by the market research firm. The respondents’ characteristics are presented in Figure 3. Like other online recruitment methods, this panel provides a large, diverse sample but is younger, wealthier, and better-educated than the universe of Brazilian voters (Samuels and Zucco, 2014). However, if anything, these characteristics of the sample increase the likelihood that the respondents will be comfortable navigating the web-based survey interface.

Brazilian voters are ideal subjects for this experimental design for two reasons. First, Brazil’s open-list proportional representation rules in legislative elections (except the Senate) and its multiparty system lead to dozens if not hundreds of candidates regularly competing in legislative elections there. Brazil’s least populous states typically have 60 to 100 candidates running in statewide districts with over 1,000 running in the highest magnitude statewide district in São Paulo. Executive races can also often have up to a dozen candidates with at least a few viable ones. As a result, Brazilian voters are accustomed to navigating large choice sets when evaluating candidates and making voting decisions. Were the survey to be conducted with voters in a two party or even a less fragmented multiparty system, it is possible that any treatment effects could be attributed to voters’ unfamiliarity with voting in elections with many candidates rather than the independent effect of the number of candidates on their voting behavior.

Brazilian voters are also ideal respondents for this research design because the information environment in Brazil’s legislative elections resembles the environment in the experiment. Most legislative candidates have very little advertising time with only a few seconds

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<sup>5</sup>Voting is compulsory in Brazil for citizens between 18 and 70 years of age so the only filter used in recruitment was to select adults.

to state their names and some other information about their backgrounds or policy positions (Albuquerque, Steibel and Carneiro, 2008). Newspaper coverage of legislative races is also extremely limited. As such, the amount of time respondents spend evaluating the candidates in the experiment before making voting decisions is not an unreasonable approximation of the candidate evaluation process in legislative elections for many Brazilian voters. Brazil's legislative elections are also highly personalistic with substantial intraparty competition and party labels are insufficient for voters to make voting decisions (Samuels, 2006).<sup>6</sup> This environment is also similar to the non-partisan ballots in the experiment. Finally, the valence issues presented by the candidates in the experiment are typical of the policy positions in legislative elections in Brazil. In sum, Brazilian voters are ideal subjects for this experimental design because they are accustomed to making voting decisions when faced with many candidates and the electoral environment presented in the experiment more closely resembles the environment in legislative elections in Brazil than in other systems.<sup>7</sup>

## External Validity

As is the case with any research design, it is important to consider whether the results from this experiment would apply with another sample of voters, other ballots, or in other political systems. In particular, because the design employed in this project employs hypothetical computer-generated ballots, how can we be confident that the results would apply with real ballots and candidates?

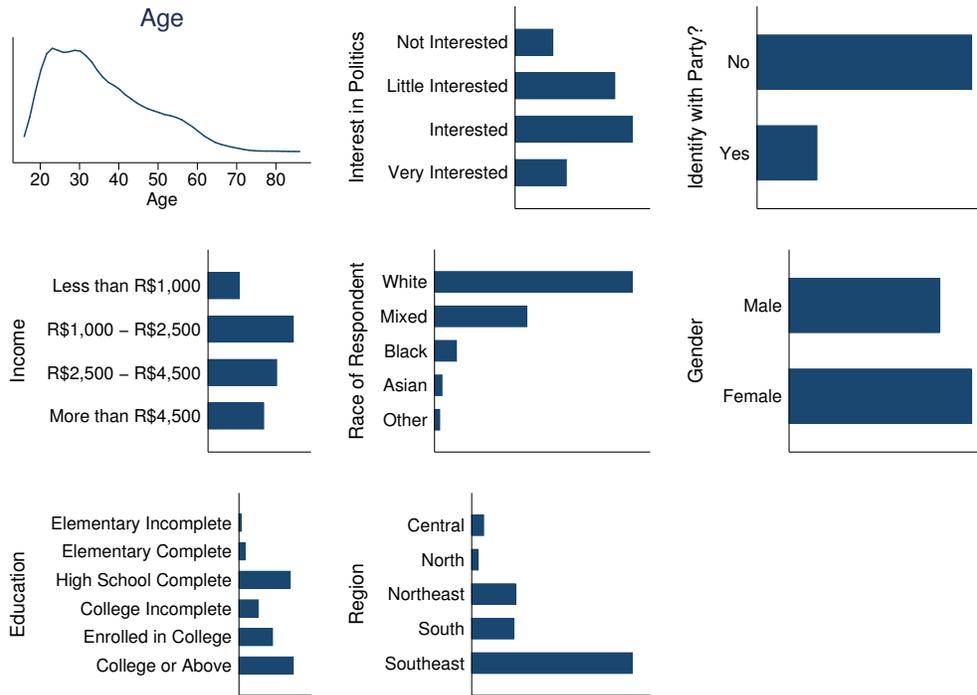
Perhaps most importantly, most voters in the survey noticed few to no differences between the candidate profiles and those of the candidates competing in their districts. Towards the end of the survey, after viewing the profiles and voting, subjects were asked to compare the profiles in the survey to the candidates who ran in the last election in their districts. Figure 4 shows responses to this question. Over 75% of respondents thought that the candidate profiles

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<sup>6</sup>Brazilian voters have an option to cast votes for party lists but very few do so (Mainwaring, 1999).

<sup>7</sup>As is discussed below, most respondents felt that the candidate profiles very closely resembled the profiles of the candidates running in the last election in their districts. This provides further support for the similarity of the electoral environment in the experiment to legislative elections in Brazil.

Figure 3: Characteristics of Survey Respondents

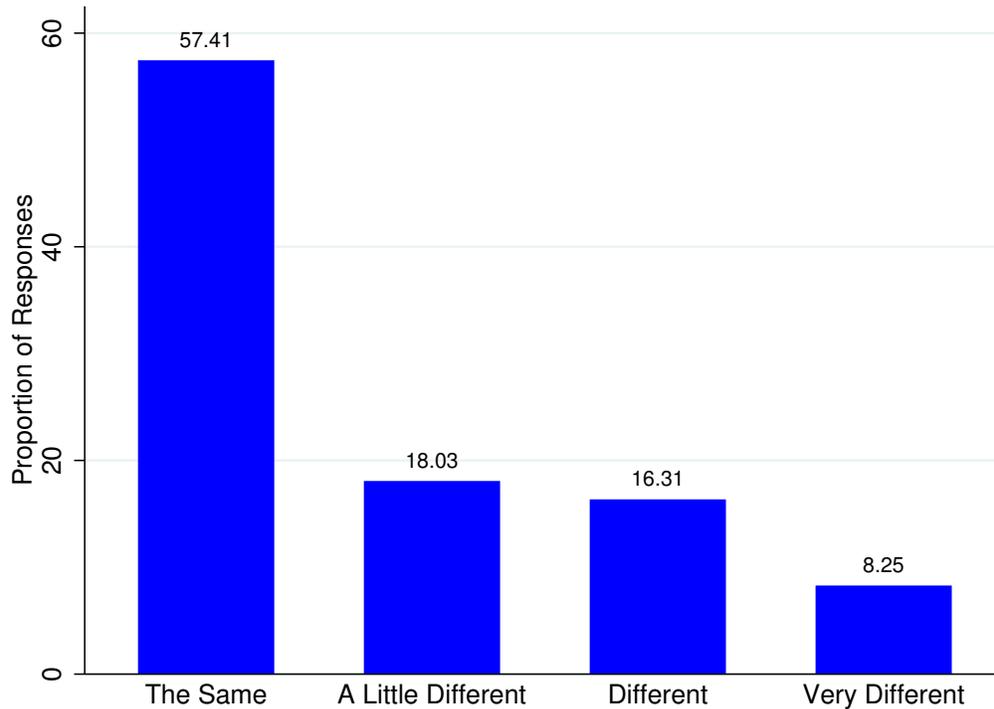


were the same or only slightly different from the candidates in the last election. Only 8.25% of respondents thought that they were very different.<sup>8</sup> As such, we can be confident that the use of hypothetical profiles did not lead most voters in the survey to behave any differently than they would have had real profiles been used.

Most of the voters who participated in the survey answered the questions seriously and made decisions that were consistent with a desire to make quality choices in the experiment. Very few respondents (less than 5%) ranked their preferred policy areas in the quickest possible fashion suggesting that the overwhelming majority attempted to complete that task in a sincere fashion. In addition, as is described in depth below, the cues employed and the choices made by most respondents in both rounds of the survey are not consistent with haphazard or reckless choice-making but rather reflect a desire to chose a quality candidate.

<sup>8</sup>In another survey experiment conducted with face-to-face interviews and using similar profiles, the author found similar perceptions of the candidate profiles. In that survey, few of the respondents who reported that the profiles were very different were able to name any specific differences. Moreover, many respondents reported being familiar with the candidates despite the profiles being fictional!

Figure 4: Difference between Survey Candidates and Candidates in the Last Elections



In sum, although the stakes for any given voter in the survey were relatively low, most respondents in the survey were sufficiently motivated to take the task at hand seriously and to select quality representatives. Moreover, given the minimal financial incentives for acquiring often costly information and making quality decisions in real elections, the rewards for the subjects in the experiment are not an unreasonable representation of the incentives for voters in most elections.

### **Information Seeking, Shortcuts and the Number of Candidates**

Before presenting the results of the experiment I briefly assess the randomization process and subjects' perceptions of the experimental stimuli. Table 1 shows the balance of respondent characteristics across the three experimental conditions. The mean values for the covariates are very similar across experimental conditions and one-way ANOVA's do not indicate any statistically significant differences across conditions, indicating that randomization was

Table 1: Covariate Balance across Experimental Conditions

Variable	3 Candidate Mean	6 Candidate Mean	12 Candidate Mean	Prob >F
Age	35.443	35.353	35.238	0.910
Interest in Politics	2.615	2.605	2.578	0.529
Identify with Party?	0.214	0.227	0.210	0.699
Income	2.645	2.623	2.575	0.071
Gender	0.556	0.546	0.539	0.570
Education	4.469	4.441	4.360	0.208

p-values from one-way ANOVA

successful.

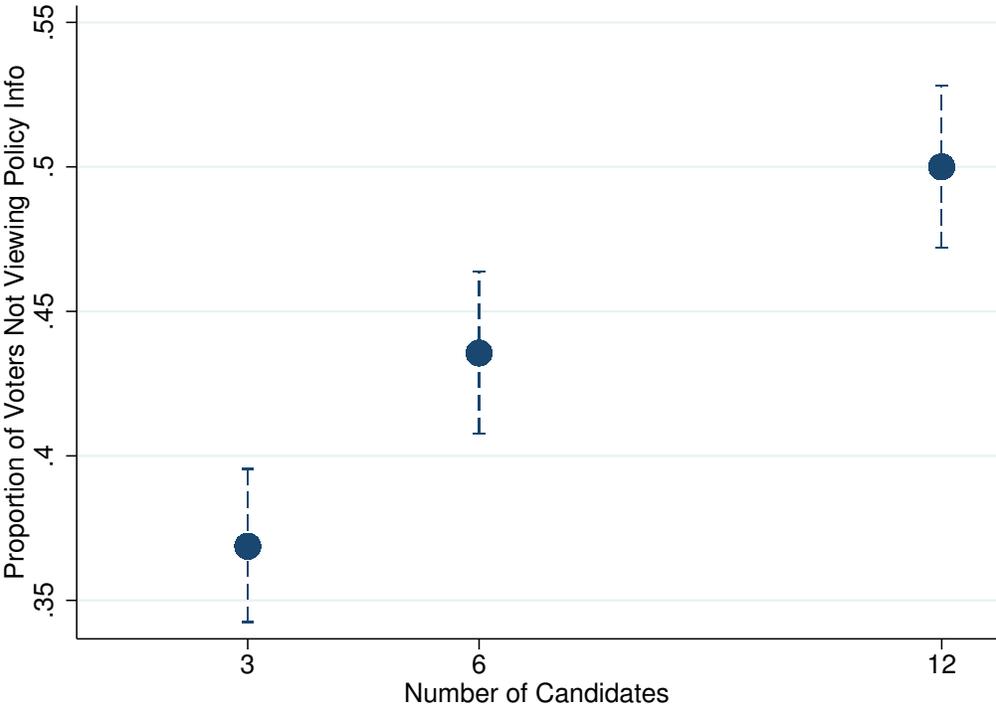
With respect to information acquisition, increasing the number of candidates leads some voters to acquire more information about candidates' policy positions but leads a larger proportion of voters to acquire less information or to entirely avoid seeking information about policy. Figure 5 shows the proportion of voters who sought no information at all about the candidates' policy positions before voting. Voters who sought policy information are considered to be any voter who opened the frame containing the candidates' policy positions. This is therefore a conservative measure of information seeking in that to pursue policy information here voters needed only to open the policy frame, even for just a second. There is a clear, positive, and nearly linear effect of the number of candidates on the proportion of voters ignoring the candidates' policy positions. Nearly half of the voters who were presented with twelve candidates completely avoided information about candidates' policy positions compared to approximately 37% of voters presented with three candidates, an increase of over 35%.<sup>9</sup> As is discussed in more depth later, this result fits well with work that shows that candidate-centered elections will grow more personalistic as the number of candidates increases (Carey and Shugart, 1995).

If increasing the number of candidates leads many voters to acquire less or no information about candidates' policy positions, how do those voters make voting decisions? As predicted

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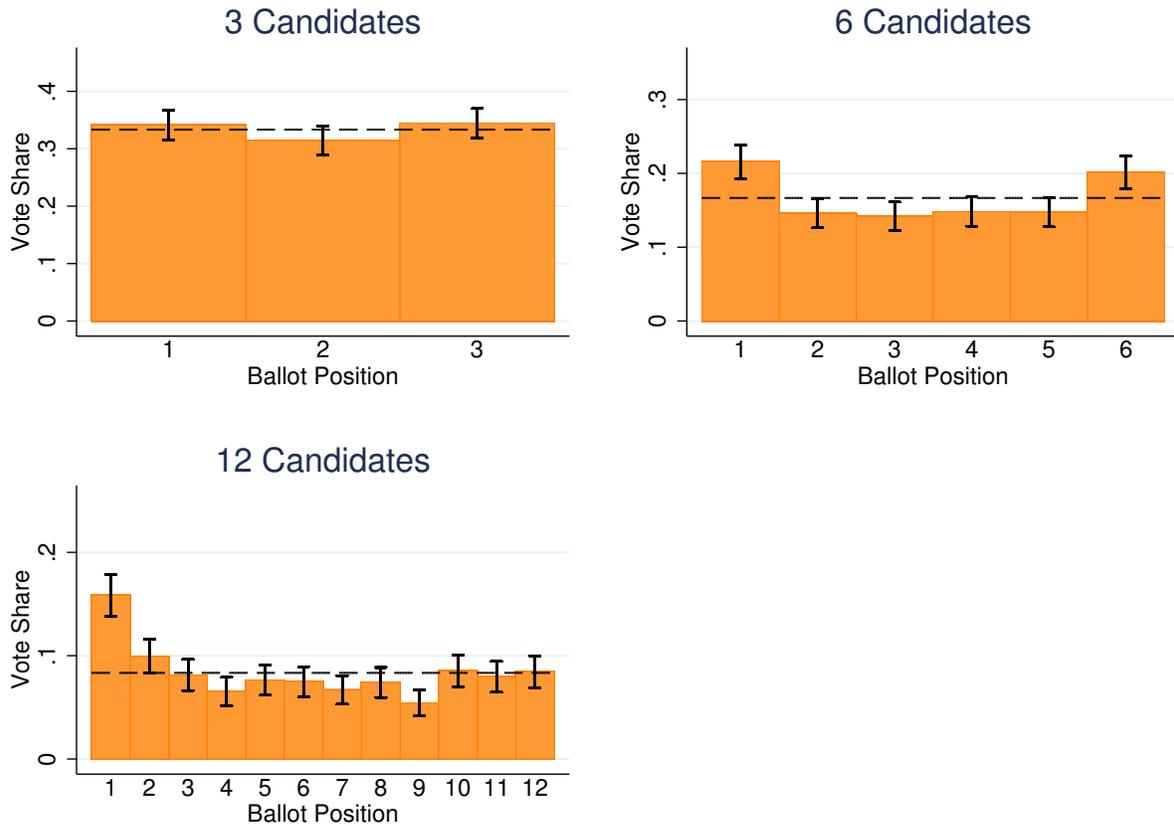
<sup>9</sup>As might be expected, regardless of the number of candidates, some voters are uninterested in acquiring information about candidates' policy positions.

Figure 5: Proportion of Voters Ignoring Candidates' Policy Positions



Sample means with 95% confidence intervals

Figure 6: Vote Share by Ballot Position and Number of Candidates



Sample means with 95% confidence intervals  
Dotted line represents  $H_0$

in Hypothesis 2, some voters are increasingly likely to rely on potentially unreliable cues of candidate quality. Figure 6 shows the vote share of the candidates in the experiment by ballot position. As is explained above, ballot order is randomly assigned to the profiles as they are generated for each respondent. As such, absent any preference for particular ballot positions, the candidates' vote shares should be equal across all ballot positions; this null hypothesis is represented by the dotted lines in the plot.

Figure 6 shows that with three candidates there are no significant ballot order effects. With six and twelve candidates however, there is a significant preference for candidates in certain ballot positions – the first position and last positions with six candidates and the

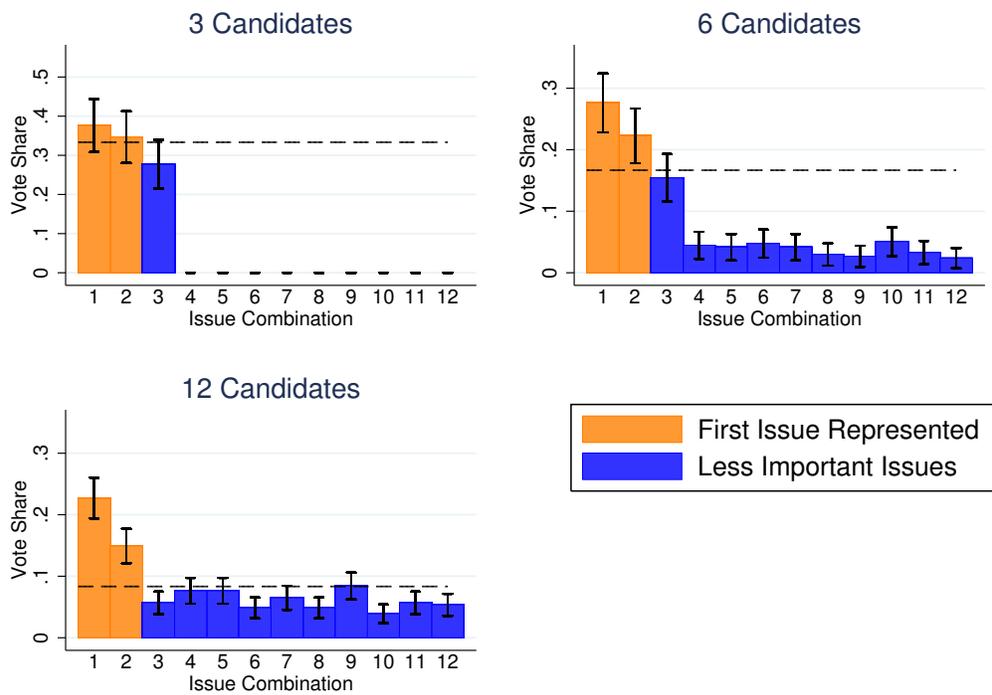
first and second positions with twelve candidates. As the number of candidates increases, some voters are more likely to rely on at least one information shortcut – ballot position – when making voting decisions. In some elections ballot position might be a meaningful signal of candidate quality if parties place their strongest candidates at the top of the ballot. In this experiment, however, it is randomly assigned and is therefore a meaningless signal of candidate quality. Here, voters employing this shortcut will find a good representative no more often than if they voted at random.

When presented with more candidates, many voters also sought to make vote choice less difficult by reducing the dimensionality of the issue space. Figure 7 shows the proportion of voters who pursued at least some information about candidates’ policy positions and voted for a candidate who presented a valence position on the voters’ (self-reported) most important issue. This proportion is shown relative to the null hypothesis which is the proportion of voters who would vote for such candidates if they voted at random.<sup>10</sup> Figure 7 shows that the proportion of voters “first issue hunting” when presented with three candidates is not statistically different from the null hypothesis. With six and twelve candidates however, there are significantly more “first issue hunters” than would be expected based on the null hypothesis. In response to increases in the dimensionality of the policy space as the number of candidates increases, many voters in the experiment sought to simplify the choice-making process by reducing the dimensionality of the issue space and hunting for their most important issue. This strategy reduces information costs but may mean losing one of the most important benefits of elections with more candidates – a higher dimension policy space – depending on the distribution of policy preferences in the election.

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<sup>10</sup>This random baseline is higher for respondents who saw fewer candidates because of the distribution of policies among candidates in the experiment. In each condition only two candidates would represent a voter’s most important issue. This meant 2 of 3, 2 of 6, and 2 of 12 candidates for the three, six, and twelve candidate conditions respectively.

Figure 7: “First Issue Hunting” Relative to Random Voting Baseline



Sample means with 95% confidence intervals  
Dotted line represents  $H_0$

## Correct Voting and the Number of Candidates

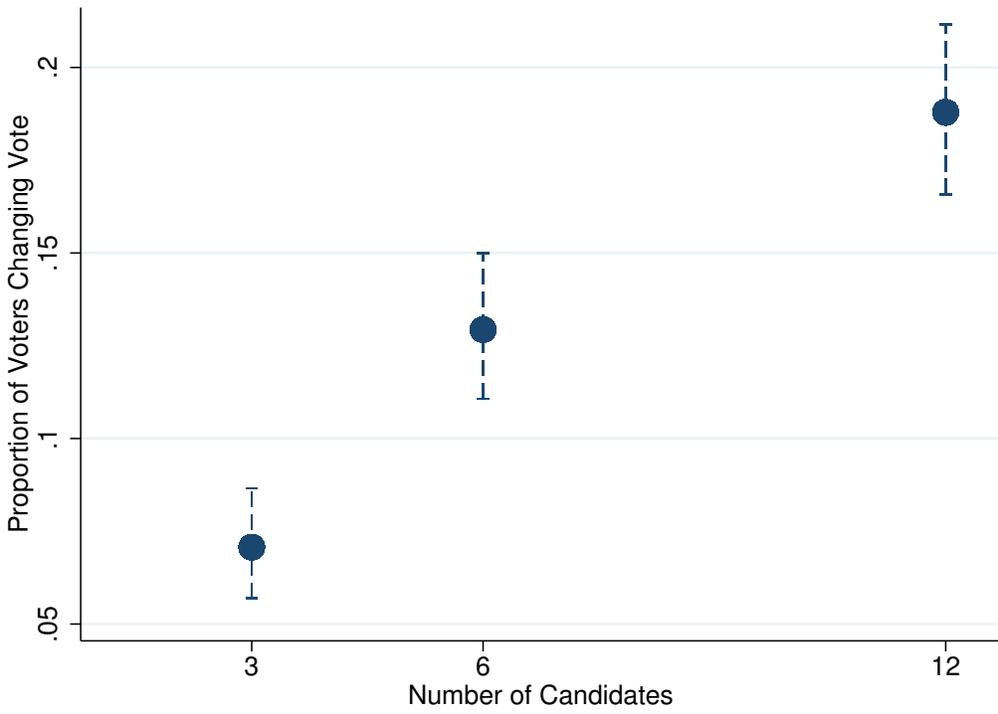
The information acquisition and dimension reducing strategies adopted by voters suggests that increasing the number of candidates has heterogeneous effects for different types of voters. Some voters take advantage of environments with more information and policy choices, others avoid policy altogether when presented with more candidates, and still others find a middle ground by relying on information shortcuts and seeking to reduce the complexity of the issue space. The next logical question is whether the changes in voters' information seeking and candidate evaluation strategies lead them to make poor voting decisions.

After selecting a candidate in the survey, respondents are asked to indicate a preference for one of two candidates – the candidate for whom they voted and one additional candidate from the ballot. Voters' choices in this second round can be used to determine if they voted correctly in the first round. Following Lau and Redlawsk (1997) and Lau, Andersen and Redlawsk (2008), voters who opt to discard their candidate in favor of another candidate are considered to have voted incorrectly in the first round. By discarding their original choice, voters indicate that they did not vote correctly and that they in fact prefer another candidate from the ballot.

Figure 8 shows the proportion of voters discarding their original candidate in the second round. Perhaps not surprisingly, the proportion of voters doing so is quite low with three candidates. As the number of candidates increases however, there is a significant and substantial impact on the proportion of voters changing candidates. This provides strong support for Hypothesis 3 – increasing the number of candidates increases rates of incorrect voting by this measure. Moreover, this measure is likely a conservative estimate of incorrect voting because endowment effects decrease the probability that voters will discard their original choice (Thaler, 1980). As a result, the nearly 20% of voters who voted incorrectly when presented with twelve candidates may in fact be an underestimate of the number of voting errors.

Are voters who discard their chosen candidates doing so haphazardly or does their decision

Figure 8: Proportion of Voters Changing Candidates by Number of Candidates



Sample means with 95% confidence intervals

to select a new candidate in fact reflect a poor initial decision and a desire to find a candidate whom they prefer? In order to determine whether or not voters select candidates who are a better fit for their preferences than their original choices, I employ a new measure of correct policy voting. I define a correct vote as a vote for a candidate whose policy positions are not strictly dominated by another candidate's.

Each of the candidate profiles in the survey includes policy positions in three of twelve issues areas. The issues represented by each candidate are a function of respondents' self-reported policy preferences. As is explained above, prior to viewing the candidate profiles, respondents are asked to rank policy areas in order of importance to them when selecting a legislator. Based on these rankings, I derive an objective measure of the quality of the fit between candidates' policy positions and voters' policy preferences. Some candidates are assigned objectively "correct" combinations of policy positions that strictly dominate other candidates' policy positions.

The logic of this new measure of correct policy voting is presented in Table 2. Here, Candidate 1 is assigned policy positions in the issue areas the are of 1st, 2nd, and 11th greatest importance to the respondent. Candidate 2 represents the 2nd, 3rd, and 11th most important issue areas. All candidates in the experiment take "valence" positions on these issues – rather than proposing a solution to a particular problem they advocate for an outcome that all voters support (less corruption, better schools, less crime, more jobs, etc.). If we assume that voters are indifferent between two candidates' positions on the same valence issue and that voters' utilities from each valence position are independent from one another, Candidate 1's issue positions strictly dominate those of Candidate 2. I therefore consider a vote for Candidate 1 to be a correct policy vote and a vote for Candidate 2 to be an incorrect policy vote. This measure can be used to evaluate the quality of the fit between voters' policy preferences and the policy positions of the candidates they select in the experiment.<sup>11</sup>

This measure of correct voting has two main benefits. First and most importantly, it

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<sup>11</sup>A more formal discussion and proof of this correct voting measure are provided in the Supplementary Information.

Table 2: Correct Policy Voting

Correct Vote	Incorrect Vote
Candidate 1	Candidate 2
1	1
2	3
11	11

is an entirely objective evaluation of the quality of voting decisions that requires no scaling of voters' responses or coding of candidates' policy positions. Previous work has relied on measures of correct voting based on scaling and weighting of voters' self-reported policy preferences and the policy positions presented by candidates (Lau and Redlawsk, 1997, 2001). Second, this measure does not require that voters answer challenging questions about their ideology or policy preferences. It only requires that voters rank policy areas in order of importance to them.

Figure 9 shows the correct policy voting measure applied to voters' second round vote choices. By this measure, voters who discard their original candidates in the second round are very likely to do so in favor of candidates whose policy positions are a better fit for their policy preferences.<sup>12</sup> This provides support for the validity of the second round vote choice as a measure of correct voting in the first round. Voters who opt to change their votes are likely to do so in pursuit of better policy representation. This result also suggests that choosing between two candidates may be considerably easier than voting in a multi-candidate election, a finding that echoes work on correct voting in U.S. presidential elections (Lau and Redlawsk, 1997; Lau, Andersen and Redlawsk, 2008).

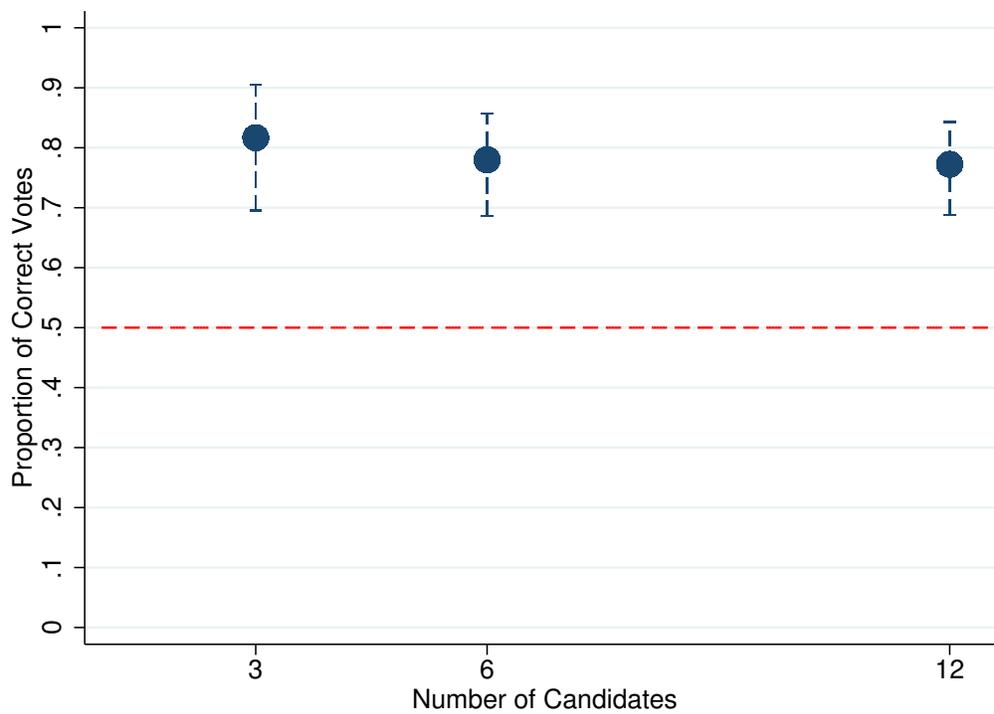
## Voter Satisfaction and the Number of Candidates

Providing voters with more choice in elections may also affect their satisfaction with their choices and with the democratic process. If, as the literature on institutional design predicts, increasing the number of candidates can improve representation, voter satisfaction

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<sup>12</sup>Because of their first round choices, some voters did not have the opportunity to select a correct candidate in the second round of the experiment and are therefore excluded from Figure 9.

Figure 9: Correct Policy Voting in 2nd Round for Voters Who Change Candidates



Sample means with 95% confidence intervals

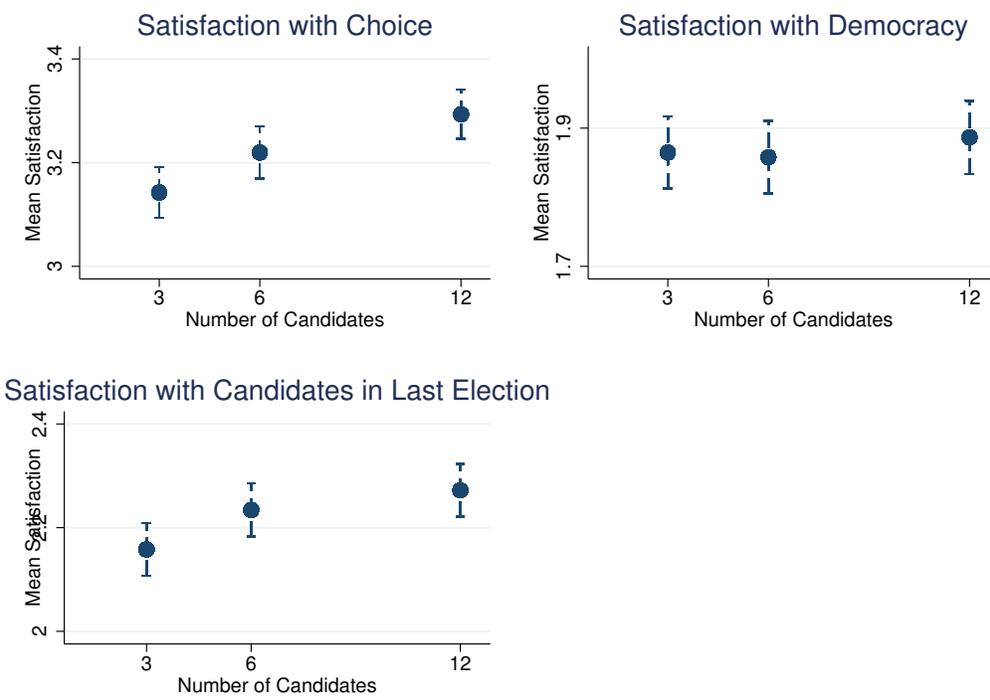
Dotted line represents probability of correct policy vote if respondents vote randomly

may increase with the number of choices in an election. On the other hand, increasing choice set size in non-political decisions has been linked to decreased satisfaction as choosers grow overwhelmed and those more prone to regret are frustrated by a growing number of alternatives (Iyengar, Wells and Schwartz, 2006; Schwartz et al., 2002). This dissatisfaction may be limited to the candidates or election at hand or may have broader consequences for voters' acceptance of electoral processes and democratic institutions.

In order to test for a relationship between the number of candidates and voter satisfaction, the final three questions of the survey asked voters how satisfied they were with their choice in the survey, with the way democracy works in their country, and with the candidates who ran in their districts in the last election. Figure 10 presents the mean responses to these questions. Voters who were presented with more candidates were slightly more satisfied with their choices and with the candidates in the last election. There was no significant effect of the number of candidates in the experiment on voters' satisfaction with democracy, possibly because the strength of the treatment in the survey was weak relative to subjects' feelings about democracy.

These results suggest that providing voters with more choices in elections may improve their satisfaction with their choices, even if it does not necessarily improve the quality of representation. Like voting behavior, the effects of choice set size on voter satisfaction may be heterogeneous across voter types. As has been found in other experimental work, some voters may seek to maximize the quality of their representatives regardless of the number of candidates and may find greater variety to be frustrating (Schwartz et al., 2002). A larger proportion however, may satisfy by avoiding costly information about policy positions and instead relying on quicker and easier cues of candidate quality. For the those voters, more choice may mean less frustration and more satisfaction as they adopt easier solutions to increasingly complex environments.

Figure 10: Voter Satisfaction by Number of Candidates



Sample means with 95% confidence intervals

## Discussion

Voters' information-seeking and decision-making strategies vary considerably with the electoral environment. Even very moderate increases in the number of choices in an election can profoundly alter how many voters evaluate candidates and select representatives. As a result, more proportional systems that seek to improve representation by allowing for more party and candidate entry may have heretofore unanticipated consequences. Rather than leading voters to seek representatives who are a closer fit for their policy preferences, increasing the size of the electoral choice set can lead many voters to avoid acquiring information about policy altogether. The information costs of increasing the number of candidates may lead other voters to first issue hunt or otherwise reduce the dimensionality of the issue space.

One of the primary benefits of more proportional electoral systems is that they will tend to lead to a wider range of policies and policy positions represented in elections. This benefit is lost on voters who ignore information about candidates' policy positions, first issue hunt, or otherwise seek to simplify their choices by reducing the complexity of the policy space. In the experiment presented in this paper, these effects begin to appear even when increasing the number of candidates from three to six, well within the lower-end of the range thought to strike a balance between representation and accountability in elections (Carey and Hix, 2011). These results suggest that scholars of elections and electoral institutions should carefully consider how voters adapt to more choice in elections and how changes in information acquisition strategies and voting behavior affect the functioning of electoral systems. These voter responses may dramatically alter the nature of elections and inhibit the translation of more representative elections into better representation.

The results presented in this paper also have a number of implications for candidate and party strategy. The dimensionality of the policy space in the experiment is exogenous to voters' demands and information-seeking behavior. However, in most elections the types of candidates who enter competition and the types of information emphasized in campaigns are in part a function of voters' demands and information-seeking behavior. The results

presented in this paper suggest that in electoral systems with more parties and candidates, policy positions may be deemphasized relative to information that is quicker and easier to acquire for voters facing more than just a few choices. Thus, in addition to the incentives created by intraparty competition and localism (Carey and Shugart, 1995; Shugart, Valdini and Suominen, 2005), the sheer number of options in an election may lead politics to be more personalistic or pork-centered because of voter demands for quicker and easier information about their options.

This paper provides evidence of the effects of increasing the number of candidates on Brazilian voters who are accustomed to navigating large choice sets in elections. Future work on the effects of choice set size on voting behavior should seek to explore how these effects vary across political systems. How do voters accustomed to fewer candidates and parties in elections respond to more choice? How does the presence of party labels alter voters' information acquisition strategies and voting decisions? How are voters affected in systems in which they vote for parties rather than candidates? Future work could also explore a wider range of choice set sizes to better explore the trade-off between representativeness and the cognitive burdens elections create for voters.

Another promising avenue for future research would be to explore which types of voters are most likely to thrive or to find voting challenging as the number of options increases. One useful framework might be the distinction between maximizers and satisficers and how those personality types hinder or facilitate choice-making (Schwartz et al., 2002). Future work might also examine how campaign content and coverage vary with the number of choices in an election and how they may hinder or facilitate vote choice. Institutional reforms may be effective in limiting candidate entry in elections but are rare because they are unlikely to be approved by politicians elected under existing configurations. Instead, changes to the way that information is delivered and presented to voters in elections (both by the media and campaigns) may provide considerable benefits for voters while being easier to implement.

Finally, the measure of correct voting and the candidate profile generation process intro-

duced in this paper may be useful tools for future research in this area. The logic of strict dominance employed in the correct policy voting measure can be applied to a wide range of choice experiments in which it is normally difficult to objectively assess the quality of choices. Future work could seek to vary the distribution of policy positions in a similar experiment. Like some recent work in political science using conjoint analysis (Hainmueller, Hopkins and Yamamoto, 2012), the complete randomization of the experimental stimuli employed in this experiment is also a promising means of improving causal inference in future experimental work.

## References

- Aguilar, Rosario, Saul Cunow, Scott Desposato and Leonardo Barone. 2012. “The Racial Democracy? Latent Racial Cues and Vote Choice in Brazil.” *Paper Presented at the Midwest Political Association Annual Meeting* .
- Albuquerque, Afonso de, Fabro Boaz Steibel and Carolina Maria Zoccoli Carneiro. 2008. “A Outra face do horario gratuito: partidos políticos e eleicoes proporcionais na televisao.” *Dados* 51(2):459–487.
- Carey, John M and Matthew Soberg Shugart. 1995. “Incentives to cultivate a personal vote: A rank ordering of electoral formulas.” *Electoral Studies* 14(4):417–439.
- Carey, John M and Simon Hix. 2011. “The Electoral Sweet Spot: Low-Magnitude Proportional Electoral Systems.” *American Journal of Political Science* 55(2):383–397.
- Cox, Gary W. 1997. *Making Votes Count*. Cambridge: Cambridge University Press.
- Cunow, Saul. 2012. “Too Much of a Good Thing? Large Choice Sets, Parties, and Representation in Multimember Districts.” *Paper Presented at the Annual Meeting of Midwest Political Science Association* .
- Green, Paul E., Abba M. Krieger and Yoram (Jerry) Wind. 2001. “Thirty Years of Conjoint Analysis: Reflections and Prospects.” *Interfaces* 31(3):S56–S73.
- Hainmueller, Jens, Daniel Hopkins and Teppei Yamamoto. 2012. “Causal Inference in Conjoint Analysis: Understanding Multi-Dimensional Choices via Stated Preference Experiments.” *Annual Summer Meeting of the Society for Political Methodology, Chapel Hill and Durham, NC* .
- Healy, Andrew J., Neil Malhotra and Cecilia Hyunjung Mo. 2010. “Irrelevant events affect voters’ evaluations of government performance.” *Proceedings of the National Academy of Sciences* 107(29):12804–12809.

- Huber, Gregory A., Seth J. Hill and Gabriel S. Lenz. 2012. "Sources of Bias in Retrospective Decision Making: Experimental Evidence on Voters' Limitations in Controlling Incumbents." *American Political Science Review* 106(04):720–741.
- Iyengar, Sheena S. and Emir Kamenica. 2010. "Choice proliferation, simplicity seeking, and asset allocation." *Journal of Public Economics* 94(7-8):530–539.
- Iyengar, Sheena S. and Mark R. Lepper. 2000. "When choice is demotivating: can one desire too much of a good thing?" *Journal of Personality and Social Psychology* 79(6):995–1006.
- Iyengar, Sheena S, Rachael E Wells and Barry Schwartz. 2006. "Doing better but feeling worse. Looking for the "best" job undermines satisfaction." *Psychological Science: A Journal of the American Psychological Society / APS* 17(2):143–150.
- Lau, Richard R., David J. Andersen and David P. Redlawsk. 2008. "An Exploration of Correct Voting in Recent U.S. Presidential Elections." *American Journal of Political Science* 52(2):395–411.
- Lau, Richard R. and David P. Redlawsk. 1997. "Voting Correctly." *The American Political Science Review* 91(3):585–598.
- Lau, Richard R. and David P. Redlawsk. 2001. "Advantages and Disadvantages of Cognitive Heuristics in Political Decision Making." *American Journal of Political Science* 45(4):951–971.
- Lawson, Chappell, Gabriel S. Lenz, Andy Baker and Michael Myers. 2010. "Looking Like a Winner: Candidate Appearance and Electoral Success in New Democracies." *World Politics* 62(04):561–593.
- Lenton, Alison P and Marco Francesconi. 2010. "How Humans Cognitively Manage an Abundance of Mate Options." *Psychological Science* 21(4):528–533.

- Lijphart, Arend. 1999. *Patterns of democracy: government forms and performance in thirty-six countries*. Yale University Press.
- Mainwaring, Scott. 1999. *Rethinking party systems in the third wave of democratization : the case of Brazil*. Stanford, Calif.: Stanford University Press.
- Persson, Torsten and Guido Enrico Tabellini. 2005. *The economic effects of constitutions*. MIT Press.
- Powell, G. Bingham. 2000. *Elections as instruments of democracy: majoritarian and proportional visions*. Yale University Press.
- Samuels, David. 2006. "Sources of Mass Partisanship in Brazil." *Latin American Politics and Society* 48(2):1–27.
- Samuels, David and Cesar Zucco. 2014. "The Power of Partisanship in Brazil: Evidence from Survey Experiments." *American Journal of Political Science* 58(1):212–225.
- Schwartz, Barry, Andrew Ward, John Monterosso, Sonja Lyubomirsky, Katherine White and Darrin R Lehman. 2002. "Maximizing versus satisficing: happiness is a matter of choice." *Journal of Personality and Social Psychology* 83(5):1178–1197.
- Shugart, Matthew Sørberg, Melody Ellis Valdini and Kati Suominen. 2005. "Looking for Locals: Voter Information Demands and Personal Vote-Earning Attributes of Legislators under Proportional Representation." *American Journal of Political Science* 49(2):437–449.
- Taagepera, Rein and Matthew Soberg Shugart. 1989. *Seats and votes the effects and determinants of electoral systems*. New Haven: Yale University Press.
- Thaler, Richard. 1980. "Toward a positive theory of consumer choice." *Journal of Economic Behavior & Organization* 1(1):39–60.

# Supplementary Information

## Correct Policy Voting

In this paper I introduce and employ a new measure of correct policy voting. I define a correct vote as a vote for any candidate whose policy positions are not strictly dominated by any other candidate's. As I illustrate in detail below, voters who cast a vote for a candidate whose policy positions are strictly dominated by another candidate's are voting incorrectly, at least with respect to policy. Dominance is determined based on voters' self-reported policy preferences.

Table 1 shows the twelve combinations of issue positions that are randomly assigned to the candidates in the survey. The issues represented by each candidate are a function of the issue ranking provided by respondents prior to viewing the candidate profiles. The numbers in Table 1 are based on the importance voters assign to each policy area in decreasing order such that 1 is a voter's most important policy area and 11 is the least important. For example, Candidate 1 presents a policy position on the respondent's 1st, 2nd, and 11th most important issues. Each candidate presents a policy position on three issues and all candidates take "valence" positions on these issues. I assume that voters are indifferent between two candidates' positions on the same valence issue as all candidates presenting policies on the same issues are advocating for the same outcome (albeit using slightly different randomly assigned language) without any specific policy prescriptions.

Table 1 presents the candidates' issue positions in the same groups of three candidates in which they are presented to voters. Within each group, the candidate in the first column of the table strictly dominates the other two candidates. For example, in the first group of three candidates, the policies of Candidate 1 strictly dominate those of Candidate 2 and Candidate 3. The following example illustrates the logic of strict dominance using iterated deletion:

Do the policies of Candidate 1 strictly dominate the policies of Candidate 2?

$$U_i(\text{Candidate 1}) \stackrel{?}{>} U_i(\text{Candidate 2})$$

Assume that voter  $i$ 's utility from the candidates' policies is the sum of the utility from each individual policy.

$$U_i(\text{Issue 1}) + U_i(\text{Issue 2}) + U_i(\text{Issue 11}) \stackrel{?}{>} U_i(\text{Issue 1}) + U_i(\text{Issue 3}) + U_i(\text{Issue 11})$$

Both candidates present the same positions on Issues 1 and 11. Using iterated deletion, voter  $i$  can ignore those issues when determining which candidate's policies are preferable because voter  $i$  is indifferent between the candidates' valence positions on those issues.

$$\cancel{U_i(\text{Issue 1})} + U_i(\text{Issue 2}) + \cancel{U_i(\text{Issue 11})} \stackrel{?}{>} \cancel{U_i(\text{Issue 1})} + U_i(\text{Issue 3}) + \cancel{U_i(\text{Issue 11})}$$

Based on voter  $i$ 's self-reported policy preferences, she derives greater utility from Issue 2 than from Issue 3.

$$U_i(\text{Issue 2}) > U_i(\text{Issue 3})$$

Therefore, for voter  $i$ , the policies of Candidate 1 strictly dominate the policies of Candidate 2.

$$U_i(\text{Candidate 1}) > U_i(\text{Candidate 2})$$

Given this strict dominance of Candidate 1's policy positions over Candidate 2's policy positions, I assume that a vote for Candidate 1 is a "correct" policy vote. Similarly, Candidate 3's policies are strictly dominated both by the policies of Candidate 1 and Candidate 2. The same logic of iterated deletion of equivalent policy positions can be applied to show that Candidate 2 strictly dominates Candidate 3. As such, a vote for Candidate 2 or 3 should be considered an "incorrect" policy vote and a vote for Candidate 3 is "doubly incorrect" in that

there are two other candidates whose policies strictly dominate the policies of Candidate 3. Any voter can achieve improved policy representation by voting for Candidate 1 compared to Candidates 2 or 3. Candidate 1 is therefore the only correct policy vote in this group of candidates while Candidate 3 is objectively the worst choice.

In each group of three candidates, one candidate strictly dominates the other two and one candidate's policies are "doubly" dominated by both of the other two candidates' policies.

$$U_i(\text{Candidate 1}) > U_i(\text{Candidate 2}) > U_i(\text{Candidate 3})$$

$$U_i(\text{Candidate 4}) > U_i(\text{Candidate 5}) > U_i(\text{Candidate 6})$$

$$U_i(\text{Candidate 7}) > U_i(\text{Candidate 8}) > U_i(\text{Candidate 9})$$

$$U_i(\text{Candidate 10}) > U_i(\text{Candidate 11}) > U_i(\text{Candidate 12})$$

This logic of strict dominance applies to candidates within groups but not across groups. Within any of the four groups of three candidates, one candidate strictly dominates the other two and one candidate is "doubly" dominated. Across groups however, none of the four dominant candidates is dominated by any other candidate.

As a result of this ambiguity across groups, regardless of the number of candidates (3, 6, or 12), the probability of a correct vote is always  $\frac{1}{3}$  and the probability of an incorrect vote is always  $\frac{2}{3}$ . In other words, there may be a "best" candidate for each voter but from the information provided by the voters in the survey, we cannot determine which candidate that is. I thus hold voters to a lower standard whereby correct voting is defined only as voting for a candidate whose policy positions are not strictly dominated by another candidate's. With more than three candidates, one or more of the "correct" candidates may not be the best candidate for a voter but would still be coded as a "correct" vote.<sup>13</sup> It is also worth noting that although voters are asked to rank twelve issues, it is only necessary that they correctly

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<sup>13</sup>With three candidates, there is only one correct candidate who represents the best available policy representative for each voter.

Table 1: Candidate Issue Positions

Group	“Correct” Vote	Strictly Dominated	
	Candidate 1	Candidate 2	Candidate 3
“A”	1	1	2
	2	3	3
	11	11	11

Group	“Correct” Vote	Strictly Dominated	
	Candidate 4	Candidate 5	Candidate 6
“B”	2	2	3
	3	4	4
	10	10	10

Group	“Correct” Vote	Strictly Dominated	
	Candidate 7	Candidate 8	Candidate 9
“C”	3	3	4
	4	5	5
	9	9	9

Group	“Correct” Vote	Strictly Dominated	
	Candidate 10	Candidate 11	Candidate 12
“D”	5	5	6
	6	7	7
	8	8	8

First column candidates strictly dominate others

rank at most their seven most important issues for this measure of correct voting to apply.<sup>14</sup>

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<sup>14</sup>The other issues are only used to maintain independence across groups of candidates and an equal probability of correct voting across experimental conditions.

## Survey Questionnaire (Author's English Translation)

### Pre-Treatment Questions

- What is your age?
- What is your gender?
  - Male
  - Female
- In what state do you live?
- How interested are you in politics?
  - Not interested
  - A little interested
  - Interested
  - Very interested
- Do you identify with any political party?
  - No
  - If yes, which one?
- What is your level of schooling?
  - Primary school incomplete
  - Primary school complete
  - High school complete
  - College incomplete not currently in college
  - Currently in college
  - College or higher
- What is your family's total monthly income?
  - Less than R\$1,000
  - From R\$1,000 to R\$2,500
  - From R\$2,500 to R\$4,500
  - More than R\$4,500
- What is your color or race?
  - White (*Branca*)

- Black (*Preta*)
  - Asian (*Amarela*)
  - Mixed race (*Parda*)
  - Other (*Outra*)
- Are you a Brazilian citizen?
    - No
    - Yes
- Which of the following areas is most important to you when you go to vote for a candidate for deputy Please rank the following issues in decreasing order of importance (most important issue =1 and the least important issue =12)
    - Taxes
    - Crime
    - Education
    - Corruption
    - Inflation
    - Transportation
    - Environment
    - Culture
    - Poverty
    - Family Values
    - Jobs
    - Health Care

### **Post-Treatment Questions**

- Do you think that the candidates you saw today were the same or different from the candidates who ran in the last Congressional election in your district?
  - The same
  - If different, how different?
    - \* A little different
    - \* Somewhat different
    - \* Very different
- How satisfied are you with the candidate you chose in this survey?
  - Very dissatisfied

- Dissatisfied
  - Neither satisfied nor dissatisfied
  - Satisfied
  - Very satisfied
- How satisfied are you with the candidate you chose in this survey?
  - Very dissatisfied
  - Dissatisfied
  - Neither satisfied nor dissatisfied
  - Satisfied
  - Very satisfied
- How satisfied are you with the candidates who ran for federal deputy in your state (district) in the last elections?
  - Very dissatisfied
  - Dissatisfied
  - Neither satisfied nor dissatisfied
  - Satisfied
  - Very satisfied
- How satisfied are you with the way democracy functions in this country?
  - Very dissatisfied
  - Dissatisfied
  - Neither satisfied nor dissatisfied
  - Satisfied
  - Very satisfied