The Effects of Choice Context on Decision-Making: An Application to Voter Fatigue

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Abstract: This paper exploits a natural experiment in which choice fatigue is isolated as an explanation for the usage of heuristics in decision-making. The empirical application provides evidence that voters who see a given contest relatively further down the ballot are more likely to vote "no" and to abstain. Within-election exogenous variation in ballot position is primarily due to differences in the set of overlaying local political jurisdictions. My central finding is that lowering a proposition 10 positions on the ballot increases precinct-level "no" votes and undervotes by 1.3 and 0.7 percentage points, respectively. Interestingly, 8 of 124 statewide propositions in the dataset have winning margins within the range of the "no" estimate. The empirical analysis employs a unique precinct-level panel dataset of votes cast for the entire menu of federal, state & local ballot choices in primary and general elections between 1992 and 2006 in San Diego County, California. Implications of the results range from the dissemination of information by firms and policy makers to the design of electoral institutions and the strategic use of ballot propositions.

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1 Introduction

Do people really find the pure act of decision-making to be exhausting or effort-consum ing? If so, much of the evidence is either anecdotal or can be interpreted differently. For instance, people may avoid making decisions due to costly information gathering, analytic complexities beyond their abilities, or a desire to delay decision-making until a source of uncertainty is resolved. In this paper, I provide evidence which isolates the effect of the process of making decisions on choice fatigue and shows that fatigue increases the reliance on heuristics in decision-making. The empirical strategy exploits a natural experiment which generates conditionally random variation in the number of decisions a voter must make before reaching her decision on a certain contest on the ballot.

The empirical application of voter behavior is quite helpful in isolating choice fatigue for several reasons. First, a person who is in a voting booth has already voluntarily invested her time in registering to vote, going to the polls and standing in line, so we know that the voter is motivated to make some decisions. Second, the voter knows that there is no opportunity to delay decision-making since the contests are only open for voting on Election Day. Third, once at the polling station, the information available for statewide propositions – gained from reading the ballot or information pamphlets brought to the poll – is unaffected by variation in the number of contests listed above a particular proposition.1 Finally, for the California propositions which are the focus of my main results, it is relatively easy for the voter to not make a decision; she can either completely abstain and allow more interested voters to make the decision for her or vote "no" as a way of maintaining the status quo without thinking about the question.2

1 Given that information about statewide propositions is distributed separately from local elections information, it is unlikely that information acquired before going to the polls depends upon the variation in a statewide proposition’s ballot position. If this is not the case, any voting precinct-specific factor will be controlled for with precinct fixed effects.

2 In contrast with California, some states have propositions in which a "no" vote is not necessarily a vote for the status quo.
The economic importance of whether decision-making is fatigue-inducing has been stimulated by recent work in behavioral economics and consumer psychology. For example, Levav et.al. (2007) find in a field experiment that German car buyers customizing their Audi are more likely to rely on defaults – and thus spend more money on the car – if decisions with larger numbers of alternatives are placed at the beginning of the sequence of customization decisions. Also, Iyengar & Kamenica (2007) find that employees at institutions with more funds to choose from in their 401(k) plan ultimately allocate more money to bond funds and less to equity funds. Although these papers provide motivation for my hypothesis, they cannot directly address the pure role of fatigue due to a lack of randomization in the position of certain decisions.

This recent work complements common wisdom that decision-making can be exhausting through the contemplation of many alternatives for a single decision or by going through a long list of decisions. However, explanations behind this intuition may confound choice fatigue and other characteristics of the choice environment. As an example directly relevant to the voting context, the phenomenon of "roll-off" describes voters as less likely to cast a vote as they move down the ballot (Burnham 1965). While there is no debating this stylized fact, the explanation for it is not clear. Voters may indeed become fatigued as they make more and more decisions, but contest saliency also generally decreases between top-of-the-ballot contests such as President and Governor and lesser-known statewide and local offices and propositions (Bowler, Donovan & Happ 1992, Bullock & Dunn 1996). Thus, fatigue and the saliency of a particular contest are interrelated.

The ability to disentangle the role of fatigue from other informational hypotheses is important. For instance, if people hesitate to make decisions because they find it costly to gather information, a benevolent policy maker might shower them with free information. On the other hand, if people hesitate to make decisions because they find the act of making decisions inherently fatiguing, the policy maker might
restrict their decision set or even deprive them of information. It is possible that people are better off making all of their decisions in a slightly uninformed way rather than making only some of their decisions in a fully informed way.

With these motivations in mind, the main contribution of this paper provides evidence that the process of decision-making induces fatigue and increases the reliance on the usage of heuristics. In particular, I find that lowering a given proposition 10 positions on the ballot increases precinct-level "no" votes and undervotes by 1.3 and 0.7 percentage points, respectively. Interestingly, the "no" estimate is within the winning margin of 8 out of 124 propositions in the dataset.

To further motivate the central idea, consider Proposition 35, a California statewide ballot measure in the 2000 general election regarding the removal of certain restrictions on the use of private contractors in public works projects. This proposition appeared on every ballot in the state, but because of the constitutionally-mandated ordering of contests and the differences in local ballot composition across the state, voters were presented with different numbers of previous decisions before seeing Proposition 35. For example, voters in San Diego County saw Proposition 35 listed anywhere between 9th and 19th on the ballot. Figure 1 illustrates the within-election variation in the ballot position of Proposition 35 across precincts. From the perspective of the standard economic model of decision-making, we would not expect that a contextual variable such as ballot position affects outcomes. However, as Proposition 35 moved down the ballot, the choice behavior of the precincts also changed. Figure 2 shows a positive association between the ballot position of Proposition 35 and the percentage of "no" votes and undervotes (i.e., abstentions) in the respective precincts. The figure also shows that no such positive relationship exists across the same precincts in the average fraction of undervotes for the U.S. Senator race, which was the last contest appearing at a common ballot position.

3The title of the proposition that appeared on the ballot is “Public works projects. Use of private contractors for engineering and architectural services.”
4The staggering of State Senate contests across presidential and gubernatorial elections also provides down-ballot variation in ballot position. This is discussed further in section 4.
across the precincts. While this example only illustrates a simple relationship for one contest, the central contribution in this paper provides econometric evidence of ballot position effects which are isolated from other contest- and precinct-specific voter choice covariates.

To better understand the relevance of this paper’s research contribution, the next section discusses the relevant previous literature on decision-making and roll-off. Section 3 provides a theory of choice fatigue which is supported by the empirical evidence built in sections 4 through 6. The implications of the results for political economics and theories of decision-making, as well as practical concerns for the design of electoral institutions are discussed in section 7. I conclude in section 8.

2 Previous Literature

The central hypothesis in this paper is motivated by evidence that the context under which decisions are made can affect outcomes. Context can be relevant in many choice environments, but given that the application in this paper is voter decision-making, I first briefly discuss relevant research in this area and later return to more broadly motivating work in consumer psychology and economic choice.

There are several dimensions in which context may be important when analyzing voter behavior, but the focus in this paper is on just one: how the collection of contests across the entire ballot can affect choices made in a particular contest. In the existing literature on the effects of ballot composition on participation, there are three main explanations for voter participation: information, confusion and fatigue. Within this body of work the fatigue effects cannot be disentangled from other participation hypotheses due to methodological limitations that disallow any sort

5 Other contexts which can serve as a cue or heuristic to the voter in individual decisions are candidate ordering (Meredith & Salant 2007, Koppell & Steen 2005), ballot configurations/design (Walker 1966), and candidate cues such as gender (McDermott 1997), ballot designation/incumbency (McDermott 2005), race (Washington 2006, Engstrom & Caridas 1991, Vanderleeuw & Utter 1993) and partisanship (Sniderman, Brody & Tetlock 1991). Additionally, these effects may be exacerbated in the absence of other cues (Miller & Krosnick 1998).
of causal inference. I discuss two representative papers here. First, Darcy and Schneider (1989) study the 1986 Oklahoma gubernatorial general election in which the usage of fill-in-the-bubble optical voting technology by some counties placed the high-salience U.S. Senator contest in obscure or unusual places on the ballot. While their data analysis is simple (e.g., no standard errors are given or hypothesis tests performed), the data on a superficial level suggest that counties using optical voting technology are associated with 3 to 7 percentage points more undervotes compared to other counties using lever machines. Clearly no inferential conclusions can be made to explain the difference, but the authors do present an example of how the relative position of a contest on the ballot may be important for voter choice.

Second, Bowler, Donovan & Happ (1992) discuss how voter fatigue may influence "no" voting and abstaining. They refer to Downs (1957) in arguing that motivations for voting are driven by benefits exceeding the costs. These benefits and costs are directly affected by informational and political economic channels such as contest controversy, expected winning margin and campaign expenditures (Downs 1957, Magleby 1989, 1984). If informational costs exceed the benefits of voting, then voters may resort to cheap decisions such as voting the status quo or allowing others to decide. I adopt a form of this argument as motivation for the choice of dependent variables. Bowler, Donovan & Happ’s empirical approach to identifying fatigue uses a state-level dataset of votes on California ballot propositions for 1974-1988 to analyze how voters behave as they move down the ballot. In their analysis, the variable for ballot position is equivalent to the ordering of the contests. Thus, if information demands increase as voters move down the ballot, then any evidence of voter fatigue is confounded with explanations regarding information and saliency. Importantly, they cannot separate proposition-specific factors from the effects of ballot position. Given these limitations, a main contribution of my paper is to disentangle fatigue from other participation covariates such as the level of available

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*Beyond the statistical limitations, characteristics of the three ‘treated’ counties are confounded with the effect of the change in voting technology.*
information or contest saliency.

Apart from fatigue, several authors look directly at the role of information in abstention. For example, Coupé and Noury (2004) use data from a survey experiment to find the "pure" effect of information on the decision to abstain. While not an application based on directly observed voter behavior, their conclusions are intuitive and suggest that those with less information about a particular survey question are more likely to abstain. Another example is Wattenberg, McAllister & Salvanto (2000). They characterize voters as "treat[ing] voting as if it were a test, picking out the questions that they can answer." While they argue that voters will less information are more likely to abstain, their empirical approach uses survey data which likely overreports participation and provides noisy measures of a voter's level of information. These issues are avoided with my approach since my data are observed voter choices and contest saliency is controlled for by analyzing within-contest variation in ballot position. This strategy allows the exploitation of a clean source of variation in ballot position to focus on the pure role of decision-making, separated from potentially unobservable and correlated determinants of voter choice. In addition, a table in their paper highlights one major shortcoming in this literature and the corresponding innovation in my work. Table 1 (p. 237) lists contests on the California statewide ballot in the 1994 general election, with the ballot position of the last statewide elective office (Superintendent of Public Schools) at 15th and the first statewide proposition (Prop. 181) at 16th. However, in between these two contests is a potentially long list of local candidate contests which, as discussed below in section 4, is the key source of variation needed to isolate the effects of voter fatigue. If certain voters have more decisions to make for local offices, then, after controlling for contest saliency, it may be possible that these voters are relatively more fatigued when deciding on the first statewide proposition and subsequent contests.

The fatigue effects that I identify in the voting application are intuitive given the previous work in behavioral economics and consumer psychology regarding the role
of context in decision-making. For example, Levav et.al. (2007) find in a field experiment with buyers of Audi cars in Germany that the sequencing of car customization decisions affects final outcomes. Customers in their experiment are randomly assigned to treatments in which the first 8 of 67 decisions over car attributes are ordered either in increasing or decreasing order of the number of attributes available for each decision. Levav et.al. find that customers in the "Hi-Lo" treatment (decisions with more alternatives first) are more likely to take the default choices than those in the "Lo-Hi" (decisions with less alternatives first) treatment. In addition, the reliance on default options cause the "Hi-Lo" customers to spend more money on the car. While it is not possible to observe changes in the ordering of ballot contests, it is informative for the voting context that evidence of early fatigue or "mental depletion" can affect later decisions. The advantage of our approach in identifying the effects of choice fatigue is that we observe exogenous and naturally random variation in the number of previous decisions made. Although the car customization experiment has some variation in the number of car characteristics presented before arriving at a particular decision, there are only two orderings and these are constructed purely with the attributes of individual decisions in mind.

Boatwright and Nunes (2001) provide additional evidence that decisions made sequentially can be affected by the attributes of individual choices. They find in a natural experiment at an online grocer that reductions in assortment within 42 product categories increase sales by an average of 11%. Additionally, 75% of the grocer’s customers increased their overall expenditures. Although the evidence points to a general story that simpler decision contexts may be associated with less choice fatigue, it is not clear whether the observed increase in purchases (decisions) is due to within-category or across-store variety reductions. However, it is likely that both

\footnote{While in this paper we do not directly address the issue of complexity of individual voting decisions, we do acknowledge that this can affect choice behavior for a particular contest. The evidence rom consumer psychology which supports this idea has been labeled "choice overload" and is found in, for example, Iyengar and Lepper (2000), Bertrand et. al. (2005), and Gourville and Soman (2001). Furthermore, theoretical arguments (Kamenica 2005) and experimental evidence (Salgado 2005) exist for why consumers may prefer smaller choice sets over larger ones.}
are important in terms of their impact on decision-making. From the perspective of Levav et.al. (2007), it is possible that the relative ease of decisions made early on in the shopping experience affect the likelihood of purchasing products later in the decision sequence. The alternate explanation that within-product decreases in variety increase sales is in line with the choice overload literature, spearheaded by Iyengar & Lepper (2000). They find in experiments on the variety of jams (and separately, chocolates) in a tasting booth and the number of ideas for extra-credit essays that decisions with more alternatives are associated with more choice overload, i.e., less actions taken.

Other economic choice research complements the evidence cited above regarding the role of defaults and opting to not decide. Madrian and Shea (2001) find that default enrollment in 401(k) savings plans enrollment affects long-term participation, even when the cost of enrolling – that is, changing the status quo – is low relative to the matching benefit provided by firms. Dhar (1997a, 1997b) finds that preference for a "no-choice" option (i.e., choice deferral) increases when there is no single alternative in the choice set that has a clear advantage. Another 401(k) study by Iyengar and Kamenica (2007) complements the research on the reliance on defaults and choosing the status quo. They find that the percentage of money allocated to lower-risk bond and money market mutual funds tends to be higher for employees of institutions whose 401(k) plans have larger numbers of funds from which to choose.

The established evidence describes decision-making as susceptible to fatigue and thus reliant on heuristics such as not choosing or choosing the status quo. The studied choice environments are those which consumers may find themselves in every day (such as shopping) or less frequent decisions that potentially have more significant implications for a person's utility (such as retirement planning). Clearly context matters, but the role of fatigue has not been isolated from other characteristics of the choice environment, even though it is intuitively present. My paper adds to the research on contextual choice in decision-making by examining a clean, exogenous
source of variation in the position of a given decision which allows me to focus on the role of fatigue in pure decision-making. Moreover, the presence of choice fatigue is found to increase the reliance on the usage of heuristics. In the empirical application, these heuristics may be abstaining and voting "no." The next section provides a theory describing this idea.

3 A Simple Theory of Choice Fatigue

The theory of choice fatigue in voter decision-making presented in this section is meant to serve as a guide to motivate the estimated reduced-form regressions. A more fundamental model of choice fatigue that generates structural equations to be estimated is beyond the goals for this paper. Instead, the objective here is to present a model simply as a description of and background for the hypothesis to be tested. To reiterate, I hypothesize that the process of making decisions induces choice fatigue and thus increases the reliance on shortcuts such as abstention and negative voting in subsequent choices. Namely, two identical voters may make different choices regarding a particular contest if voter $i$ makes their choice $2^{nd}$ on the ballot and voter $j$ makes their choice $10^{th}$. One assumption behind this hypothesis is that voters make their ballot decisions sequentially, i.e., in the order in which the contests appear on the ballot. This assumption is also behind the regression specifications.

Suppose that a representative voter is presented a ballot with $n$ contests on it, each of which is indexed by $i \in \{1, 2, ..., n\}$ and with alternatives 0 and 1. The decision for contest $i$ is denoted as $d_i \in \{0, 1\}$. Before voting begins, nature chooses a state of the world $s_i \in \{0, 1\}$ for all of the contests. The voter does not know these states of the world, but for each contest she has the same prior $\Pr(s_i = 0) = p > 0.5$. The objective of the voter is to match her decision for each contest with the state of the world. That is, her utility for each decision after the state of the world is revealed.
is

\[ u(d_i) = \begin{cases} 
1 & \text{if } d_i = s_i \\
0 & \text{otherwise}
\end{cases} \quad (1) \]

and aggregate utility is then \( \sum_{i=1}^{n} u(d_i) \).

Prior to making a decision, the voter may obtain exactly one costly signal of \( s_i \) with which she updates her prior. Choosing to make a "thoughtful" decision results in signal \( t_i \), whereas making a "quick" decision results in signal \( q_i \). Although both signals on average return the true state of the world, thoughtful decision-making provides a more accurate signal than quick decision-making. Specifically, \( T_i \sim N(s_i, \sigma_T^2) \) and \( Q_i \sim N(s_i, \sigma_Q^2) \), with \( \sigma_Q^2 > \sigma_T^2 \) and \( t_i \) and \( q_i \) being realizations of the two distributions, respectively. The cost of receiving the signal \( q_i \) is 0 and the cost of signal \( t_i \) is \( c(F_i) > 0 \), where \( c(\cdot) \) is differentiable and \( F_i \) is the stock of "fatigue" or "mental depletion" at decision \( i \). To capture the idea that choice fatigue increases with the number of decisions made, it is true that \( c'(\cdot) > 0 \), i.e., the cost of obtaining a thoughtful signal increases with the stock of fatigue.

\( F_i \) evolves according to the following rules:

- \( F_1 = 0 \)
- \( F_i = F_{i-1} + 1 \) if the signal at decision \( i - 1 \) was a thoughtful one \( (t_{i-1}) \)
- \( F_i = F_{i-1} + a \) if the signal at decision \( i - 1 \) was a quick one \( (q_{i-1}) \), with \( 0 < a < 1 \)

Since \( c \) is a function of \( F_i \) and \( F_i \) is strictly increasing in the number of decisions made, the evolution of \( F_i \) tells us that the cost of obtaining a thoughtful signal increases in not only the stock of fatigue, but also in the number of decisions made.

Once a signal is observed, the voter chooses to take an action \( d_i \in \{0, 1\} \) or to allow a random process to make the decision for her. In particular, the random process decides according to \( \Pr(d_i = s_i) = r > 0.5 \). This random process serves as
the ability for the voter to abstain and allow other voters to decide for her. \( r > 0.5 \) because otherwise she will always do better with her posterior distribution.

After observing the signal, the voter updates her prior. If the signal \( x \) is a realization from the distribution \( X \sim N(s_i, \sigma^2) \) with corresponding pdf \( \phi(x) \), the voter uses Bayes’ rule to determine the posterior distribution:

\[
\Pr(s_i = 0 \mid X = x) = \frac{p \phi\left(\frac{x}{\sigma}\right)}{p \phi\left(\frac{x}{\sigma}\right) + (1 - p) \phi\left(\frac{x - 1}{\sigma}\right)} \equiv p^*(x) \quad (2)
\]

Given the utility mapping and this updated belief about whether the state of the world is 0, then the optimal decision rule is decided by choosing the action with the highest expected value:

- \( E(d_i = 0 \mid X = x) = p^*(x)(1) + (1 - p^*(x))(0) = p^*(x) \)
- \( E(d_i = 1 \mid X = x) = p^*(x)(0) + (1 - p^*(x))(1) = 1 - p^*(x) \)
- \( E(\text{random}) = r(1) + (1 - r)(0) = r \)

The cost of the signal can be ignored while evaluating the expected value to each action since it is the same across actions. These expected benefits lead to the decision rule:

- choose \( d_i = 1 \) if

\[
E(d_i = 1 \mid X = x) > E(\text{random}) > 0.5 > E(d_i = 0 \mid X = x)
\]

\( \Leftrightarrow \ 1 - p^*(x) > r > 0.5 > p^*(x) \)

\( \Leftrightarrow \ p^*(x) < 1 - r \)
choose \( d_i = 0 \) if

\[
E(d_i = 0 \mid X = x) > E(\text{random}) > 0.5 > E(d_i = 1 \mid X = x)
\]

\[\Leftrightarrow p^*(x) > r > 0.5 > 1 - p^*(x)\]

\[\Leftrightarrow p^*(x) > r\]

otherwise, choose to let the random process decide, i.e., \( r < p^*(x) < 1 - r \)

Given this decision rule, I want to know how the probability of each action changes (since it is a function of the signal \( x \)) as the voter makes more and more decisions. Since thoughtful decisions provide more accurate signals of the state of the world and only become more costly, they will be frontloaded and at some point only quick decisions will subsequently be made. Thus, to see how the probability of each action being taken changes as the voter makes more and more decisions, it is really only necessary to see how these probabilities change as the variance of the signal increases, i.e., moving from thoughtful to quick decision-making. Intuitively, a thoughtful signal provides more accuracy around the true state of the world \( s_i \), which in turn makes the voter less likely to undervote and also less likely to vote her prior. Thus, the opposite is then true: if the signal is more noisy, then the voter is more likely to undervote and also more likely to rely on her prior (vote zero/no).

**Proposition 1** As the voter moves through the sequence of decisions, the probabilities of choosing \( d_i = 0 \) and letting the random process decide both increase.

See the Appendix for the proof.

This theory of voter decision-making describes voters as less likely to make careful decisions as they become more fatigued, and thus also more likely to rely on abstaining and following their prior. If I think of reliance on the status quo as a prior, and that voting "no" is a vote against change (i.e., for the status quo), then
the voter will become more likely to vote "no" as she becomes more fatigued. Similarly, abstention can be thought of as another heuristic which the voter uses to aid decision-making. With this theory in mind, I now move on to a discussion of the institutional and empirical details necessary to clearly understand the validity of the natural experiment used in the identification strategy.

4 Empirical Strategy

The natural experiment is generated by two main characteristics. First, §13109 of the Elections Code of the California State Constitution dictates that contests appear in the same ordering across ballots. In particular, statewide and local offices always appear above the statewide propositions, which in turn appear above the local propositions. Additionally, statewide propositions are listed as Proposition 53, Proposition 54, Proposition 55, etc., and this order is the same for all voters across the state (note that any effects on choice behavior due to the ordering of propositions is controlled for by individual proposition fixed effects). Second, individual propositions appear at different ballot positions across voters due to within-election variation in the number of contests appearing above the block of statewide propositions. This variation is primarily due to the set of local political jurisdictions which have a candidate contest on the ballot in a particular election. A smaller contribution to this variation comes from the staggering of even- and odd-numbered State Senate contests across Presidential and Gubernatorial election years.

I argue that the within-contest variation in ballot position is uncorrelated with any unobservable heterogeneity after controlling for contest- and precinct-specific

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8 Charter cities and counties are allowed flexibility in their elections code. However, the charter of the 4 charter cities in my dataset all abide by the state elections code.

9 Technically there is also within-election variation in a proposition's ballot position in primary elections. If Democrats, Republicans and other third-parties have candidates in different sets of statewide and federal contests, then this can affect ballot position. However, since by-party votes for nonpartisan contests are not available, we calculate the ballot position of a particular primary election contest in a precinct as the party registration-weighted average of ballot positions within the precinct, across parties.
determinants of voter behavior. The data allow for the inclusion of contest fixed effects which pick up all contest-specific participation covariates cited in the literature such as expected contest closeness (Shachar and Nalebuff 1999), the size of polity (Imbeau et. al. 2001), campaign expenditures (Cox & Munger 1989), etc. In addition, they also pick up broader unmeasurable factors such as the level of available information and the saliency of a contest. If these contest-specific factors such as saliency are omitted, then the error term will likely be correlated with ballot position since propositions are not randomly ordered within an election. State propositions are ordered in a way such that it may be easier for voters to decide on bond measures appearing at the top of the list compared to relatively obscure citizens’ initiatives appearing at the bottom of the list.10

The longitudinal nature of the data permits the addition of precinct fixed effects. If only one election were observed, it may be that certain precincts tend to both participate less and also to have more local offices on the ballot. In this case, statewide propositions will appear relatively further down the ballot and observed increases in abstention and "no" voting are related to both the position as well as the precinct characteristics. Precinct fixed effects account for this alternative hypothesis. However, if precinct characteristics related to participation or "no" voting change over time, then my approach will not capture this. This omitted heterogeneity is not intuitively correlated with ballot position and thus is not of significant concern.

With contest and precinct fixed effects included, it is of course necessary to have variation in the ballot position of a particular proposition. Otherwise, proposition ordering, proposition position and the proposition fixed effects are collinear. Even with a small amount of variation in ballot position within propositions, the ordering of propositions would be closely related to the position. Given the stylized fact of

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10 Propositions are ordered by sub-categories of general obligation bond measures (e.g., education, transportation, earthquake retrofitting, etc.), legislative bond measures, legislative constitutional amendments, referenda, and citizen’s initiatives. Within these categories, propositions appear on the ballot in the order in which they qualified.
"roll-off" that participation decreases as voters move down the ballot, position, ordering and saliency are thus interrelated. The dataset confronts this with exogenous and significant across-precinct variation in the ballot position of individual propositions. To illustrate this, the top-left panel of Figure 3 describes the distribution of the standard deviations of ballot position across precincts for individual propositions. In line with what I have described, there are no propositions that appear at the same ballot position across precincts (i.e., a standard deviation of 0) and the minimum standard deviation is around 1. This variation is exploited in order to hold voting costs constant while estimating the fatigue effects from differences in ballot position.\footnote{Another hypothesis of concern is that partisan affiliation is related to the position effects. If third-party voters have shorter ballots, and they also tend to participate more, then this inserts a partisan identifier into the fatigue story. This is not a problem since third party voters constitute a small share of election-day voters (\(\approx 10\%\)) and the estimated effects also hold for an alternative dataset only using Democratic and Republican voters.}

With these points in mind, I claim that the ballot position of a given proposition in a particular precinct is an exogenous determinant of the likelihood that a voter will vote against a proposition or completely abstain. The main results in the paper come from the estimation of the parameters \(\beta_{UV}\) and \(\beta_{NO}\) in the following two equations:

\[
\begin{align*}
NO_{ci} &= \alpha_{NO} + \beta_{NO} \cdot \text{POSITION}_{ci} + \rho^NO_{c} + f^NO_{i} + \eta_{ci} \\
UV_{ci} &= \alpha_{UV} + \beta_{UV} \cdot \text{POSITION}_{ci} + \rho^UV_{c} + f^UV_{i} + \upsilon_{ci}
\end{align*}
\]

\(UV_{ci}\) denotes the percentage of undervotes in contest \(c\) and precinct \(i\) as a percentage of turnout in precinct \(i\). Note that election dates are implicitly indexed by \(c\) since propositions appear on the ballot only once. \(NO_{ci}\) is the percentage of "no" votes of the total "yes" and "no" votes cast and \(\text{POSITION}_{ci}\) refers to the ballot position of a particular proposition in a precinct. For the benchmark specification using the sample of statewide propositions, I include proposition and precinct fixed
effects $\rho_c$ and $f_t$, respectively. $v_{ci}$ and $\eta_{ci}$ are the unobservable predictors of $UV_{ci}$ and $NO_{ci}$, respectively and are uncorrelated with any of the included regressors. I assume that the error terms are correlated across contests within a particular precinct and thus cluster the standard errors on the precinct level.

In addition to the statewide propositions, I also look for ballot position effects in other parts of the ballot. While identified, the limitation of these exercises is that the source of exogenous variation in ballot position is not as rich as for the statewide ballot measures. Figure 3 depicts within-contest standard deviations in ballot position for different types of contests on the ballot. Note that many contests have no variation in ballot position. First, most top-of-the ballot statewide and federal offices all appear at the same ballot position across the county. The only state offices that have variation in ballot position are State Assembly, State Superintendent of Public Instruction and the judicial retention questions, which is due to the aforementioned staggering of State Senate contests. Second, precincts within some small special districts will have no variation in ballot position since the set of other overlaying political jurisdictions is the same for all precincts within the district.\textsuperscript{12} Contests with no variation in ballot position are dropped from the regressions in order to identify the contest fixed effects.

5 Data

The analysis uses a precinct-level panel dataset of participation and number of votes cast for every federal, statewide and local contest on the primary and general election ballot in San Diego County, California between 1992 and 2006. To my knowledge, this dataset is unique and novel. Importantly, it depicts the number of votes across the entire menu of contests on the ballot, which is the main reason why the ballot position effects can be identified.

\textsuperscript{12}In fact, as political jurisdictions generally get smaller, variation in ballot position also gets smaller. For example, the average standard deviations for the county, school, city, and special district propositions depicted in figure 3 are 1.85, 0.77, 0.58 and 0.42 respectively.
Constructing the dataset was a major endeavour: data for each election are reported in varying formats and identifiers for candidate vote totals (and thus contests and jurisdictions) were created mostly manually. Overall there are 3.1 million election-precinct-contest-option observations, although I restrict the sample to polling precincts for the purposes of tracking precincts longitudinally. In addition, I aggregate across candidates and ballot measure alternatives to create a contest-level dataset of 1.1 million observations. The data provide precinct-level participation and number of votes cast for every ballot option. From these data and the elections code I then infer ballot position for every election-precinct-contest observation. It is also important to note that the turnout data by party in the 2004 and 2006 primaries are unreliable due to an aggregation of absentee and polling voters. Since polling precincts are the focus of the other elections in the dataset, we drop these years due to difficulty in separating the polling precinct voters from the absentee voters. Thus, the analyses focus on 1992-2002, except for the California judicial contests, for which I use data from the 2006 general election.

The source of the data is the Statement of the Vote/Official Canvas published by the San Diego County Registrar of Voters on their website. San Diego County was chosen due to data availability and the large variation across precincts and elections in the number of overlaying local political jurisdictions. Official canvas data are also available for other counties, but obtaining electronic or paper files has proven difficult, mainly for lack of preservation of records and limitations on public access. Electronic precinct-level data are available for San Francisco, for example, but due the lack of special districts within the City and County, it is not feasible to exploit the necessary variation to identify the ballot position effects. The voting data are supplemented with data on campaign expenditures to interact with the ballot position variable. Spending data are from the California Secretary of State’s

\[13\] Absentee votes are generally reported by ballot type (i.e., ballots with the same list of contests) rather than by absentee voters living within the geographical boundaries of a particular polling precinct.

\[14\] http://www.sdcounty.ca.gov/voters/Eng/Eindex.html
Cal-Access database as well as past publications of the "Campaign Finance Reports" series.

Even though the dataset is very comprehensive and provides a clean source of variation in the independent variable of interest, there are some disadvantages to using this kind of dataset. First, each election-precinct observation constitutes a different subset of voters who decided to turn out in that election. As long as the characteristics of these different sets of voters do not change much across elections, I can capture this with precinct fixed effects. However, if voters in primary elections tend to be more motivated and less susceptible to fatigue relative to general election voters (Brockington 2003), precinct fixed effects will not capture this. I can account for this though by breaking the data down into general and primary election subsamples. Second, precinct borders may change over time and thus the longitudinal dimension of the data may not be tracking precincts perfectly. For instance, the precinct "ALPINE 553110" in the 1992 primary may have different geographical boundaries than the precinct with the same label in the 2002 general election. Conversations with the San Diego Registrar of Voters have suggested that this is not a significant problem since precinct boundaries change primarily to keep the number of registered voters within a precinct roughly equal and any changes will stay geographically and demographically close to the old boundaries.  

15 Finally, there are some changes in the set of overlaying political districts across time due to the 2000 Census redistricting and the creation and merging of local districts. This is a small issue since it does not affect within-election variation in ballot position.

6 Results

The main empirical results estimate the effect of the ballot position of statewide propositions on the percentage of undervotes and "no" votes. Following these results

\[ \text{undervotes} = \beta_0 + \beta_1 \times \text{ballot position} + \epsilon \]

\[ \text{no votes} = \gamma_0 + \gamma_1 \times \text{ballot position} + \eta \]

A related issue is the attrition and creation of precincts over the dataset due to population growth.
are the estimates for the sets of local propositions, judicial retention questions and local, statewide & federal offices. Note that every specification includes precinct and contest fixed effects.

6.1 Statewide Propositions

Columns 1 and 7 in Table 1 provide estimates of equations 3 and 4, respectively. These benchmark specifications estimate that moving a particular proposition 10 positions lower on the ballot increases precinct-level "no" votes and undervotes by 1.3 and 0.7 percentage points, respectively.\textsuperscript{16} I interpret these estimates as the pure effect of choice fatigue on voter decision-making.

Taking these estimates as the baseline, the rest of the specifications offer different fits of the data. First, columns 2, 3, 8 and 9 estimate the benchmark specification on the subsets of the data including only general and only primary elections. Regressing on a subset of the data – rather than just interacting a primary dummy with ballot position – allows for the precinct fixed effects to differ across general and primary elections. If, as noted earlier, different subsets of voters are turning out in the precinct across election types, then there may be differences in the ballot position effects across general and primary elections. Interestingly, there is no evidence that voters in primary elections are susceptible to the "no" ballot order effects. This is in line with Brockington (2003) who argues that primary voters are more motivated compared to general election voters. However, the evidence in columns 8 and 9 shows that primary voters undervote more relative to general election voters. This may suggest that they are just smarter about which heuristic to use when fatigued, which agrees with the informational explanations for roll-off in Wattenberg et.al. (2000).

It may be reasonable to assume that the ballot position effects are not linear as a proposition moves down the ballot. The rest of the columns in Table 1 fit these

\textsuperscript{16}Given the amount of propositions within an election and the variation in ballot position for a given question, 10 positions may actually be a relatively conservative counterfactual.
nonlinear effects using quadratics. The marginal effects are presented in figures 4 and 5. As a reference for which ballot positions are relevant to use in evaluating the comparative statics, both figures have vertical lines at 20.5, 25.0 and 29.8. These mark the average ballot position across elections for the first proposition on the ballot, all propositions on the ballot, and the final proposition on the ballot, respectively. The first thing to notice is that in Figure 4, for all elections (column 4), the quadratic fit produces positive "no" marginal effects throughout the relevant range positions. This relationship also holds for general elections, and the insignificant relationship for primary elections remains. For the undervotes, Figure 5, all of the marginal effects are positive within the relevant range.

Table 2 provides additional robustness checks by interacting the ballot position variable with different measures of contest saliency. If a particular contest is well-known due to, say, massive media exposure, or large campaign spending, it is reasonable to expect a mitigation of the ballot position effects. To capture the potential interaction with saliency, I add interaction terms involving the log of total campaign expenditures (when undervotes is the dependent variable) and the log of the ratio of "no" over "yes" spending (when "no" votes is the dependent variable).\footnote{Expected winning margin is another measure of contest saliency which is useful to interact with ballot position. However, polling data are available for only about 40% of the propositions in our dataset. While this in and of itself is not a significant limitation, the propositions included in statewide polls (either the Field Poll or the LA Times California Poll) are either bond measures or the most controversial or impactful propositions. Limiting the sample to the available 40% creates strange inconsistencies in the benchmark specifications. I take this to be an artifact of selection and thus leave out expected winning margin as a candidate for interacting with ballot position.} Using the median values of the two spending measures, again the marginal effects are plotted as a function of ballot position in Figure 6. Note that the slopes of the position-behavior relationships are all positive over the relevant range of positions. The first three columns with just the interaction with no/yes spending are reasonably close to the initial estimate from Table 1, column 1. The only specification which does not quite fit the pattern is column 6, but this is probably an artifact of including a quadratic fit when both the initial linear and quadratic fits were both
insignificant, as seen in columns 3 and 6 in Table 1.

The empirical results presented above provide good evidence for the central hypothesis. The evidence fails to reject the idea that voters in precincts who view a contest relatively further down the ballot are more likely to vote "no" and to abstain. It is also in line with previous work on the significance of defaults, the option of not deciding, the reliance on heuristics, and the role of fatigue in decision-making (Dhar 1997a, Iyengar & Lepper 2000, Madrian & Shea 2001, Levav et.al. 2007). In terms of the theory, decisions made further into a sequence are more costly and less informed, thus making the voter more likely to rely upon heuristics and shortcuts.

6.2 Local Propositions

Ballot position effects in the block of local propositions are identified in the same way as the statewide propositions, although the exogenous variation is smaller (refer back to Figure 3 and the discussion in section 4). Columns 1-4 of Table 3 provide estimates of the ballot position effects. The linear fit finds significant and positive "no" effects, but statistically insignificant effects on undervoting. However, adding the squared ballot position for a nonlinear fit shows that moving a local proposition one position down the ballot relative to the average position (33.8) increases "no" votes by 0.164 percentage points. Furthermore, the effect on undervotes at this same ballot position is near zero, which is in line with the linear fit in column 3.

6.3 California Judicial Retention Questions

Statewide judicial retention contests are some of the lowest-salience contests on the ballot.\textsuperscript{18} This is due to a couple of main factors. First, the institution of electing judges is one of retention rather than competition; instead of voters choosing

\textsuperscript{18}The Supreme Court is comprised of the Chief Justice and 6 Associate Justices. Appellate Courts are broken down into Districts, and further into Divisions. For example, San Diego County is within the Fourth Appellate District, which itself has 3 Divisions and 10, 7, and 8 judges in Divisions 1, 2, and 3, respectively. Each Division has one Presiding Justice and the rest are Associate Justices.
between candidates in electoral competition, voters confirm each of the Governor's appointees with yes or no voting. Retention questions may distance the judges from the influence of external pressures such as lobbying and campaign contributions, but at the same time lack the aspects of candidate competition that foster the spread of information through the mobilization of elites and corresponding campaign spending (Bonneau & Hall 2003). In the words of the California Courts' homepage, "Appellate court justices generally do not actively campaign for retention."¹¹⁹ Thus, voters may have low levels of information regarding these contests. Second, information provided on the ballot in these statewide judicial contests provides voters with no cues regarding ballot designation, partisanship or incumbency. In fact, retention questions are the only contests on the ballot in which candidates may not list a ballot designation.²⁰ Instead, voters are simply asked questions like, "Shall Presiding Justice Judith McConnell be elected to the office for the term provided by law?" With the low salience of these contests in mind, we expect voters to be especially reliant on heuristics when thinking about these questions and thus susceptible to ballot position effects. Another notable characteristic of these contests is that voting "yes" is actually the status quo since the contests are questions which confirm the appointment that the Governor has already made.

Columns 5-8 in Table 3 provide estimates of the ballot position effects. Clearly the estimated effects are very large. Even though ballot position for a particular contest will only vary by 1 or 2 positions within an election, the effects are still big. While this result is interesting, it is simultaneously muted by the fact that effects are not outcome-relevant. Over the entire dataset only 1.14% of precincts ever voted majority against one of the candidates. Moreover, no judges across the time period in the dataset were not confirmed by the voters. This being said, the estimates are compelling from the perspective of the theory of voter decision-making. If fatigued

¹¹⁹ See http://www.courtinfo.ca.gov/courts/courtsofappeal/4thDistrict/how.htm
²⁰ California State Constitution, §13107 (a). It could be argued, however, that the seat in which the judge is sitting offers some sort of voting cue.
voters are more likely to rely on shortcuts like voting the status quo, then these voters should be voting yes since the judges have already been appointed and in some cases have been on the bench for a few years. However, the evidence in these judicial contests is that voters are more likely to vote against retention if the contest appears further down the ballot. There are a few potential explanations for what is going on. First, it could be that voters are so uninformed that they have no idea what the status quo actually is. Second, it is possible that the frequent use of the initiative process in California has conditioned voters to use "no" as a shortcut. If uninformed voters in proposition contests rely on abstention and negative voting when a decision is difficult or not obvious for them, then it is feasible that these voters behave similarly when uninformed in the judicial contests. Finally, relatively fatigued voters rely on the choice that is least costly for them. This may be the status quo in the case of propositions, but may be the opposite in the judicial contests.

6.4 Local, Federal & Statewide Offices

Given that most statewide and federal offices have no variation in ballot position and that there is some interspersion in the ordering of statewide and local contests, I group these contests together into one sample. Figure 3 shows that many candidate contests have no within-election variation in ballot position and thus these are dropped in order to include contest fixed effects. Column 9 in Table 3 shows no evidence of ballot position effects with a linear fit. However, the estimated effect with a quadratic fit in column 10 is positive until the 23rd contest on the ballot. Since the average ballot position in this sample is 17.4, there is some evidence for the hypothesis, although the fitted relationship is decreasing while the theory predicts it should be weakly increasing.

Across the tables and regression specifications, the results generally characterize voters as susceptible to choice fatigue and thus likely to rely on shortcuts and heuristics in decision-making. This is particularly interesting given that the data
observe choice behavior *conditional* on turnout. These voters have already incurred the costs of going to the polls and are motivated enough to go and make some decisions. However, once at the polls, some voters experience a drop-off in their ability to participate purely due to the number of questions appearing higher up on the ballot. The next section discusses the implications relevant to the voting context as well as from the wider perspective of economic choice.

7 Theoretical and Practical Implications of the Results

Even though the empirical application in this paper focuses on voter behavior, the strength of the identification strategy and established evidence make it an intuitive leap to apply the results to a broader set of consumer and economic choice problems in which a person makes a sequence or a bundle of decisions. For instance, consumers in environments who must complete a multi-stage choice problem in order to execute a task are potentially susceptible to fatigue and thus more likely to rely on heuristics in decision-making. If firms or policy makers know about this characteristic of decision behavior, then this may influence their strategy in how they order decisions or disseminate information.

For example, it is not unusual for consumers shopping online for electronics to be offered the possibility to compare the attributes of a handful of similar items. If consumers experience fatigue while comparing a long list of attributes, then a retailer may strategically place attributes at particular positions in the comparison sequence so as to mitigate or exacerbate fatigue.\(^{21}\) Evidence of the importance of this type of strategic behavior is highlighted in Levav et.al. (2007). Rather than the comparison of products, their results focus on the full customization of a single product. Selection may actually be relevant as the opportunity to choose the perfect product potentially overwhelms the consumer and thus they opt-out of the

\(^{21}\)These attributes clearly vary according to importance and ease of comparison. Part of my future research agenda – discussed in section 8 – will follow up on the interplay between the role of fatigue and the characteristics of individual decisions.
customization process to choose some pre-packaged product (bundle of attributes) instead. With this selection in mind, a firm may want to find a sweet spot in terms of the trade-off between selection and customization. Moreover, firms may find it optimal to allow for partial product customization in order to avoid scaring consumers from overloading them with decisions, while also being able to capitalize on fatigue effects.\textsuperscript{22}

Portfolio choice and diversification is another task involving bundled decisions. Although not an environment in which a long list of individual decisions are made, the handful of choices across different risk categories has substantial significance for lifetime utility. The research cited above in 401(k) plan enrollment and fund choice (Madrian and Shea 2001, Iyengar and Kamenica 2007) show that the choice environment indeed can affect decisions made relatively early in life and thus total assets upon retirement. If decision-making among investors in 401(k) funds is susceptible to fatigue, a benevolent planner will take care in the dissemination of information regarding the investment options and the ordering of decisions. In particular, if difficult choice environments cause a larger share of money to be placed in lower return and less risky money market funds, then a firm with its employees’ best interests in mind may alter the way that the fund options are presented so as to optimize returns, given an individual’s risk preferences. If certain decisions carry more weight in terms of utility (i.e., equity fund investments), then these decisions should be placed towards the beginning of the decision sequence so as to minimize the likelihood that the investor is fatigued and making less-than-careful decisions.\textsuperscript{23}

The results also potentially have implications for other applications in decision-making such as health plan selection (see, e.g., McFadden 2005), car insurance interviews and the physical arrangement of items in a store. Importantly, there are

\textsuperscript{22} Of course this is also dependent upon whether the economies of scale from offering a simple product selection is less attractive for the firm.

\textsuperscript{23} The pairwise comparison of investment alternatives for a single decision may also induce fatigue. Intuitively, fatigue induced by multiple decisions may be similar to fatigue experienced in contemplating options for a particular decision.
also several theoretical and practical implications relevant to the voting context.

First, special interest groups may want to exploit the control that they have over the position in which their proposition appears on the ballot. For example, citizens' initiatives appear in the order in which they qualify and thus it may be optimal for the group to qualify their proposition as early as possible if they wish to minimize the "no" effect from voter fatigue.\textsuperscript{24} Alternatively, it also makes sense to think about proposition placement across elections, given that the top of the ballot is significantly longer in gubernatorial elections, and that the evidence suggests that general election voters are more susceptible to fatigue than primary election voters.

Second, and in a similar vein to the first point, the evidence provided may contribute to the literature on the endogenous timing of school bond elections (Romer & Rosenthal 1978, Meredith 2006). The basic idea is than an agenda setter may find it optimal to put a school bond proposition on the ballot in off-year special elections when the electorate who chooses to turn out will be relatively motivated in favor of passage of the bond. In primary and general elections, voters who are motivated to turn out by higher-salience contests and who also happen to be against the school bond measures will mark "no". The special elections will potentially disproportionately motivate voters in favor of the measure. The evidence in this paper seems to suggest that propositions listed towards the end of the ballot are more likely to experience "no" votes and this may induce an agenda setter to put the bond measure on a special election ballot.

Third, a theoretical result by Besley and Coate (2000) finds that there are welfare gains to the unbundling of policies from candidates, i.e., the addition of initiatives to the ballot as a separate contest to the candidate election. If these welfare effects are generalizable to a larger number of unbundled policies, then the result potentially

\textsuperscript{24}Initiatives qualify for the ballot in two steps. First, the initiative is approved and phrased by the Attorney General. Second, the proponents of the initiative must collect signatures from registered voters. For initiative statutes, the number of necessary signatures is equal to 5\% of the number of votes in the last gubernatorial contest. Initiative constitutional amendments require 8\%. 

26
contradicts my characterization of voter decision-making. If voters are more likely to vote "no" and abstain depending upon ballot position, then it could be that they are not participating or voting "no" in elections that they otherwise may decide differently. While the results above do not claim that voters are making mistakes, it is possible and a behavioral model of this type of behavior would be useful.

Fourth, if the documented fatigue effect is undesirable, then elections officials could consider randomizing the order in which the contests appear on the ballot in order to remove the position effects. While this may be impractical for the entire ballot, even a within-block randomization would partially mitigate the effects. A large body of previous work on the effects of candidate position within a contest (Krosnick & Miller 1998, Koppell and Steen 2004) is in line with my work and confirms that order matters. A number of states have begun to randomize candidate orderings across precincts in an election, suggesting that elections officials may be open to the idea.

Fifth, if voters experience choice fatigue and this affects their ability to participate in the democratic process, then elections officials may want to think about either limiting the length of ballots or holding more frequent elections. This may avoid potentially putting so many issues before the voters so as to adversely affect participation and increase the number of "no" votes. As an example, Canada holds national and local elections on separate dates.

Finally, if having the ballot at home for a length of time mitigates the position effects, elections officials may want to increase efforts to convert citizens from polling station voters to absentee voters. My study focuses on poll voters only (because the absentee data are much more difficult to implement empirically), yet one could imagine that voting absentee does not create the potential perceived pressures at the polling booth. If voters feel like others are waiting on them, or do not have information about a given contest readily available in the booth, they may feel more and more rushed as they move down the ballot. On the other hand, absentee voters
may have less time pressure and can easily access elections materials or the internet to do research if they so choose. There are clearly selection effects between these two groups, but if absentee voters do not exhibit the position effects and poll voters do, then it would be an interesting experiment to move some of those poll voters over to absentee.

8 Conclusion and Future Research

This paper aims to isolate fatigue as an input into individual decision-making. The natural experiment in which the ballot position of a particular contest varies across voters allows me to separate choice fatigue from other competing explanations for choice behavior. Specifically, I find that fatigued voters are more likely to vote "no" and to abstain on statewide propositions. These results generally hold in other parts of the ballot as well, although the source of identifying variation in these cases is less rich.

As discussed in section 7, the results have broad implications for economic choice and for the design of electoral institutions. Fortunately these implications offer opportunities for future work. For example, a dimension of decision-making which is not fully explored in this paper is the complexity and saliency of individual decisions. It is reasonable to expect that more "difficult" decisions are fatigue-inducing, and thus there is some interaction between the fatigue effects documented here and the "choice overload" phenomenon discussed in Iyengar and Lepper (2000). The voting context again is a particularly interesting one in which to examine choice overload due to variation in the presence of cues such as party affiliation, gender, race and incumbency, as well other contest-specific characteristics such as the number of candidates, campaign expenditures, the size of the voting polity, etc.25 We would expect more stressful, complex or difficult decisions to disproportionately

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25 For example, the open primaries of 1998 and 2000 offer a potentially exogenous change in the number of candidates appearing in what normally are contests open only to voters registered with a particular party.
contribute to the level of fatigue. This analysis is naturally coupled with field or laboratory experiments in economic choice environments such as across-product attribute comparisons, portfolio choice or shopping.

Also, from the perspective of the design of electoral institutions it is also worthwhile to compare the differences between polling voters – studied in this paper – with absentee voters. Absentee votes are reported according to ‘ballot type’ rather than precinct, but additional work will make the two types of voters more comparable and can shed light on whether fatigue also occurs in voters who presumably have more time and also access to more information when filling out their ballot.

References


Figure 1: Distribution of Number of Precincts with Proposition 35 at Different Ballot Positions
Figure 2: Undervotes and "No" Votes Increase with the Ballot Position of Proposition 35
Figure 3: Rank order of standard deviation in ballot position for individual contests
Notes: Lines correspond to estimated ballot position effects across specifications 1-6 in Table 2. Vertical lines around 20, 25 and 30 represent the average ballot position of the first proposition, all propositions and the last proposition, respectively. Also, coefficient estimates in specifications (3) and (6) are insignificant.

Figure 4: Effect of ballot position on "no" voting across specifications in Table 2
Figure 5: Effect of ballot position on undervotes across specifications in Table 2
Figure 6: Effect of ballot position on "no" votes and undervotes across specifications in Table 3

Notes: Lines correspond to estimated ballot position effects across specifications in Table 3. Vertical lines around 20, 25 and 30 represent the average ballot position of the first proposition, all propositions and the last proposition, respectively. Also, not all coefficient estimates are statistically significant; see Table 3 for standard errors.
Table 1
The Effect of Ballot Position on % of "No" Votes and Undervotes: Statewide Propositions

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<th>4</th>
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Notes
1) All regressions include precinct and contest fixed effects
2) Standard errors are clustered at the precinct level
3) "All", "Gen" and "Prim" refer to the full, general and primary elections samples, respectively.
Table 2
The Effect of Ballot Position on % of "No" Votes and Undervotes: Robustness Checks for Statewide Propositions

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<th>Prim</th>
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Notes
1) All regressions include precinct and contest fixed effects
2) Standard errors are clustered on the precinct level
3) "All", "Gen" and "Prim" refer to the full, general and primary elections samples, respectively.
## Table 3
The Effect of Ballot Position on % of "No" Votes and Undervotes: Other Parts of the Ballot

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Notes
1) All regressions include precinct and contest fixed effects
2) Standard errors are clustered at the precinct level