Do Open Primaries Improve Representation?
An Experimental Test of California’s 2012 Top-Two Primary

Supporting Information/Online Appendix

Contents
1 Survey Results Compared to Actual Election Returns ................................................................. 4
2 Sample Demographics and Comparison to Population Estimates .............................................. 5
3 Distribution of the Number of Candidates .................................................................................. 6
4 Candidate Ideology ...................................................................................................................... 7
  4.1 Measurement—Additional Comments .................................................................................... 7
  Respondent ratings ...................................................................................................................... 7
  Author Ratings ......................................................................................................................... 7
  MTurk ratings ............................................................................................................................ 7
  Respondent perception of candidate ideology ............................................................................. 7
  CF Scores .................................................................................................................................. 7
  Project Vote Smart ................................................................................................................... 7
4.2 Candidate ideological positions ............................................................................................... 8
4.3 Candidate moderateness plots (absolute value of ideological positions) ............................... 11
4.4 Correlation between DW Nominate and ideology measures .................................................. 12
4.5 Did the top-two ballot attract more moderate candidates? ................................................... 13
5 Are Districts Moderate? .............................................................................................................. 15
  District medians by party registration (Democrats and Republicans) ........................................ 17
  District medians by party registration (Democrats and Republicans, sorted) ............................ 18
  District medians by party registration (Democrats, Republicans, and NPP, sorted) .................. 19
  District medians by party registration with overall district median ......................................... 20
  District medians by party registration with overall district median for category 3 districts ......... 21
6 Knowledge of Candidate Ideology .............................................................................................. 22
  Within-Party Analysis .............................................................................................................. 23
  Do voters know more than just candidate party affiliations? .................................................... 23
    4-item measure of ideology vs. partisanship dummy ............................................................... 23
    Robustness to other measures of candidate ideology ............................................................. 26
    With district fixed effects ....................................................................................................... 27
    Individual-level analysis of whether voter knowledge of candidate positions goes beyond party 28
    Moderate and independent respondents’ perceptions ............................................................ 29
7 Example of Treatment and Control Ballots .............................................................................. 32
8 Ideological Differences between Treatment and Control Groups .......................................... 33
  8.1 Independents (NPP) choosing to vote or not vote in the Democratic primary ....................... 33
  8.2 Posttreatment bias .............................................................................................................. 33
9 Additional Candidate-Level Analysis ......................................................................................... 34
  9.1 All 34 Districts (Major Party Candidates) ............................................................................ 35
  9.2 Multiple moderates ............................................................................................................. 36
  9.3 Did the reform affect election outcomes? ............................................................................ 37
10 Other Individual-Level Analyses ............................................................................................. 39
11 Additional Proximity Results.................................................................41
  11.1 Proximity plots using Euclidean distance four-item average .................41
  11.2 Possible versus Actual Proximity ..................................................44
  11.3 Proximity plots using average respondent perceptions (City Block) ..........54
  11.4 Proximity plots using individual respondent perceptions (City Block) .......57
  11.5 Did the Top-Two Primary Help Among Subgroups? ............................62
12 Awareness of the Open Ballot ................................................................63
13 Political Knowledge Index ......................................................................63
14 Strategic Voting: Addressing Hedging ....................................................64
  Treatment effect on proximity by district party registration and respondent registration ........................................64
  Treatment effect on proximity by district party registration and respondent registration ........................................65
  Treatment effect on proximity by party spending and respondent registration ....................................................66
  Treatment effect on proximity by party spending and respondent registration ....................................................67
  Treatment effect on proximity by max party spending and respondent registration ..............................................68
  Treatment effect on proximity by max party spending and respondent registration ..............................................69
  Treatment effect on proximity by party legislator experience .......................70
  Treatment effect on proximity by party legislator experience .......................71
  Treatment effect on proximity by party experience plus money ....................72
  Treatment effect on proximity by party experience plus money ....................73
15 Crossover Voting and Proximity of Vote Choices ....................................74
  Crossover voters choose candidates further away from their stated preferences than they could ..................74
  Ideological distance with four-item average measure, category 3 districts and viable candidates only ..........75
  Ideological distance with four-item average measure, by party registration, category 3 districts and viable candidates only ...........................................................................76
  Ideological distance with four-item average measure, by party registration, all districts and candidates included ...........................................................................77
  Ideological distance with individual respondent ratings, category 3 districts and viable candidates ................78
  Ideological distance with individual respondent ratings, by party, category 3 districts and viable candidates 79
    Democrats .......................................................................................79
    Republicans ...................................................................................80
  Possible proximity with four-item average measure, category 3 districts and viable candidates only ..........81
  Possible proximity with four-item average measure, by party registration, category 3 districts and viable candidates only ...........................................................................82
  Possible proximity with four-item average measure, by party registration, all districts and candidates included ...........................................................................83
  Crossover voters: possible versus actual proximity with four-item average measure, by party registration, all districts and candidates included ........................................84
  Same-Party voters: possible versus actual proximity with four-item average measure, by party registration, all districts and candidates included ........................................85
16 Strategic Voting: Evidence against Raiding ............................................86
  Republicans cross over to vote for the same candidates Democrats tend to vote for ..................86
  Democrats cross over to vote for the same candidates Republicans tend to vote for ..................87
17 Replication of Candidate-Level Analysis in State Senate Races ..................88
18 Number of Candidates on the Open Ballot and Proximity .......................89
  Ideological distance and number of candidates with four-item average measure .............................................89
  Ideological distance and number of candidates with four-item average measure by political knowledge ........90
  Ideological distance and number of candidates with mean voter perception measure ....................................91
19 Distribution of Self-Reported Ideology ....................................................92
  Histogram of self-reported ideology by party registration ............................92
Survey Results Compared to Actual Election Returns

Responses to the IGS California Top-Two Primary Survey predicted actual outcomes from the June 5, 2012 election reasonably well. Candidates’ vote shares, as reported by the Secretary of State, were quite similar to the percentages of votes they received from survey respondents assigned to the open-ballot condition (which mirrors the actual electoral rules used in 2012). The scatterplot presented below demonstrates this relationship.

Regressing candidates’ predicted vote share on actual vote share confirms that the survey’s results were in line with real-world outcomes. This regression produces a coefficient of 0.994 ($t=32.06$, $p<.001$), with a standard error of regression of .088.
We compare our sample to population benchmarks in the table above. Since our population of interest is California voters, we primarily compare our sample to a 2012 Field Poll probability sample of that population. The SSI sample matches the Field Poll sample reasonably well on several key covariates, including party registration and ideology, which are crucial for this study. (Note that the Field Poll survey used an 11-point measure of ideology rather than a 7-point measure, which likely accounts for the slightly lower percentage of self-reported moderates.)
3 Distribution of the Number of Candidates

Of these races, the distribution of viable number of candidates per election was as follows: 6 races were contested by 3 candidates, 4 races were contested by 4 candidates, 3 races were contested by 5 candidates, 2 races were contested by 6 candidates, and there was one race featuring each of the following number of candidates: 7, 8, 10, 11, and 13. See section 4.2 for plots of the number of candidates by races and their ideologies.
4 Candidate Ideology
This section presents additional information on the 4-item candidate ideology measure, including plots of candidate scores by district (section 4.2) and the correlation between the scores and DW nominate scores (section 4.4).

4.1 Measurement—Additional Comments

Respondent ratings
To prevent respondent fatigue, we directed participants in districts with over six candidates to rate all viable candidates and a randomly assigned portion of the nonviable candidates.

Author Ratings
Due to a lack of website content and media coverage, we were unable to rate 12 candidates of 238 candidates.

MTurk ratings
Before the primary, we hired 204 Mechanical Turk workers to visit websites for viable candidates in the 20 category 3 districts. These workers used the seven-point scale to place candidates on the liberal-conservative spectrum. We used ratings from workers who passed a series of political knowledge and attentiveness questions to generate a mean ideological rating for each candidate.

Respondent perception of candidate ideology
Testing for projection is difficult because of reverse causation, but we find considerable evidence consistent with projection in respondents' perceptions of candidate ideology on the seven-point scale. We regressed the seven-point placements of the candidate respondent said they would vote for on those voters' own seven-point self-placements. We find an average projection effect of .50 (p<.001). This implies that beliefs about a candidate would differ by half a point, on average, between two of her supporters separated by a point on the seven-point scale.

CF Scores
Two candidates in the primary had extremely liberal scores: Shields in district 12 and Goodwin in district 16. They were such outliers that, when we rescaled CF scores to include them in the four-item index, they cut the variance of CF scores almost in half among other candidates. So, we dropped these candidates before calculating the four-item average.

We noticed one apparent anomaly in the scores: all “Red-to-Blue” and “Young Guns” candidates clump together and many appear to be placed as too extreme. This may occur because of the similarity of their national donor bases rather than underlying ideology.

Project Vote Smart
Each election cycle, Project Vote Smart encourages politicians to take the “Political Courage Test” and answer a series of yes/no questions on major issues. Although most candidates do not respond, Project Vote Smart imputes answers to many based on statements and voting records. We collected this data for 2012 congressional elections in California and used a unidimensional item response theory (IRT) model. We used the MCMCpack R package (Martin et al.). We restricted the IRT model to candidates who had at least five recorded positions in the Project Vote Smart database.
4.2 Candidate ideological positions

The plots in this section show each candidate’s ideological position as measured by the four-item average.

Best case districts, viable candidates
All 34 districts, viable candidates
All 34 districts, all candidates
4.3 Candidate moderateness plots (absolute value of ideological positions)

The plots in this section show each candidate’s ideological position, using the four-item average, but folded to capture moderateness, so 4 is most moderate, 1 is most extreme.

Best-case districts, viable candidates
4.4 Correlation between DW Nominate and ideology measures

To vet the 4-item ideology measure that we use throughout the paper, the table below presents the correlations between it, its components, and average respondent ratings with DW Nominate scores. Of course, DW Nominate scores are only available for incumbents.

The sample size for MTurk ratings is smaller because we only had Mechanical Turk workers rate candidates in the 20 best-case districts.

Author ratings correlate unusually highly with DW nominate in part because the authors had DW nominate scores available to them while rating the ideology of candidates.

<table>
<thead>
<tr>
<th>Correlations for incumbents (pairwise) with Ns</th>
<th>DW Nominate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Republicans</td>
</tr>
<tr>
<td>4-item measure</td>
<td>0.6072</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
<tr>
<td>4-item measure components</td>
<td></td>
</tr>
<tr>
<td>MTurk ratings</td>
<td>0.1523</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Author ratings</td>
<td>0.9173</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Project Vote Smart</td>
<td>0.0102</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
<tr>
<td>CF scores</td>
<td>0.5784</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Ave. respondent ratings</td>
<td>0.5291</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
4.5 Did the top-two ballot attract more moderate candidates?

The counterfactual examined in the paper—the closed-ballot condition—is not the perfect counterfactual because the top-two ballot may have attracted very different candidates than the previous primary ballot.

In particular, one potential concern with the key finding in the paper is that the top-two ballot may have attracted so many moderate candidates that respondents in the closed-ballot condition could already vote for very moderate candidates. In the paper, we present an array of evidence that this is not the case and the plots in sections 4.2 and 4.3 (above) show that, if anything, voters lack moderate candidates to choose from, especially among major party candidates.

To directly test whether the ideology of candidates changed with the introduction of the ballot, we examined campaign finance scores (Bonica forthcoming) in 2010 and 2012 for U.S. House primary candidates. In the plots below, we show the distribution of these estimated ideologies by party. The plots show very little change in the distributions, except for a slight liberal shift (lower values) in 2012 across all candidates, which may have simply arisen because of the presidential election.

We replicated these plots for viable candidates (those who raise more than $50,000) and using non-dynamic campaign scores. The results were the same.

Overall, the results suggest that the top-two primary did not noticeably moderate candidate ideology positioning.

**Republican candidates**

![Kernel density estimate](image)

Higher values indicate more conservative candidate positioning.
Democratic candidates

Higher values indicate more conservative candidate positioning.

NPP/third-party candidates

Higher values indicate more conservative candidate positioning.
5 Are Districts Moderate?

Open primaries are likely to favor moderate candidates if the median voter in the district is moderate relative to the median voters in the closed primary. Although national and state surveys generally find that voters are overwhelmingly centrist (Fiorina, Abrams, and Pope 2005; Ansolabehere, Rodden, and Snyder 2006; Levendusky and Pope 2011), congressional candidates run in districts that may be much more one-sided by design. For example, California's District 23, located in the Central Valley, is the most Republican district in California, according to the Cook Political Report (2012). It may have so many strong conservatives and so few moderates and liberals that a more open primary would fail to benefit moderate candidates.

Since our survey asks voters about their ideology, we can estimate the median voter's position in every California district. Despite popular conceptions about certain districts, such as the 23<sup>rd</sup> (Central Valley) being conservative or the 13<sup>th</sup> (Berkeley and Oakland) being liberal, they are actually all moderate, a finding consistent with other measures (Kousser, Phillips, and Shor 2013). Figure A on the next page shows a histogram of the 20 best-case districts—the ones where at least one viable moderate faced more extreme candidates. It shows that 17 of these districts have a median at 4, the midpoint on the 7-point ideology scale, and three districts have medians at 3 or 3.5 (due to ties). With a dot plot, Figure B shows that primary reform has some potential to help moderate candidates because the district medians (+ signs) are generally more centrist than the closed-primary party medians, which we can also estimate from our data. Voters in closed Democratic primaries (hollow circles), which include registered Democratic voters and Independent voters who choose to vote in the Democratic primary, tend to be quite moderate, though 11 of 20 have medians at two or three. Republican primary voters (solid circles) tend to be more extreme, with most district Republican medians at 6, and even two district medians at 7. Overall, the top-two primary should incentivize centrism among candidates of both parties but especially among Republican candidates, who faced more moderate district medians than their closed-party medians in all 20 districts. Across all California districts where we interviewed respondents, this held for Democratic candidates in 29 of 48 districts and held for Republican candidates in all 48 districts.

A potential problem with these findings is that voters may respond to the ideology scale relative to their own districts rather than in an absolute sense. For example, strong liberals in Berkeley may report being moderates because they are comparing themselves primarily to their extremely liberal neighbors. Although our survey cannot address this criticism, another survey conducted in 2012 also estimated district ideology, not with self-reported ideology, but with responses to policy questions, and reached the same conclusion as we did: California districts generally are moderate, despite popular impressions to the contrary (Kousser, Phillips, and Shor 2013).
Figure A: Histogram of California Congressional District Ideological Medians

Figure B: District Medians and Closed Primary Medians

Note: These plots show the 20 best-case congressional districts (Category 3) where the top-two primary seemed likely to benefit moderate candidates, as coded by the authors before Election Day. The results are similar for other California districts.
The plots in this section show the self-reported 7-point ideology of districts' median voters and partisan median voters, presented several ways. They are consistent with the point made in the paper: the top-two ballot did create potential incentives for candidates to be centrist. District medians tend to be more moderate than the partisan medians, and NPP voters, a group with greater access to the primary process post-reform, also tend to be more moderate than the partisan medians.

**District medians by party registration (Democrats and Republicans)**
District medians by party registration (Democrats and Republicans, sorted)

Sorted by Republican median
District medians by party registration (Democrats, Republicans, and NPP, sorted)

Sorted by Republican median
District medians by party registration with overall district median

Sorted by absolute value of the distance between overall district median and party medians
District medians by party registration with overall district median for category 3 districts
Sorted by absolute value of the distance between overall district median and party medians
In the paper, we show that likely primary voters appear to have little sense for the ideology stances of candidates within party. (Below this paragraph, we re-present Figure 1 from the article, but with candidate names representing data points.) In this section, we show the results hold up across types of candidates, across districts, and across measures.

Moderate voters, those who placed themselves at 3-5 on the 7-point ideology scale, were even less willing to hazard a guess: they failed to rate 52% of all candidates, compared to 47% among those with stronger ideological identifications (p=.003).

We note some examples of egregious misperceptions in the paper. Here's two more:

The open-seat election in the 21st District provides another example. During the campaign, Republican Assembly member David Valadao professed his belief in a government “as limited as possible,” Fresno city Councilman Blong Xiong attempted to portray himself as a pragmatist with a deep connection to the constituency, and Central California Hispanic Chamber of Commerce President John Hernandez’s remarks adopted the language of the Occupy movement (Hanford Sentinel 2012). Participants in our study, however, mistakenly saw all three as centrists (Valadao 4.7, Hernandez 3.6, and Xiong 3.5).
The primary in the 26th District provides yet another illustration. While participants accurately placed Republican Tony Strickland, they saw Democrat Julia Brownley’s as a moderate rather than a liberal. In fact, Brownley tied as the most liberal member of the California Assembly in Capitol Weekly’s most recent legislative scorecard. This misperception potentially hurt the true centrist in the race, NPP candidate Linda Parks, who failed to advance in the June primary.

**Within-Party Analysis**

One possibility is that voters can distinguish between centrists and extremists within their own parties but not in the out-party. If this is the case, Figure 1 and the other analyses in the paper may mask a degree of voter knowledge that comes in handy in the closed primary format and thus overstate voter ignorance. However, we find that this is not the case. As the table below shows, the correlation between perceptions and the 4-item measure appear to be somewhat higher for in-party evaluations, but even these correlations are weak and the associated R²’s are essentially zero.

<table>
<thead>
<tr>
<th></th>
<th>Democratic Respondents</th>
<th>Republican Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Placement of</td>
<td>Placement of</td>
<td>Placement of</td>
</tr>
<tr>
<td>4-item measure</td>
<td>0.0938</td>
<td>0.0367</td>
</tr>
<tr>
<td></td>
<td>(0.121)</td>
<td>(0.166)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.932***</td>
<td>4.838***</td>
</tr>
<tr>
<td></td>
<td>(0.292)</td>
<td>(0.992)</td>
</tr>
<tr>
<td>Observations</td>
<td>56</td>
<td>50</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.011</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Do voters know more than just candidate party affiliations?

**4-item measure of ideology vs. partisanship dummy**

To determine whether a dummy variable indicating candidate party would predict respondents' ideological placements of candidates as well as a finer-grained measure of candidate ideology (our four-item measure), we first regressed respondent placements on the party dummy, and then on the four-item scores. In the paper, we focus on the 20 best-case districts (category three). In the table below, we first show the results for all districts in California. Since we focus on the explanatory power of partisanship, we limit the analysis to the 213 (of 238) major candidates and exclude NPP and other party candidates. We then show the results for viable candidates, viable candidates in category three districts, and on the next page viable nonincumbents and incumbents.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV: Average respondent placement of candidate ideology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All candidates</td>
<td>All candidates</td>
<td>Viable candidates</td>
<td>Viable candidates</td>
<td>Viable candidates, Viable candidates,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-item average scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.396***</td>
<td>0.471***</td>
<td>0.445***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0191)</td>
<td>(0.0237)</td>
<td>(0.0251)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Party dummy</td>
<td>0.268***</td>
<td>0.306***</td>
<td>0.282***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0108)</td>
<td>(0.0128)</td>
<td>(0.0141)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.313***</td>
<td>0.272***</td>
<td>0.290***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0115)</td>
<td>(0.0139)</td>
<td>(0.0149)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.382***</td>
<td>0.362***</td>
<td>0.374***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00761)</td>
<td>(0.00878)</td>
<td>(0.00996)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>213</td>
<td>143</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>213</td>
<td>143</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.671</td>
<td>0.737</td>
<td>0.769</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.743</td>
<td>0.802</td>
<td>0.810</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root MSE</td>
<td>0.090</td>
<td>0.088</td>
<td>0.076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.079</td>
<td>0.077</td>
<td>0.069</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses. The 4-item average score is an average of these ideological measures for each candidate: CF Scores, author ratings, MTurk ratings, and IRT-scaled Project Vote Smart responses.

*** p<0.01, ** p<0.05, * p<0.1

Additional regressions on the next page
Table continued

<table>
<thead>
<tr>
<th>DV: Average respondent placement of candidate ideology</th>
<th>Viable non-incumbents</th>
<th>Viable non-incumbents</th>
<th>Incumbents</th>
<th>Incumbents</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-item average scores</td>
<td>0.348***</td>
<td>0.701***</td>
<td>0.431***</td>
<td>0.313***</td>
</tr>
<tr>
<td></td>
<td>(0.0239)</td>
<td>(0.0317)</td>
<td>(0.0199)</td>
<td>(0.0130)</td>
</tr>
<tr>
<td>Party dummy</td>
<td>0.237***</td>
<td>0.394***</td>
<td>0.151***</td>
<td>0.313***</td>
</tr>
<tr>
<td></td>
<td>(0.0115)</td>
<td>(0.00808)</td>
<td>(0.0183)</td>
<td>(0.0130)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.338***</td>
<td>0.394***</td>
<td>0.151***</td>
<td>0.313***</td>
</tr>
<tr>
<td></td>
<td>(0.0141)</td>
<td>(0.00808)</td>
<td>(0.0183)</td>
<td>(0.0130)</td>
</tr>
<tr>
<td>Observations</td>
<td>91</td>
<td>91</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.704</td>
<td>0.827</td>
<td>0.907</td>
<td>0.904</td>
</tr>
<tr>
<td>Root MSE</td>
<td>0.072</td>
<td>0.055</td>
<td>0.070</td>
<td>0.071</td>
</tr>
</tbody>
</table>

Standard errors in parentheses. The 4-item average score is an average of these ideological measures for each candidate: CF Scores, author ratings, MTurk ratings, and IRT-scaled Project Vote Smart responses. *** p<0.01, ** p<0.05, * p<0.1
Robustness to other measures of candidate ideology

MTurk ratings, CF Scores, author ratings, and IRT-scaled Project Vote Smart

When we substituted CF Scores, author ratings, MTurk ratings, and IRT-scaled Project Vote Smart responses individually in place of the 4-item measure, we continued to find the same pattern of results shown in the above table. That is, the regression of respondent ratings on the partisanship dummy exhibits slightly better fit, as measured by the standard error of regression (SER) and $R^2$, than does the regression of respondent ratings on those individual measures. The table below shows this result for all candidates for whom ideological ratings exist on the respective measure and for all California districts. Restricting the analysis to incumbent candidates, fit is slightly better for the regression involving author ratings than the partisanship dummy, but not for the other three measures of ideology (not shown but available by request).

<table>
<thead>
<tr>
<th></th>
<th>DV: Average respondent placement of candidate ideology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MTurk</td>
</tr>
<tr>
<td>Ideology measure</td>
<td>0.0652*** (0.00479)</td>
</tr>
<tr>
<td>Party dummy</td>
<td>0.280*** (0.0139)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.249*** (0.0218)</td>
</tr>
<tr>
<td></td>
<td>0.259*** (0.0145)</td>
</tr>
<tr>
<td>Observations</td>
<td>98</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.659</td>
</tr>
<tr>
<td>SER</td>
<td>0.0918</td>
</tr>
</tbody>
</table>

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

DW-Nominate and Capitol Weekly scores

To examine whether these results are robust to other measures of ideology, we substituted DW-NOMINATE scores and Capitol Weekly legislative scorecard scores for the measures of ideology described above. We again pitted these measures against a partisanship dummy to determine which better predicts respondent ratings. DW-NOMINATE scores slightly outperform a partisanship dummy. Here, it's important to note that we are necessarily restricted to incumbents (the only candidates with DW-NOMINATE scores), so this result is consistent with our analyses above. On the other hand, Capitol Weekly scores slightly negatively predict respondent ratings, so they perform worse than the party dummy.
With district fixed effects

One possibility is that voters accurately perceive politicians’ ideologies but use the ideology scale inconsistently (across individuals or districts) and so appear ignorant even though they are not. Evidence presented by Tausanovitch and Warshaw (2013) appears to rule out this possibility by analyzing respondents’ perceptions, not of representatives’ ideology, but of their roll call votes. They nevertheless reach similar conclusions. To further rule out this possibility, we repeated the party indicator analysis with district fixed effects. We continue to find marginally higher R²s when predicting respondent ratings with a party dummy variable (see SI section 6). We thank Jonathan Wand for bringing this concern to our attention.

<table>
<thead>
<tr>
<th></th>
<th>(1) Respondent ratings</th>
<th>(2) Respondent ratings</th>
<th>(3) Respondent ratings</th>
<th>(4) Respondent ratings</th>
<th>(5) Respondent ratings</th>
<th>(6) Respondent ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV:</td>
<td>All candidates</td>
<td>All candidates</td>
<td>Viable candidates</td>
<td>Viable candidates</td>
<td>Viable candidates, cat. 3 dists</td>
<td>Viable candidates, cat. 3 dists</td>
</tr>
<tr>
<td>4-item scores</td>
<td>0.374***</td>
<td>0.443***</td>
<td>0.415***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0179)</td>
<td>(0.0184)</td>
<td>(0.0209)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Party dummy</td>
<td>0.249***</td>
<td>0.287***</td>
<td>0.259***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0112)</td>
<td>(0.0105)</td>
<td>(0.0132)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.326***</td>
<td>0.393***</td>
<td>0.371***</td>
<td>0.304***</td>
<td>0.386***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0103)</td>
<td>(0.00743)</td>
<td>(0.00672)</td>
<td>(0.0120)</td>
<td>(0.00868)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>230</td>
<td>217</td>
<td>154</td>
<td>143</td>
<td>104</td>
<td>96</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.778</td>
<td>0.806</td>
<td>0.891</td>
<td>0.922</td>
<td>0.888</td>
<td>0.902</td>
</tr>
<tr>
<td>Root MSE</td>
<td>0.077</td>
<td>0.074</td>
<td>0.062</td>
<td>0.055</td>
<td>0.057</td>
<td>0.055</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
**Individual-level analysis of whether voter knowledge of candidate positions goes beyond party**

For primary elections, in which voters consider a broad set of candidates, candidate-level analysis is cleanest for answering this question of whether voters tend to know more about candidate positions than partisanship indicates. However, this type of analysis has traditionally been conducted at the individual level (see Snyder and Ting 2003), so we present an individual level analysis here to show that our results hold up at this level. The unit of analysis in this case is the respondent-candidate pair, since respondents were asked about multiple candidates’ ideologies within their districts. As the regression analyses below show, the R-squared and SER are nearly identical, indicating relatively comparable fit. This indicates that respondents do not appear to bring any additional information to their placements, on average, than they could glean from partisanship.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DV:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-Item score</td>
<td>0.452***</td>
<td>0.421***</td>
<td>0.415***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0133)</td>
<td>(0.0146)</td>
<td>(0.0123)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Party Dummy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.252***</td>
<td></td>
</tr>
<tr>
<td>(Dem. = 0, Rep. = 1)</td>
<td>(0.00815)</td>
<td>(0.00913)</td>
<td>(0.00927)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.281***</td>
<td>0.374***</td>
<td>0.297***</td>
<td>0.385***</td>
<td>0.298***</td>
<td>0.394***</td>
</tr>
<tr>
<td></td>
<td>(0.00811)</td>
<td>(0.00570)</td>
<td>(0.00868)</td>
<td>(0.00601)</td>
<td>(0.00707)</td>
<td>(0.00585)</td>
</tr>
<tr>
<td>Observations</td>
<td>4,347</td>
<td>4,426</td>
<td>4,347</td>
<td>4,426</td>
<td>4,347</td>
<td>4,426</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.211</td>
<td>0.227</td>
<td>0.247</td>
<td>0.247</td>
<td>0.621</td>
<td>0.626</td>
</tr>
<tr>
<td>SER</td>
<td>0.274</td>
<td>0.271</td>
<td>0.269</td>
<td>0.268</td>
<td>0.250</td>
<td>0.247</td>
</tr>
<tr>
<td>District FE</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent FE</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses. The 4-item average score is an average of these ideological measures for each candidate: CF Scores, author ratings, MTurk ratings, and IRT-scaled Project Vote Smart responses.

*** p<0.01, ** p<0.05, * p<0.1
Moderate and independent respondents' perceptions
One potential challenge to the argument that voters don't know where candidates stand is that not all voters need to do so for moderate candidates to benefit from the rules change. Indeed, if just the moderate voters cared enough to seek out this information and vote for centrist candidates, the top-two ballot could make a difference. To determine whether this happened, we examine moderate respondents' perceptions of incumbents and challengers, as well as independent voters' perceptions. As the plots below, show, these voters exhibit the same perceptual patterns that we observe in the sample as a whole. Perceptions of incumbents tend to be more accurate, but respondents also tend to place the most extreme incumbents as arguably too moderate. And, again, we see little sign that the moderate and independent respondents know anything about challengers' ideology other than what they can glean from the party label shown on the ballot.
**Figure 5a: Moderate Respondents’ Perceptions of Viable Democratic Candidates**

Graphs by RECODE of inc

**Figure 5b: Moderate Respondents’ Perceptions of Viable Republican Candidates**

Graphs by RECODE of inc
Figure 6a: Independent Respondents’ Perceptions of Viable Democratic Candidates

Figure 6b: Independent Respondents’ Perceptions of Viable Republican Candidates
7 Example of Treatment and Control Ballots

The ballots shown below are representative of what respondents assigned to treatment (the top-two ballot) or control (the appropriate closed ballot) saw. This particular example comes from District 24.

Treatment - Open Ballot

Which primary candidate for The House of Representatives do you plan to vote for?

- Chris Mitchum
  Party Preference: Republican
  Occupation: Actor/Writer/Businessman

- Abel Maldonado
  Party Preference: Republican
  Occupation: Farmer/Business Owner

- Lois Capps
  Party Preference: Democratic
  Occupation: Congresswoman/Nurse

- Matte Bouté
  Party Preference: None
  Occupation: Law Student

- Don’t know yet

Control - Democratic Ballot

Which primary candidate for The House of Representatives do you plan to vote for?

- Lois Capps
  Party Preference: Democratic
  Occupation: Congresswoman/Nurse

- Don’t know yet

Control - Republican Ballot

Which primary candidate for The House of Representatives do you plan to vote for?

- Abel Maldonado
  Party Preference: Republican
  Occupation: Farmer/Business Owner

- Chris Mitchum
  Party Preference: Republican
  Occupation: Actor/Writer/Businessman

- Don’t know yet
8.1 Independents (NPP) choosing to vote or not vote in the Democratic primary
Consistent with the rules under California’s previous closed-ballot system, participants registered as independents were asked if they would like a Democratic Party ballot. 61.6% of these independent respondents chose to participate with the Democratic ballot. As one might expect, independent participants who opted for the Democratic ballot were significantly more liberal: Their mean 7-point ideological self-placement was 3.6, compared to 4.5 for those who refused the Democratic ballot (p<.01). However, this did not compromise the integrity of the experiment. Before independents opted out of the control group, the average participant ideology in the two randomly assigned groups was 4.0 (control) and 4.1 (treatment). After 170 independents assigned to the control group opted out of the Democratic ballot, the average ideology within the control group remained at 4.0. Furthermore, while this assignment mechanism may, in expectation, produce mild nonequivalence between the two groups, it allows us to speak to the effect of the actual rules change in California in 2012, thus improving external validity.

8.2 Posttreatment bias
Another potential cause of ideological difference between the treatment and control group is posttreatment bias. Since we asked self-reported ideology posttreatment, the treatment could influence people's responses to the ideology question. The plot below, however, shows how similar ideology is by treatment condition by party registration.

**Density plots of ideology by open ballot (solid) and closed ballot (dashed) and by party registration**
9 Additional Candidate-Level Analysis

In the candidate-level analysis, we calculate vote share separately for each candidate by the party registration of voters. We do so and include voter*candidate party fixed effects because a tendency to disproportionally vote in the treatment condition for Democratic or NPP candidates for any reason, such as disliking Republicans, could make it appear as if the treatment favors moderate candidates, as Democratic candidates and Republican candidates are both quite moderate. We show these results in Figure 3 in the article, and below with candidate names labeling data points.

One reason why voters may shift towards Democratic candidates in the treatment condition is that, in California, non-Democrats lean Democratic. Registered independent and third-party voters in California, who participate in larger numbers in the top-two (treatment) condition, skew heavily Democratic: according to our survey, 34.8% of these voters lean toward or identify with the Democratic Party, while just 21.2% lean toward or identify with the Republican Party. Of course, independents can already vote Democratic in the control condition if they choose to, but not all do.
9.1 All 34 Districts (Major Party Candidates)
The paper only shows a scatterplot for the best case (category 3) districts, so we present the scatterplot for all districts below.
9.2 Multiple moderates

One concern with the candidate-level analysis is that multiple moderates in the same district could make it appear as if the open ballot fails to help moderate candidates because they split the vote. To address this concern, we reestimate the regression in Table 1, column 1, after combining candidates in the same district with similar ideologies. (After rounding, we aggregate the vote share for each point on the rounded ideology scale.) The table below first reproduces the estimates from Table 1 (column 1) and then shows the same estimate but with candidate ideology rounded to 0.5 (column 2), which reduces the number of data points from 174 to 38, and then shows the estimate but with candidate moderateness rounded to 1 (column 3), which reduces the number of data points to 33. The results of this table suggest that competing moderates are not causing us to underestimate of the open ballot effect on moderate candidate vote share. When we replicated this analysis on all districts, we reached similar conclusions.

Major party candidates, category 3 districts

<table>
<thead>
<tr>
<th>DV: Treatment - control vote share</th>
<th>(1) Not rounded (same as Table 1, column 1)</th>
<th>(2) Rounded to 0.5</th>
<th>(3) Rounded to 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate ideological moderateness</td>
<td>-0.021</td>
<td>-0.001</td>
<td>0.027</td>
</tr>
<tr>
<td>Constant</td>
<td>0.088</td>
<td>0.094</td>
<td>0.086</td>
</tr>
<tr>
<td>Observations</td>
<td>174</td>
<td>141</td>
<td>123</td>
</tr>
<tr>
<td>Candidates</td>
<td>58</td>
<td>47</td>
<td>41</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.322</td>
<td>0.382</td>
<td>0.408</td>
</tr>
</tbody>
</table>

Standard errors in parentheses clustered at the candidate-level (candidates combined by ideology within districts in columns 2 and 3). Indicator variables for voter party registration interacted with candidate party registration (fixed effects) included but not shown.

*** p<0.01, ** p<0.05, * p<0.1
9.3 Did the reform affect election outcomes?

If the open primary failed to benefit moderates, we should not only see that the treatment fails to increase moderates’ vote share, but that it also fails to increase their chances of winning—that is, finishing in the top two and moving on to the general election. To test this, we compare the moderateness of top-two finishers in our control condition and in our treatment condition. Regardless of whether we measure ideology with respondents’ perceptions or with the four-item average, and regardless of whether we restrict the analysis to the 20 districts in which we thought the ballot would matter most, we find that candidates who advanced in the treatment condition are no more moderate than those in the control condition, as the table below shows. This table also presents the average moderateness of candidates who actually advanced in the June 6 election, showing that they are no more moderate than our control top-two finishers, a reassuring finding.

Finally, the figure on the next page plots the proportion of candidates that finished in the top two in both ballot conditions by ideological moderateness. While truly centrist candidates appear to have finished in the top two at a slightly higher rate in the treatment condition, this is an artifact of NPP candidates’ exclusion from the control ballot. Meanwhile, the most extreme candidates also appear to have advanced at a higher rate in the open ballot condition. In short, this analysis provides little evidence that the top two format systematically improved moderates’ fortunes.

These analyses may overestimate the effect of the top-two format on moderates’ fortunes. Four NPP candidates finished in the top two in our treatment condition (three advanced to the general election in the real primary). Had Proposition 14 failed, these candidates may have run as partisans in a closed primary, but they were excluded from the closed ballot in our experiment. As a consequence, the counterfactual we construct in the control condition (zero votes on a closed ballot) is a lower bound on NPP candidates’ chances of advancement under a closed primary. Since NPP candidates were generally more moderate, this should bias the analyses shown in this section against the null findings we demonstrate.

### Average Moderateness of Advancing Candidates in Treatment and Control Groups, and of the Actual Top Two Finishers

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Control</th>
<th>June 6, 2012 Top Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 districts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent ratings</td>
<td>0.54(0.02)</td>
<td>0.53(0.02)</td>
<td>0.53(0.02)</td>
</tr>
<tr>
<td>4-item index</td>
<td>0.31(0.02)</td>
<td>0.33(0.02)</td>
<td>0.34(0.02)</td>
</tr>
<tr>
<td>34 districts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent ratings</td>
<td>0.53(0.02)</td>
<td>0.52(0.02)</td>
<td>0.52(0.02)</td>
</tr>
<tr>
<td>4-item index</td>
<td>0.31(0.02)</td>
<td>0.32(0.02)</td>
<td>0.33(0.02)</td>
</tr>
</tbody>
</table>

Moderateness measured using folded ideology ratings, rescaled 0-1 with most moderate = 1. Standard errors in parentheses.
Probability of Advancement by Ideology and Ballot Format


10 Other Individual-Level Analyses

Our main individual-level analysis shows that proximity voting failed to improve under the top-two ballot. An alternative individual-level analysis is to determine whether individual survey respondents were more likely to select the most moderate candidate in their districts under the open ballot versus the closed ballot. In the analyses shown below, we determine the most moderate candidate by folding the four-item ideology scores, but these results are robust to alternative specifications of ideology.

We specify "vote for most moderate major party candidate" three ways: First, as used in columns 1 and 4 in the table below, we select the most moderate major party candidate among all possible candidates in the district. Second, as used in columns 2 and 5, we restrict the determination to viable candidates only. Finally, as used in columns 3 and 6, we only allow the most centrist viable candidate to be considered moderate if her 4-item ideology score falls in the middle half of the 7-point scale (between 2.5 and 5.5).

As the table below shows, we fail to find any sign that the top-two ballot leads individuals to select the most moderate candidate by any of these specifications. If anything, and consistent with the proximity analyses, voters may be less likely to select moderate candidates when given a larger choice set.\n
<table>
<thead>
<tr>
<th>DV: Vote for most moderate major-party candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 20 best-case districts (category 3)</td>
</tr>
<tr>
<td>(2) All 34 districts (category 2 &amp; 3)</td>
</tr>
<tr>
<td>Most moderate candidate from among</td>
</tr>
<tr>
<td>All candidates</td>
</tr>
<tr>
<td>Viable candidates</td>
</tr>
<tr>
<td>Viable candidates btw. 2.5-5.5</td>
</tr>
<tr>
<td>(3)</td>
</tr>
<tr>
<td>(4)</td>
</tr>
<tr>
<td>(5)</td>
</tr>
<tr>
<td>(6)</td>
</tr>
<tr>
<td>Open ballot</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Standard errors in parentheses</td>
</tr>
<tr>
<td>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open ballot</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00972</td>
</tr>
<tr>
<td>(0.0264)</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>0.230***</td>
</tr>
<tr>
<td>(0.0194)</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td>1,043</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>0.000</td>
</tr>
</tbody>
</table>
To determine whether the open ballot leads certain types of respondents to select the most moderate candidate, we repeat the above analyses, but restrict the sample to only the most knowledgeable respondents (those who answered at least 3 out of 4 political questions correctly, in columns 1-3) and then to the moderate respondents (self-placed at 3-5 on the 7-point ideological scale, in columns 4-6). For power purposes, we look at all districts in which we conducted the experiment. We again fail to find that the open ballot worked as reformers expected.

<table>
<thead>
<tr>
<th></th>
<th>Knowledgeable respondents</th>
<th>Moderate respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most moderate candidate from among</td>
<td>Viable candidates btw. 2.5-5.5</td>
</tr>
<tr>
<td>DV:</td>
<td>Vote for most moderate major-party candidate</td>
<td></td>
</tr>
<tr>
<td>Open ballot</td>
<td>-0.00757</td>
<td>-0.0529</td>
</tr>
<tr>
<td></td>
<td>(0.0286)</td>
<td>(0.0521)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.305***</td>
<td>0.488***</td>
</tr>
<tr>
<td></td>
<td>(0.0210)</td>
<td>(0.0394)</td>
</tr>
<tr>
<td>Observations</td>
<td>1,042</td>
<td>374</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.000</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
11 Additional Proximity Results
The paper's main individual-level analyses rely on city-block proximity as the dependent variable. In the analyses below, we show that results are the same when we instead use Euclidean distance to measure proximity. We also break out the results by party registration of respondents.

11.1 Proximity plots using Euclidean distance four-item average
Category 3 districts, viable candidates only
Proximity plots using Euclidean distance four-item average by party registration for Category 3 districts, viable candidates only

Democratic

Republican

Non-partisan/No party preference

Actual Proximity Voting
Proximity plots using Euclidean distance four-item average by party registration Category 2 and 3 districts, all candidates
11.2 Possible versus Actual Proximity

This section first shows possible versus actual proximity for all districts, breaks this down by party registration, respondent ideology, and then shows the results for each district individually. The results are consistent with the plots shown in the paper, which are restricted to the 20 best case (category 3) districts: the top-two ballot increased potential proximity voting, but proximity voting actually tended to worsen under the new format.
All districts: possible versus actual proximity

Possible proximity (city block, four-item average, all districts)

![Possible Proximity Voting Graph](image1)

Actual proximity (city block, four-item average, all districts)

![Actual Proximity Voting Graph](image2)
Possible versus actual proximity by party registration

Possible proximity (city block, four-item average)

![Possible Proximity Voting Graph]

Actual proximity (city block, four-item average)

![Actual Proximity Voting Graph]
Actual proximity by respondent ideology (city block, four-item average)
Solid line is open ballot, dashed line is closed ballot. Category 2 and 3 districts, all candidates.

Actual Proximity Voting
Possible proximity mean by district for category 3 districts (city block, four-item average)
Potential proximity improves in all districts under the top-two ballot.
Possible proximity mean by district for category 3 districts (city block, four-item average)

This plot reproduces the one above, except that it rescaled the control group to zero and then shows the gain in possible proximity for the treatment group, sorted by the size of that gain. Districts 39 and 41 gain the most from the open ballot in terms of proximity. Districts 15 and 47 gain the least.

- District 39 is Republican Ed Royce’s district. It leans Republican. The Democratic challenger was Jay Chen, who we put at 2. It also has a NPP candidate, who were rated as viable and a 4.
- District 41 has John Tavaglione, a moderate Republican (4-item score = 4.7) who faced Mark Takano, a liberal Democrat (4-item score = 2.3).

Recreating the above plot without NPP candidates results in essentially the same outcomes, with just some slight differences in ordering.
Possible proximity mean by district for all districts (city block, four-item average)

Possible proximity improves in all districts except: 35.

This district does not feature Republican candidates, just Democrats. Thus, potential proximity worsens as a mechanical feature: In the control condition, only Democrats and Independents are voting, and they are closer to the Democratic candidates, while in the treatment condition, Republicans get to vote as well. Potential proximity worsening does not involve the set of candidates changing, but rather, the set of potential voters.
Registered Republicans: Possible proximity mean by district for category 3 districts (city block, four-item average)

In districts without Republican candidates, such as District 13, distance can’t be calculated for the control condition. This fact partly explains why Republican voters have less to gain from the open ballot, on average.
Registered Democrats: Possible proximity mean by district for category 3 districts (city block, four-item average)

Unlike with Republicans, we have no races without Democratic candidates, so can calculate possible ideological distance in the control group for all races.
Nonpartisan/no party preference/other: Possible proximity mean by district for category 3 districts (city block, four-item average)

Note the truly massive potential gains in proximity in some races, which are not as striking in part because the x-axis goes all the way to 3 in this plot, not the 1.5 and 2 in the previous two plots.
11.3 Proximity plots using average respondent perceptions (City Block)
As noted earlier, voters tend to project their own views and positions onto their preferred candidates, so respondent ratings are an inferior and unreliable measure of candidate ideology. Even using this measure, we still fail to find much evidence that the open ballot led voters to select more proximate candidates. The lone exception is that independent voters appeared to select candidates they believed to be closer to themselves under the top-two format.

Category 3 districts, viable candidates only
By party registration for category 3 districts, viable candidates only
By party registration, all districts in ballot experiment, all candidates
11.4 Proximity plots using individual respondent perceptions (City Block)
Finally, we use individual respondent perceptions to measure candidate ideology. Here, the dependent variable is the distance between a voter and the 7-point ideological score she assigns to her chosen candidate. We use histograms here instead of kernel density estimates because the dependent variable is discrete. (Respondents placed both themselves and candidates using integers.) Amazingly, we fail to find any sign that the open ballot reduced proximity, even using this potentially problematic measure.

Category 3 districts, viable candidates only
Average proximity is .08 scale points less in the open-ballot condition, but this difference is not significant (p = .36).
By party registration for category 3 districts, viable candidates only
Actual Proximity Voting (Non-Partisans)

Density

Closed ballot
Open ballot
By party registration for all districts in ballot experiment, all candidates

Proximity, by Individual Respondent Perception (Democrats)

Proximity, by Individual Respondent Perception (Republicans)
Proximity, by Individual Respondent Perception (Non-Partisans)

Closed ballot
Open ballot
11.5 Did the Top-Two Primary Help Among Subgroups?

<table>
<thead>
<tr>
<th>Description</th>
<th>Effect of top-two ballot on ideological distance (SE)</th>
<th>N candidate</th>
<th>N participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full sample</td>
<td>0.154(0.070)</td>
<td>58</td>
<td>835</td>
</tr>
<tr>
<td>Ideologically moderate (4s on 7-point scale)</td>
<td>-0.086(0.060)</td>
<td>49</td>
<td>182</td>
</tr>
<tr>
<td>Ideologically moderate (3-5s on 7-point scale)</td>
<td>0.071(0.082)</td>
<td>54</td>
<td>340</td>
</tr>
<tr>
<td>Independent voters (3-5 on 7-point scale)</td>
<td>0.056(0.164)</td>
<td>50</td>
<td>178</td>
</tr>
<tr>
<td>Democratic voters (1-2 on 7-point scale)</td>
<td>0.270(0.113)</td>
<td>41</td>
<td>384</td>
</tr>
<tr>
<td>Republican voters (6-7 on 7-point scale)</td>
<td>0.052(0.111)</td>
<td>39</td>
<td>271</td>
</tr>
<tr>
<td>Centrist districts (Dem-Rep registration within 10%)</td>
<td>0.139(0.093)</td>
<td>31</td>
<td>492</td>
</tr>
<tr>
<td>Districts with high independent registered voter proportion</td>
<td>0.116(0.102)</td>
<td>32</td>
<td>443</td>
</tr>
<tr>
<td>Districts with 4+ candidates</td>
<td>0.215(0.103)</td>
<td>36</td>
<td>399</td>
</tr>
<tr>
<td>Districts with 4+ viable candidates</td>
<td>0.196(0.180)</td>
<td>20</td>
<td>151</td>
</tr>
<tr>
<td>Districts with 3 candidates or less</td>
<td>0.093(0.130)</td>
<td>15</td>
<td>262</td>
</tr>
<tr>
<td>Districts with 2 viable candidates</td>
<td>0.214(0.107)</td>
<td>14</td>
<td>314</td>
</tr>
<tr>
<td>Non-viable candidates included</td>
<td>0.183(0.068)</td>
<td>94</td>
<td>990</td>
</tr>
</tbody>
</table>

Note: This table reports the key coefficient from the model in Table 2 (col. 1), which is from the regression of city block proximity of vote choice on treatment assignment for best-case districts (category 3). District fixed effects included.
12 Awareness of the Open Ballot

Among all survey respondents, just 41.3% reported being aware of the switch to the top-two ballot. This increased to 42.4% in best case (category 3) districts, and increases further to 50.5% when restricting the sample to participants who indicated a preferred candidate for U.S. House of Representatives.

Assignment to the open ballot increased the percent saying they were “not aware” by about three percentage points (p = 0.44). Since we asked this question post-treatment, results subsetting respondents based on response to the awareness question need to be interpreted with caution. In the control condition, we included this statement before the question: “As you may or may not know, California will be using a new ballot format this year, in which voters will be able to choose candidates from any party in the primary election.” These statistics are only for respondents in the 20 category 3 districts. Across all districts, the treatment decreased this response by about seven percentage points (p = 0.000).

13 Political Knowledge Index

We constructed our index measuring political knowledge from four items. Three of these items were multiple choice: identification of Senate Majority Leader as Harry Reid's political office, identification of Treasury Secretary as Timothy Geithner's political office, and identification of the Supreme Court as the institution with the responsibility to decide if a law is constitutional or not. We constructed our fourth item from seven-point party placement questions. Respondents who correctly placed the Democratic Party to the left of the Republican Party scored 1 on this item, while those who incorrectly placed the parties scored 0. Cronbach's alpha for these four items is 0.73. The distribution of political knowledge based on this index is described as follows: 5.7% of respondents scored 0 out of 4, 14.5% scored 1 out of 4, 21.7% scored 2 out of 4, 25.7% scored 3 out of 4, and 32.4% answered all questions correctly.
14 Strategic Voting: Addressing Hedging

The plots below indicate the possibility of hedging: In districts in which one of the two major parties has a significant advantage (e.g., registration, money, candidate quality), voters from the disadvantaged party tend to select candidates further from their own ideological self-placements under the open ballot, indicating that they may be selecting candidates from the other side. However, this does not mask an overall effect of the open ballot to reduce proximity: In districts in which the parties are evenly balanced, the ballot still either increases or has no effect on proximity voting.

Treatment effect on proximity by district party registration and respondent registration
All districts, viable candidates, no NPP
Treatment effect on proximity by district party registration and respondent registration
All districts, viable candidates, no NPP
Treatment effect on proximity by party spending and respondent registration

Category 3 districts, viable candidates, no NPP

Districts that lacked candidates of one party, e.g., District 13, are excluded.
Treatment effect on proximity by party spending and respondent registration

All districts, viable candidates, no NPP

Districts that lacked candidates of one party, e.g., District 13, are excluded.
Treatment effect on proximity by max party spending and respondent registration
Category 3 districts, viable candidates, no NPP

Maximum spending by a Republican candidate minus maximum spending by Democratic candidate. Districts that lacked candidates of one party, e.g., District 13, are excluded.
Treatment effect on proximity by max party spending and respondent registration

All districts, viable candidates, no NPP

Maximum spending by a Republican candidate minus maximum spending by Democratic candidate. Districts that lacked candidates of one party, e.g., District 13, are excluded.
Treatment effect on proximity by party legislator experience
Category 3 districts, viable candidates, no NPP

# Rep. minus # Dem. experienced candidates

Democratic

Republican
Treatment effect on proximity by party legislator experience
All districts, viable candidates, no NPP
Treatment effect on proximity by party experience plus money

Category 3 districts, viable candidates, no NPP
Treatment effect on proximity by party experience plus money
All districts, viable candidates, no NPP
15 Crossover Voting and Proximity of Vote Choices

Reformers expected that voters would cross over to vote for candidates closer to their own ideological preferences if they lacked proximate candidates from their own parties. In the paper, Figure 5 shows that crossover voters could be voting for much more proximate candidates than they actually do.

In this section, we show a variety of evidence comparing same-party voters to crossover voters. We start by examining the potential proximity and actual proximity of vote choices for voters who did cross over. The results imply that voters who crossed over chose less proximate candidates than they could have. We then show that proximity was worse for crossover voters than it was for same-party voters.

Crossover voters choose candidates further away from their stated preferences than they could

---

Note: The figure shows best-case districts (category 3).
Ideological distance with four-item average measure, category 3 districts and viable candidates only
Ideological distance with four-item average measure, by party registration, category 3 districts and viable candidates only

![Graph showing ideological distance](image-url)
Ideological distance with four-item average measure, by party registration, all districts and candidates included

Democratic

Republican

Same-Party Voters

Crossover Voters

Density

Actual Proximity Voting in Open Ballot Condition
Ideological distance with individual respondent ratings, category 3 districts and viable candidates

This should be a tougher test for showing that proximity worsens with crossover voting. As shown in the projection analysis, respondents place their chosen candidates close to themselves, which should bias results toward finding no difference in proximity between the open and closed ballot conditions. Instead, we find that the same general pattern from the above plots holds.
Ideological distance with individual respondent ratings, by party, category 3 districts and viable candidates

Democrats
Republicans

Actual Proximity Voting in Open Ballot Condition

- Same-party voters
- Crossover voters

Density

0 0.1 0.2 0.3 0.4 0.5 0.6

0 1 2 3 4
Possible proximity with four-item average measure, category 3 districts and viable candidates only

In the plots above, crossover voters may have greater ideological distance, not because they are trying but failing to vote for the most ideologically proximate candidate on the open ballot, but because they differ in some way from same-party voters. In particular, they may reside in districts where they have worse in-party candidates in terms of proximity. In the next three plots, we therefore show the possible proximity plots. They reveal that, for the most part, crossover voters do not face worse options in terms of proximity.
Possible proximity with four-item average measure, by party registration, category 3 districts and viable candidates only

Same-party voters (dashed), Crossover voters (solid)
Possible proximity with four-item average measure, by party registration, all districts and candidates included

Same-party voters (dashed), Crossover voters (solid)
Crossover voters: possible versus actual proximity with four-item average measure, by party registration, all districts and candidates included

Another way of showing that crossover voters appear to be failing to vote for the most ideologically proximate candidate is to plot their possible versus actual proximity in the same plot. Here we do so just for all districts and all candidates, but the results are similar for just category 3 districts.
Same-Party voters: possible versus actual proximity with four-item average measure, by party registration, all districts and candidates included

Same party voters could also improve their proximity, but the differences are not quite as stark for same-party voters.
16 Strategic Voting: Evidence against Raiding

If voters were raiding---that is, crossing over to vote for low quality or extreme outparty candidates to sabotage the other side---we should expect to see crossover Democrats selecting different Republican candidates than Republican voters do, and vice versa. Instead, the plots below show that voters from the two parties tend to select the same candidates when they vote for candidates of one party.

**Republicans cross over to vote for the same candidates Democrats tend to vote for**

All districts
Includes only districts where more than one Republican crossed over
Democratic vote share for Democratic candidates calculated only from the open ballot condition
Best fit slope: 0.55, standard error: 0.11, R squared: 0.58

Results are similar for category 3 districts:
Best fit slope: 0.46, standard error: 0.15, R squared: 0.49
Democrats cross over to vote for the same candidates Republicans tend to vote for
All districts
Includes only districts where more than one Democrat crossed over
Democratic vote share for Democratic candidates calculated only from the open ballot condition
Best fit slope: 0.69, standard error: 0.21, R squared: 0.46

Results are similar for category 3 districts:
Best fit slope: 0.65, standard error: 0.24, R squared: 0.43
17 Replication of Candidate-Level Analysis in State Senate Races

Do the candidate-level findings from House elections hold true in downticket races? Voters appear to know even less about state senate candidates than congressional candidates. When asked to place the candidates on the 7-point ideology scale, 57% responded, "Don't know," for state senate incumbents compared to 30% for US House incumbents. Instead, voters appear to have relied much more heavily on partisanship in selecting state senate candidates—just 6% of participants cast a crossover vote compared to 16% in the House races studied.

Given that the top-two format failed to help moderate congressional candidates, who are much more prominent, it seems unlikely to help moderate state senate candidates. Indeed, when we replicate the candidate-level analysis from the congressional races in best-case state senate contests, we again find little evidence that the new ballot format helped centrists. In this case, we measure moderateness as the folded three-item average of author ratings, MTurk ratings, and CFscores (Project Vote Smart responses are unavailable). Moderate candidates performed slightly worse under the open ballot, on average (slope = -0.12, p = 0.16; see figure below), but the effect is imprecisely estimated, in part because so many respondents who cast a U.S. House vote in our survey failed to vote in these races. (See SI section 17 for a scatterplot similar to Figure 2 for the congressional races.) We suspect that this is again due to poor knowledge of the candidates. Primary reform alone cannot reward moderate candidates when voters lack information about where candidates stand.

We again find that the reform does not improve proximity even among the most politically knowledgeable respondents. Participants who answered at least three of the four knowledge questions correctly chose candidates who were 0.07 scale-points further away from themselves with the top-two ballot, on average, than with the closed ballot (p = 0.56).

As in the candidate-level analysis for the house races, to avoid potential biases, the unit of analysis is the candidate-voter registration type pair.
18 Number of Candidates on the Open Ballot and Proximity

More candidates should increase proximity because voters have more choices. However, we actually find the opposite, even among politically knowledgeable individuals.

The plots show only the open ballot condition, includes category 2 and 3 districts, and all candidates.

**Ideological distance and number of candidates with four-item average measure**
Ideological distance and number of candidates with four-item average measure by political knowledge

0 = no questions correct
4 = 4 of 4 questions correct
Ideological distance and number of candidates with mean voter perception measure
19 Distribution of Self-Reported Ideology
Here, we present the ideological composition of subsamples based on party registration.

Histogram of self-reported ideology by party registration
20 District Party Registration Plot

For reference, this plot presents the share of registration each party controls in each of California's congressional districts.