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ORIGINAL PAPER

Does the Ideological Proximity Between Candidates and Voters Affect Voting in U.S. House Elections?

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Abstract Do citizens hold congressional candidates accountable for their policy positions? Recent studies reach different conclusions on this important question. In line with the predictions of spatial voting theory, a number of recent survey-based studies have found reassuring evidence that voters choose the candidate with the most spatially proximate policy positions. In contrast, most electoral studies find that candidates' ideological moderation has only a small association with vote margins, especially in the modern, polarized Congress. We bring clarity to these discordant findings using the largest dataset to date of voting behavior in congressional elections. We find that the ideological positions of congressional candidates have only a small association with citizens' voting behavior. Instead, citizens cast their votes "as if" based on proximity to parties rather than individual candidates. The modest degree of candidate-centered spatial voting in recent Congressional elections may help explain the polarization and lack of responsiveness in the contemporary Congress.

Keywords Spatial voting · Electoral accountability · Congress · Representation

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Do citizens hold their congressional candidates accountable for their policy positions? Recent studies reach extremely different conclusions on this important question.[1] The bulk of the electoral studies on the effect of candidates' ideological positions on their vote shares find that ideological moderation has a relatively small influence on candidates' vote margins, especially in the modern, polarized Congress. Examining elections between 1956–1996, Canes-Wrone et al. (2002, p. 133) find that shifting from the middle of their party to the extremes lowers an incumbent's vote share by "1 to 3 percentage points." Wilkins (2012) extends their analysis to the present and finds that the electoral reward for moderation in Congress has shrunk even further in recent years, and is close to zero in the last decade.[2] Based on data from over 400 US House elections from 1996 to 2006 where successive challengers competed against a common incumbent, Montagnes and Rogowski (2015) "uncover no evidence that challengers increase their vote shares by adopting more moderate platform positions." Hall and Snyder (2013) find that "a one standard deviation move to the right" only increases the Democratic candidate's vote share by "1.3 to 2 percentage points." Finally, Hall (2015, pp. 24–25) finds that ideological extremity harms candidates in open-seat races, but has little or no effect in races with incumbents.

This macro-level evidence that candidates, and especially incumbents, only pay a modest electoral penalty for ideological extremity should not be surprising in light of the increasing levels of polarization in the modern Congress. If citizens are holding legislators accountable for extreme policy positions, then legislators should have a strong incentive to cast votes that represent the median voter in their districts (Black 1948; Downs 1957). Thus, legislators should converge on the median voter and there should be a tight association between the views of constituents in each district and the roll call voting behavior of their representative. But a large body of work shows that legislators do not converge on the position of the median voter (Ansolabehere et al. 2001; Fowler and Hall 2016; Levitt 1996). In addition, there is only a modest relationship between district preferences and legislators' roll call voting behavior once party is accounted for (Clinton 2006; Lee et al. 2004; Tausanovitch and Warshaw 2013).

In light of these studies, it is surprising that a number of recent survey-based studies appear to find evidence that candidates' ideological positioning has a large causal effect on citizens' voting choices. These survey-based studies examine whether voters are more likely to support candidates with similar positions either on individual issues or on an ideological scale. Focusing on incumbents, Ansolabehere and Jones (2010) find that "the public collectively hold[s] politicians accountable" and Jones (2011) finds that "the buck stops with members of Congress for the positions they take." Studies that include both incumbents and challengers in their analyses reach similar conclusions. For example, Simas (2013) finds that the "relative distance from the candidates...plays a significant role" in voting behavior

[1] Replication data for this paper is available on the Political Behavior Dataverse at https://doi.org/10.7910/DVN/RRBQAU.

[2] Wilkins (2012) finds that " as polarization substantially increased during the 1990s and 2000s, the penalty for extremism in the 1990s got smaller and in the 2000s, the penalty was no longer significant."

in recent congressional elections and voters "punish candidates who take positions that are too far out of line." Likewise, Shor and Rogowski (2016) find "robust evidence that vote choice in congressional elections is strongly associated with [the] spatial proximity" between voters and candidates. As a result, "candidates...have...incentives to advocate policies that reflect district preferences."

Overall, the findings from macro-level studies that incumbents face little or no electoral penalty for ideological extremity sit uneasily with these survey-based findings. If ideological moderation only leads to a small gain in incumbent vote share, it is unlikely that "vote choice in congressional elections is strongly associated with [the] spatial proximity" between voters and candidates.[3] Given the findings in the classic literature on congressional elections, it is far more likely that candidate positioning has only marginal causal effects on the vote choices of citizens. This is particularly true in recent elections due to the nationalization of elections at all geographic levels in the United States (Hopkins 2018).

In this study, we bring clarity to the discordant findings in previous studies. We use new statistical tests and the largest dataset to date of citizens' policy positions and voting decisions in congressional elections. Our dataset includes the policy positions, ideal points, and voting decisions of over 75,000 voters in 1100 electoral contests between 2006 and 2012. In analyses using only incumbents, as well as analyses using two measures of challenger positions, we show that the results in previous survey-based studies of spatial voting conflate the association between voters' *ideology* and their *ideological distance* from candidates. By failing to take account of voters' and candidates' positions separately, previous studies find artificially high levels of candidate-centered spatial voting. In contrast, we find that citizen policy positions are directly associated with their voting probabilities, with more liberal citizens being more loyal Democratic voters and conservatives being more loyal Republican voters. However, we find that the ideological positions of individual congressional candidates have only a modest effect on citizens' voting decisions. This suggests that congressional voters are primarily casting their ballots on the basis of their spatial alignment with parties rather than individual candidates.

Our model also enables us to examine the relationship between legislator vote shares and legislator positions (cf. Canes-Wrone et al. 2002; Wilkins 2012). For each district, we can calculate the change in vote share that would result from a one standard deviation move toward the center by the legislator if we assume our model is correctly specified and take the results as given. Consistent with previous electoral studies, but unlike most recent survey-based studies, we find that ideological moderation has a relatively small effect on the vote share of incumbents. Overall, we find that incumbents in recent congressional elections are unlikely to increase their vote share more than 1-2% by taking more moderate positions.

[3] This is especially true given the fact that candidates' quality and their spatial positioning is often conflated in observational studies. For instance, Canes-Wrone et al. (2002) only control for variation in the quality of incumbents via their campaign spending levels. If other, unobserved aspects of candidates' quality is correlated with their levels of ideological extremity (e.g., more moderate candidates are higher quality in other respects), this is likely to lead to upwardly biased estimates of the effect of candidate positions on voter margins.

Our results have broad implications for representation and democratic accountability in the United States. Most importantly, our results do not support the conclusion from recent survey-based studies that "the public collectively hold[s] politicians accountable" for the positions that they take in congressional elections (c.f. Ansolabehere and Jones 2010). Instead, our analysis indicates that incumbent legislators only face modest electoral consequences for unrepresentative positions in recent congresses (c.f. Wilkins 2012).[4] This helps explain the broad patterns of divergence between the parties (Poole and Rosenthal 2000; Lee et al. 2004), and very weak responsiveness to the preferences of constituents (e.g., Clinton 2006), that we observe in the contemporary Congress.

Previous Studies of Spatial Voting

In *An Economic Theory of Democracy*, Downs (1957) argues that vote choices are a function of the spatial proximity between the ideal points of voters and parties. This *spatial voting hypothesis* was easily extended to the proposition that citizens should be more likely to vote for individual candidates that share their ideological preferences, spawning a long literature in spatial voting theory (e.g., Enelow and Hinich 1984). In a related line of research, called directional voting theory, scholars argue that voters support candidates whose spatial positions are on the same side of the political spectrum as their own positions (Rabinowitz and Macdonald 1989).[5] The common element of both of these theories is that they imply that individual candidates' positions should influence citizens' voting decisions. For many years, there was "surprisingly little direct evidence supporting [the spatial voting model's] main assumptions" (Ansolabehere and Jones 2010, p. 583). However, the explosion of large-sample surveys in recent years has facilitated a renaissance in scholarship on voter behavior in congressional elections.

Some studies focus only on incumbents while others include *both* challengers and incumbents. But all of these studies reach broadly similar results. They all find that citizens are more likely to vote for candidates with similar preferences to their own (e.g., Ansolabehere and Jones 2010; Jones 2011; Nyhan et al. 2012; Simas 2013; Shor and Rogowski 2016). As a result, each study concludes that constituents are capable of holding congressional candidates accountable for their ideological positions and punishing candidates that take roll call votes that do not reflect their constituents' views.

However, the research designs of these studies conflate the effect of *voters' ideology*, *candidates' ideology*, and the *ideological distance* between voters and candidates (Table 1). For example, Shor and Rogowski (2016) argues that "vote choice in congressional elections is...strongly associated with spatial proximity." But they fail to separately control for either *voters' ideology* or *candidates'*

[4] Note that our findings do not suggest that legislative candidates can take any position at all. For instance, ideologically extreme candidates that take positions far outside the bounds of their party's platform may still face electoral consequences (Hall 2015).

[5] Tomz and Van Houweling (2008) use survey experiments to adjudicate between theories of spatial and directional voting. They find that spatial voting is four times more common than directional voting.

Table 1 Recent empirical studies of proximity voting

Paper	Controls for voter position	Controls for incumbent position	Includes challenger position
Adams et al. (2016)	No[a]	No	Expert placements & Project vote smart
Ansolabehere and Jones (2010)	Self-placement on an ideological scale	Perceived position on an ideological scale	No
Joesten and Stone (2014)	No	No	Expert placements on an ideological scale
Jones (2011)	Self-placement on an ideological scale	No	No
Shor and Rogowski (2016)	No	No	Vote smart survey policy positions
Simas (2013)	No	No	Expert placements on an ideological scale

[a]Dummy for whether a voter is "non-moderate" on a 7-point self-placement scale is used to test whether proximity voting differs by whether voters are extreme.

ideology. This is problematic because the preferences of the voter and the position of the candidate can contribute to vote choice irrespective of the distance between them.

First, ideologically extreme voters are more likely to be loyal to the party on their side of the political spectrum than moderate voters. This party loyalty could stem from a number of different factors. A psychological or sociological perspective might suggest that more ideologically extreme voters are likely to have a stronger affinity for their party. The same affective benefits that induce partisans to vote for their 'team' could also incentivize them to carry that teams' ideological banner (Green et al. 2002; Lenz 2013). From a rational choice point of view, it could be that citizens vote spatially for the most proximate party rather than the most proximate candidate. Ideologically extreme voters may view the party that controls the legislature as more important than their ideological proximity to individual legislators (Bonica and Cox 2017). Overall, this *party loyalty hypothesis* means that more extreme voters are likely to support their party's candidates regardless of the actual positions that these candidates take.

Second, irrespective of the spatial proximity between voters and candidates, extreme candidates may be more likely to lose because they are more likely to have undesirable valence characteristics (Stone and Simas 2010, p. 378).[6] We call this the *valence hypothesis*. For instance, more extreme candidates may be less likely to be career politicians. They also may be more bombastic or outspoken than more moderate candidates. We contend that few observers of politics would contest these two hypotheses. Together, we call these hypotheses "party loyalty plus valence." Evidence for the valence hypothesis is mixed, but evidence for the party loyalty

[6] This is one plausible explanation for the findings in Hall (2015) that more extreme candidates do significantly worse in open seat races.

hypothesis is strong and robust. In general, work on spatial voting should account for both possibilities.

Distinguishing Theories of Proximity Voting from Party Loyalty Voting

The spatial voting hypothesis proceeds from the assumption that voter preferences can be defined by a utility function, typically centered on the voter's ideal point. The utility of voting for a candidate is decreasing in the distance between the voter and the candidate in question. The key to distinguishing 'proximity voting' from 'party loyalty plus valence' is to characterize the nature of the dependence between the two endpoints. Under spatial voting, the effect of candidate positions must depend on the position of the voter. The utility function used determines the functional form of this dependence. If no such dependence is found, then the null hypothesis that vote choice is driven by party loyalty and valence, rather than spatial proximity, cannot be rejected.

Consider a voter whose ideal policy in some policy space occurs at v, and an election where the Democratic candidate has ideal point d and the Republican has ideal point r. According to the candidate-centered notion of spatial voting, voters should vote, with error, for the candidate who has an ideal point in some sense "closer" to their own. Votes are cast with error, but voters are more likely to vote for their favored candidate as the spatial advantage of their favored candidate grows. Simply put:

$$P(y = R) = f(\delta(d, v) - \delta(r, v)) \tag{1}$$

where δ is a distance function, v is the ideology of voters, d is the ideology of Democratic candidates, r is the ideology of Republican candidates, f is some well-behaved increasing function on [0, 1],[7] and y is the vote cast, with $y = R$ indicating a vote for the Republican candidate. The most common distance functions in the spatial voting literature are quadratic utility (i.e. Jessee 2009) and linear or absolute value utility (i.e. Adams et al. 2016).[8]

Table 2 summarizes the implications of each voting model.[9] The second column shows the regression equation that is implied by each model. In the third column, we summarize the predictions of each model that distinguish them from the party loyalty plus valence hypothesis. These predictions are defined in terms of the coefficients of a regression model.

Both directional voting and quadratic spatial voting require an interaction between the candidate locations and the voter location. Evidence for these predictions constitutes support for spatial voting theory over the null hypothesis of

[7] In our parametric analysis we will employ both linear and logistic link functions for f.

[8] Alternatively, directional voting theory proposes that distance be measured by the product of the absolute value of the distances of the voter and the candidate from some neutral point (Rabinowitz and Macdonald 1989).

[9] Supplementary Appendix A shows the full derivation of each model, in which we expand the kernel of $P(y = R) = f(\cdots)$ for each of the common spatial utility functions, as well as for directional voting.

Table 2 Theories of proximity voting and their empirical implications

Voting theory	$P(y = R) = f(\cdots)$	Empirical prediction	Table with result
Spatial voting			
Quadratic spatial voting	$d^2 - r^2 + 2rv - 2dv$	Significant interactions between candidate and voter locations	Table 4
Directional voting	$rv - rc - dv + dc$ where c is the "neutral point"	Significant interactions between candidate and voter locations	Table 4
Linear spatial voting	$\begin{cases} d - r & v < d < r \\ 2v - d - r & d < v < r \\ r - d & d < r < v \end{cases}$	Voter position only has an effect for voters who are between the two candidates.	Table 5
Party loyalty plus valence			
Party-centered Spatial Voting with lower valence extreme candidates	$v - d - r$	The effects of v, d, and r do not substantially depend on v	Tables 4 and 5

Note v is the ideal point of a voter in a policy space, d is the position of a Democratic candidate in that space, and r is the position of a Republican candidate. We assume two-candidate elections with a Democratic and a Republican candidate

party loyalty plus valence. In the linear voting model, voters' ideological positions should only have an effect for voters who are between the two candidates. For voters that lie to the left or right of both candidates, voters' ideology should have no effect on their voting behavior. The bottom row of the table shows the prediction of the party loyalty plus valence hypothesis, which indicates that all that matters are the direct effects.

Data

We use three sources of data to evaluate the association between candidate positions and voter decision-making in congressional elections. First, following classic studies, we evaluate the predictions of the quadratic and directional voting models using the relationship between incumbent positions and citizens' voting behavior from 2006-2012. For this analysis, we pool together the 2006-2012 Cooperative Congressional Election Surveys . In all, we have information on 178,742 survey respondents. We have information on self-reported vote choices in congressional elections for 77,205 of these respondents in contested races with incumbents running for re-election.[10] Data on legislators' party and estimates of legislators' roll call positions come from Poole and Rosenthal's DW-NOMINATE scores (Poole and Rosenthal 2000). Data on legislators' incumbency status are derived from Gary Jacobson's data on congressional elections and research by the authors. Finally, we classify "leaners" (those who identify themselves as Independents but say they lean

[10] Note that each of these surveys name both the challenger and incumbent candidates in each contest.

Table 3 Symbolic ideology and citizen ideal points

Symbolic ideology	Mean ideal point
Very liberal	−1.30
Liberal	−1.03
Moderate	−0.31
Conserative	.83
Very conservative	1.34

towards one party or the other) as partisans for all of the substantive analyses that follow.[11]

For our measure of respondents' ideology, we use ideal point estimates that are based on policy responses from all CCES surveys during this period (Tausanovitch and Warshaw 2013).[12] However, we only use the respondents from even-year surveys for this study. We use the pre-election survey for respondents' policy questions, and the post-election panel for their vote choice. Each of these surveys asked between 14 and 32 policy questions to 30,000–55,000 Americans.[13] To validate these ideal point estimates, Table 3 shows the strong relationship between symbolic ideology and our scaled measure of citizens' ideal points.

Unlike some other recent studies (e.g., Joesten and Stone 2014; Shor and Rogowski 2016), in the first portion of our analysis we focus explicitly on incumbent positions and eschew any attempt to estimate the positions of challengers (i.e., we focus on r and v for Republican incumbents and d and v for Democrats). This enables us to pool across multiple election cycles. It also mirrors the strategic situation faced by incumbents, for whom the position of potential challengers is typically unknown. Of course, this design is vulnerable to omitted variable bias if the positions taken by challengers and incumbents are correlated.[14] Two recent studies, however, indicate that there is only a modest correlation in the positions of challengers and incumbents in House elections.[15]

[11] This choice does not significantly affect the results.

[12] See Supplementary Appendix B for more details on both the survey sample and the ideal point measures.

[13] Supplementary Appendix B shows all of the questions used in the ideal point model.

[14] It is also important to note that the ideological locations between the candidates may be correlated with other differences, such as differences in valence or quality (see Groseclose 2001; Ashworth and De Mesquita 2009). However, it is difficult to measure the valence of challengers. As a result, previous spatial voting studies rarely explicitly control for these differences. We leave it to future work to better understand the role that valence plays in candidate choice.

[15] First, in 2010, there is a correlation of only 0.05 between Democratic and Republican candidates' positions on the National Political Awareness Test (NPAT) conducted by Project Vote Smart (Adams et al. 2016). Similarly, there is only a within-district correlation of .15 in the Campaign Finance (CF) scores of Democrats and Republicans in congressional elections between 2006–2012 (Bonica 2013).

Second, we follow some recent studies by controlling for challenger positions. For this analysis, we use data on challenger positions from Bonica (forthcoming) and Adams et al. (2016). Bonica (forthcoming) estimates the latent positions of congressional challengers and incumbents by applying a machine learning algorithm to campaign contribution data. Adams et al. (2016) estimates the latent, ideological positions of voters, challengers, and incumbents in the 2010 election on a common scale. The ideal points of voters are based on their responses to policy questions on the 2010 Cooperative Congressional Election Study (CCES). The ideological positions of candidates are based on their responses to National Political Awareness Test (NPAT), which is a large battery of policy questions that an organization called Project Vote Smart asks to all candidates for federal and state office.[16] The positions of voters and candidates are bridged onto a common scale using common questions on the CCES and National Political Awareness Test survey.[17]

Each of these two approaches has important advantages and drawbacks. Limiting the analysis to incumbents simplifies it by allowing us to focus on the effects of one candidate's spatial positioning. It also enables us to examine spatial voting in many districts and elections, rather than focusing on the small number of elections where measures of candidate positions are available. In addition, this approach avoids recent critiques that call into question the validity of measures of non-incumbents' ideological positions (Tausanovitch and Warshaw 2017, see also Hill and Huber 2015 regarding measures based on campaign donations).[18] However, incumbent-based analyses leave out a key player in the spatial voting decision—the position of challengers—creating the possibility for confounding. The best we can do is to conduct both analyses and show that we reach similar conclusions.

Visualizing Legislators' Positions and Constituent Voting

Do candidate positions affect voting behavior in Congressional elections? As a first cut, we estimate a simple non-parametric relationship between legislators' positions and vote choices for voters at different positions in the ideological spectrum. Without assuming any particular utility function, this will give us a sense of whether voter decisions depend on a combination of voter positions and the positions of individual legislators. In this initial section of our analysis we focus only on

[16] A number of recent studies have used the National Political Awareness Test (NPAT) to estimate candidate ideology (see, e.g., Shor and McCarty 2011; Adams et al. 2016; Shor and Rogowski 2016).

[17] See Adams et al. (2016, pp. 4–6) for more details on their methodology for bridging these latent positions. They state that "Project Vote Smart data provide information on both major-party candidates' policy positions in 288 districts. [M]any of these questions–15 in all–matched (or nearly matched) the text of questions that appeared on the CCES, which allowed us to generate joint estimates of operational ideology for both citizens and candidates in a common space using the estimation procedure described above."

[18] The DW-DIME measure from Bonica (forthcoming) has not yet been subjected to the same scrutiny as previous measures. It shows promise, however, in overcoming critiques of previous measures (e.g., it displays a very high contemporaneous within-party correlation with the DW-Nominate scores of incumbents).

incumbents (i.e., we focus on *r* and *v* for Republican incumbents and *d* and *v* for Democrats.) For now we rely on the assumption that the positions taken by challengers and incumbents are approximately uncorrelated, and thus can be treated as orthogonal from one another.

To account for party we separate our data into voter-legislator pairs, one for each combination of voter and legislator partisanship (Democratic-Democratic, Independent-Democratic, Republican-Democratic and so on).[19] For each pair, we separate voters into three groups based on their ideology, depending on whether they are in the liberal, moderate, or conservative tercile of the entire population. In each of these categories, we graph a loess curve of the percent voting for the incumbent across the range of incumbents' ideal points (DW-Nominate scores).[20] This is similar to binning into categories and graphing a point for each category of voter ideology and each category of legislator ideology. Each of the panels in Fig. 1 subset our data based on the above partisan groups. The first row shows Democratic voters, the second row shows Independent voters, and the third row shows Republican voters. The first column shows Democratic legislators, and the second column shows Republican legislators.

The theory of proximity voting has a simple prediction: liberals should be more likely to vote for more liberal legislators, conservatives should be more likely to vote for more conservative legislators, and moderates should be more likely to vote for more moderate legislators. In other words, each of our lines should have a slope representing the sensitivity of the vote choice to legislator positions. If the slope is flat, then either citizens are not voting spatially or the role that these considerations play is small.[21]

In the case of directional voting, the slope should be even steeper: as legislators go from the "wrong" side of some "neutral point" to the "right" one, the voters should switch en masse from voting against them to for them. If the neutral point is between the two parties, with no cross-over by candidates, then voters should always vote for the party on their side of the neutral point (all lines should be at 100 or 0%), and voting should be completely determined by ideology, not party.

Looking first at the graphs for Democratic voters (top row), the most salient pattern is that all of the curves are generally flat. Indeed, over 98% of liberal Democratic voters support Democratic incumbents, and upwards of 90% oppose Republican incumbents, virtually regardless of the legislators' positions.[22]

Next, we examine the graphs for Independent voters (2nd row). Several recent, prominent papers suggest that Independents are highly responsive to legislators' roll call positions (Jessee 2009, 2012; Shor and Rogowski 2016). However, Fig. 1 indicates there are only very modest associations between the vote choices of

[19] All of the analyses that follow focus on contested races, but the results are similar if we analyze all races.

[20] All of the curves are weighted using respondents' survey weights.

[21] Of course, it is always possible that voters are capable of using a proximity voting rule, but that the use of such voting rules is not prevalent enough to matter. It is also possible that they use a proximity voting rule, but with respect to some orthogonal unmeasured policy or consideration.

[22] Note that 67% of Democrats are in the liberal tercile.

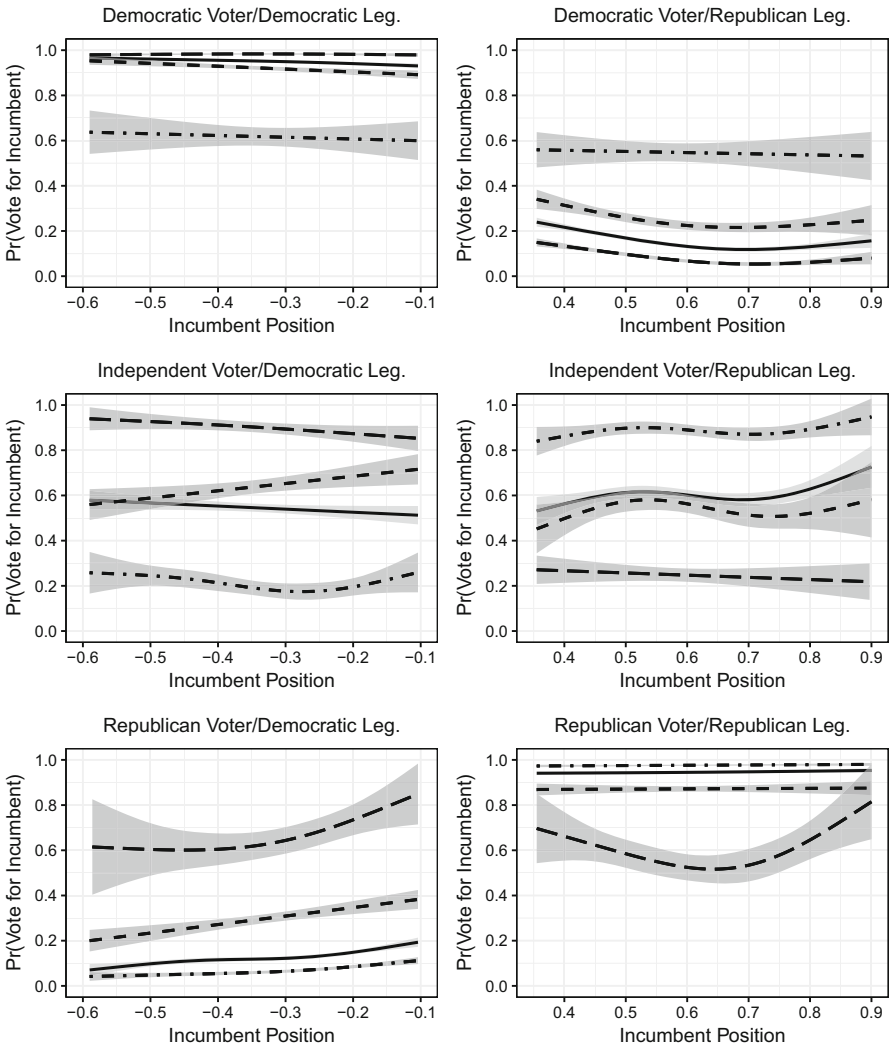

Fig. 1 Spatial voting in the U.S. House: 2006–2012—This graph shows non-parametric loess curves of the relationship between legislators' DW-Nominate scores and the probability that respondents at various ideological levels support them on election-day. The y-axis is the probability of voting for the incumbent and the x-axis is the incumbent's DW-NOMINATE score. Each line is a loess plot for a set of voters within a given tercile of ideology, where these terciles are defined by the entire population, rather than the terciles within a particular cell. The line made up of long dashes represents the liberal tercile, the long made up of short dashed represents the moderate tercile, and the line made up of dots and dashes represents the conservative tercile. The solid line is the mean for the entire population in each cell. The top row of the graph shows loess fits for Democratic respondents, the second row is for Independent respondents, and the last row is for Republican respondents. The first column is for Democratic legislators and the second column is for Republican legislators

Independents and legislators' roll call positions in our data (see also Adams et al. 2016).

Finally, the bottom row of Fig. 1 shows the association between legislators' positions and constituents' decisions on election day for Republican voters. The plot shows that Republican voters are slightly more likely to support moderate Democratic incumbents. However, there is no consistent association between the probability that Republican voters support Republican incumbents and the incumbents' ideology. Overall, over 97% of Republicans support Republican incumbents, and over 90% oppose Democratic incumbents, virtually regardless of the legislators' positions. 78% of Republican voters are in the conservative tercile, while only 3% are liberal. For this 3%, there is a relatively strong association between the positions of Democratic incumbents and vote choice. This is the only instance in which we see a substantively large relationship between candidate ideology and citizens' voting decisions. Due to the small size of this group, however, the aggregate effect is very small.

Looking across the plots, a remarkable feature of these results is the strength of both respondents' party and ideology as a predictor of vote choice. The effect of ideology is captured by the differences in the levels of the lines within each panel, and the effect of party is captured by the differences in the lines going down the plots in each column of graphs. A cursory glance shows that these effects are substantial. Even moderate Democrats overwhelmingly support Democratic incumbents, and moderate Republicans overwhelmingly support Republican incumbents. These individuals have the same ideology and differ only in party identification. However, the ideology of voters also has a substantial independent effect. For instance, Democratic voters who are conservative support Democratic incumbents about 60% of the time. Republican voters who are liberal support Republican incumbents at about the same rate. Overall, Fig. 1 indicates that the direct effects of party and voter ideology dwarf the effect of legislator position. The difference in the levels of the lines within and across panels is vastly greater than the difference between the two endpoints of the lines.

The fact that voters' ideology has a strong independent effect on vote choice is not evidence for the proximity model, because it contains no notion of distance. However, it does provide evidence that party attachment may not be purely affective. If voters' policy positions drive the extent to which they reliably support their party, then the spatial distance between the voter and the *party* is a sensible explanation. It may be the case that voters think or act spatially with reference to parties, but not candidates.

Regression Results

While the results in Fig. 1 suggest little reason to believe that the roll call positions of legislators influence voters' decisions on election day, the link between the graphs and the theoretical predictions is somewhat loose. To make a clearer connection between theory and evidence, we next turn to a parametric, regression-based framework that encompasses the theoretical predictions discussed earlier.

Quadratic Voting Model

First, we evaluate the predictions of the quadratic voting model in Equation 1 and operationalized in Equation 8 in Supplementary Appendix A.[23] This yields the regression model:

$$P(y = R) = v + v^2 + d + d^2 + dv + r + r^2 + rv + PID + \epsilon \quad (2)$$

where v is the ideology of voters, d is the ideology of Democratic candidates, r is the ideology of Republican candidates, PID is the voter's party, ϵ is the customary IID normal error, and y is the vote cast, with $y = R$ indicating a vote for the Republican candidate.

Columns (1) and (2) of Table 4 show the results of a linear probability model using data on incumbents' spatial positioning and citizen voting behavior in the 2006–2012 congressional elections.[24] Here, we rely on the assumption that the positions taken by challengers and incumbents are approximately orthogonal. We incorporate challenger positions in the next set of analyses. Thus, the regression model for Democratic incumbents is:

$$P(y = R) = v + v^2 + d + d^2 + dv + PID + \epsilon \quad (3)$$

Recall that the main prediction of the quadratic spatial voting model is that both the coefficients on candidates' ideology and the interaction between candidate and voter ideology should be large and significant. Specifically, there should be a large, negative interaction between d and v (as both Democratic candidates and voters get more conservative, voters should be less likely to support the Republican candidate) and a large, positive interaction of r and v (as both Republican candidates and voters get more conservative, voters should be more likely to support the Republican candidate). In contrast, if voting is party-centered then voting behavior should be driven by voters' ideology and party identification rather than candidate positioning. Candidate positions may effect voting via the valence hypothesis.

In column (1), we show the effect of candidate positioning among incumbent Democrats. The results indicate that more liberal voters are more likely to support Democrats and more conservative voters are more likely to support Republicans. A standard deviation move to the right among citizens is associated with a 24% increase in the probability that they support the Republican candidate. However, the evidence is weaker for the idea that citizens vote spatially based on their proximity with individual legislators. The interaction term for legislator ideology and citizen ideology, which captures spatial voting, indicates that a one standard deviation move toward the middle by Democratic legislators only makes conservative voters 1.4% more likely to support an incumbent Democrat (and vice versa for liberal voters).

[23] Note that we use standardized measures of both voter and legislator ideology in all the regression analyses in Table 4.

[24] As shown below, logistic regression models yield similar results. Also, all of the regression models are weighted using respondents' survey weights. In addition, the standard errors in all the regression models are clustered at the state-year level.

Table 4 Spatial voting in congressional elections

	Dependent variable			
	Vote for Republican candidate			
	Elections with Democratic Incumbent [2006–2012] (1)	Elections with Republican Incumbent [2006–2012] (2)	All elections	
			Both incumbent and challenger positions [2006–2012] (3)	[2010] (4)
Citizen Ideology	0.192***	0.176***	0.187***	0.215***
	(0.009)	(0.008)	(0.008)	(0.007)
Citizen Ideology	0.043***	−0.040***	−0.004	−0.003
	(0.003)	(0.003)	(0.003)	(0.006)
Democratic Cand. Ideology	−0.058		−0.235***	−0.0003
	(0.054)		(0.047)	(0.005)
Democratic Cand. Ideology Squared	−0.013		−0.113***	0.00004
	(0.026)			(0.003)
Republican Cand. Ideology		−0.090**	0.019	−0.019***
		(0.037)	(0.027)	(0.005)
Republican Cand. Ideology Squared		0.035*	−0.024*	−0.008*
		(0.019)	(0.014)	(0.005)
Independent	0.251***	0.280***	0.272***	0.328***
	(0.012)	(0.013)	(0.010)	(0.019)
Republican	0.504***	0.497***	0.509***	0.509***
	(0.011)	(0.011)	(0.009)	(0.016)
Citizen Ideology × Dem. Candidate Ideology	−0.014*		−0.005	−0.003
	(0.008)		(0.006)	(0.003)
Citizen Ideology × Rep. Candidate Ideology		0.020***	0.009**	0.006*
		(0.007)	(0.004)	(0.003)
Constant	0.088***	0.383***	0.156***	0.264***
	(0.030)	(0.019)	(0.025)	(0.012)
Observations	36,626	41,169	65,977	20,337
R^2	0.697	0.646	0.671	0.726
Adjusted R^2	0.697	0.646	0.671	0.726
Challenger positions?	No	No	Bonica (forthcoming)	Adams et al. (2016)

Note Standard errors are clustered by congressional district and year

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Column (2) shows much the same story for incumbent Republicans (the model looks similar to equation (3), but only includes the ideology of incumbent Republicans). A one standard deviation move to the right among citizens is associated with a 14% increase in the probability that they support the Republican candidate. Once again, the evidence is weaker for the idea that citizens vote spatially based on their proximity with individual legislators. Indeed, the interaction term for legislator ideology and citizen ideology indicates that a one standard deviation move toward the middle by incumbent Republicans only makes conservative voters 2% less likely to support an incumbent Republican (and vice versa for liberal voters).

Finally, columns (3) and (4) show the results using *both candidates*.[25] Columns (3) uses data on candidate positions from Bonica (forthcoming) that are based on the application of a machine learning model to campaign contribution data, while Columns (4) uses data on candidate positions congressional races in 2010 from Adams et al. (2016). Unlike the other models, these models control for the positions of both the Democratic and Republican candidates rather than only the position of the incumbent. However, the substantive conclusions are similar to the ones in columns (1) and (2) which only include incumbents. In both models, a one standard deviation move to the right among citizens is associated with about a 20% increase in the probability that they support the Republican candidate. But there are only modest interactions between candidates' positions and the ideology of voters.

Of course, these results are based on a linear probability model, which could attenuate some of the effect of candidate positioning. They also fail to separate voters by party. Thus, we also estimate each model using a logistic regression.[26] The downside of this model is that the results are less readily interpretable than the linear probability model. We graph the results to make it easier to visualize them. Figure 2 shows the results for incumbents in the 2006–2012 elections and Fig. 3 shows the results for both challengers and incumbents using data from Bonica (forthcoming).[27] The graphs mirror the descriptive patterns in Fig. 1. They show evidence that citizens vote spatially, but the substantive impact of spatial voting is small.

The left panel of Fig. 2 shows the effect of the ideological positions of Democratic incumbents' on the voting behavior of different groups. Democratic incumbents' positions have no effect on the behavior of Democratic voters, and only modest effects on the voting behavior of Independents and Republicans. The right panel of Fig. 2 shows similar results for incumbent Republicans. Republican legislators can gain a few percentage points among moderate Independents by moderating their positions. They can also gain about 10 percentage points among Democrats. Figure 2 shows that the ideological positioning of incumbents rarely improves their electoral performance by more than a few percentage points among any subset of voters, and the average effect is much lower than that. Figure 3 shows

[25] For these analyses, we matched the data on candidates' ideal points in the replication data of Adams et al. (2016) and Bonica (forthcoming) with our master dataset on voters' preferences and voting behavior.

[26] These models interact all coefficients with voters' party identification.

[27] The graphs are on a logistic regression of the model in Table 4 where voters' party ID is interacted with the other terms in the model.

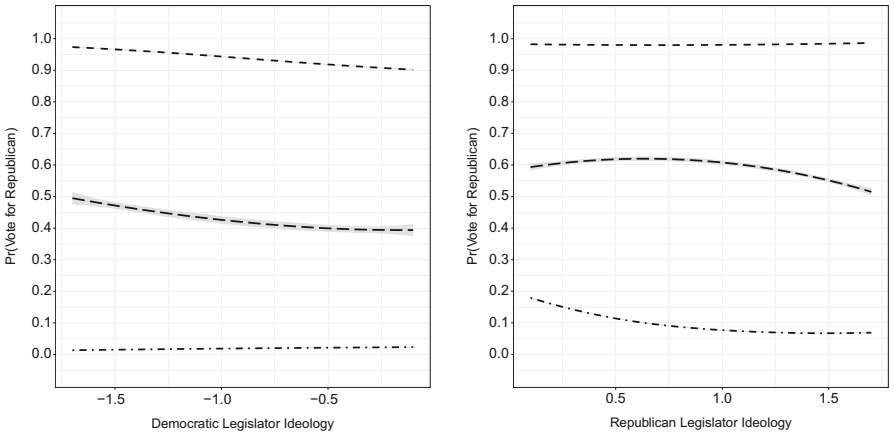

Fig. 2 Effect of incumbent positioning (2006–2012): this graph shows the increase in the probability that voters in each party support the incumbent if the incumbent changes their position. For simplicity, voters in each party are assigned the average ideology of people in their party. The plot is based on a logistic regression of the model in Table 4, columns 1 and 2. The dot-dash line in the bottom portion of each plot shows Democratic voters, the long-dash line in the middle shows Independent voters, and the dashed line at the top of each plot shows Republican voters

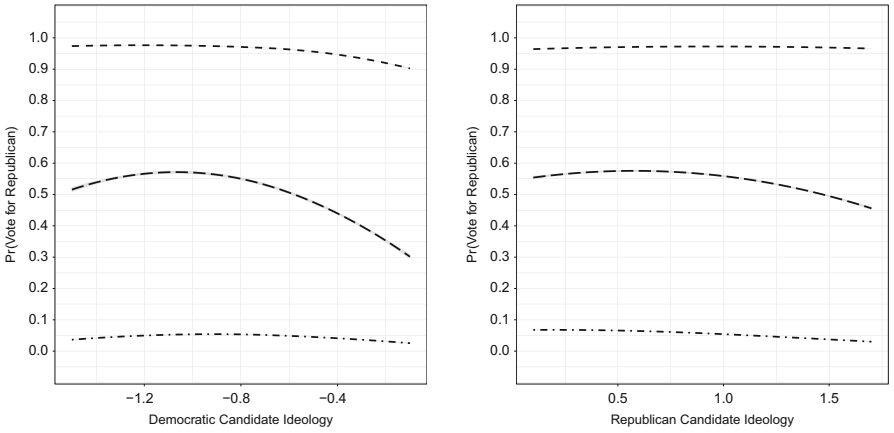

Fig. 3 Effect of candidate positioning (2006–2012): this graph shows the increase in the probability that voters in each party support the candidate if the candidate changes their position, holding the other party's candidate's position fixed. For simplicity, voters in each party are assigned the average ideology of people in their party. The plot is based on a logistic regression of the model in Table 4, column 3. The dot-dash line in the bottom portion of each plot shows Democratic voters, the long-dash line in the middle shows Independent voters, and the dashed line at the top of each plot shows Republican voters

similar results using data on the ideological the positions of both Democratic and Republican candidates in the 2006–2012 elections from Bonica (forthcoming). In this specification we once again find small effects, except when it comes to Independent voters and Democratic incumbents. Independents support moderate

Democrats at higher rates than extreme ones. Overall, the ideological positioning of candidates has modest effects on vote choice. In contrast, we see massive differences in voting behavior between conservative Republican voters and liberal Democratic voters.

The results in Figures 2 and 3 are strongly consistent with our party loyalty hypothesis, but much weaker when it comes to the valence hypothesis. Even independent voters do not appear much less likely to support extreme candidates. These effects differ only slightly for voters with different ideologies, offering limited evidence for candidate-centered spatial voting. These substantively small effects are consistent with the aggregate-level evidence that candidate moderation has a limited effect on vote shares.

Linear Voting Model

Testing the quadratic voting model does not actually require us to place candidates and voters onto the same scale. However, it is necessary to place candidates and voters onto the same scale in order to test the more precise predictions of the linear voting model. In this section, we use the replication data of Adams et al. (2016) to do this. These data include estimates of the positions for voters and both candidates in the 2010 election that all lie on the same ideological scale.[28]

Recall that the linear voting model makes a sharp empirical prediction: the coefficient on voters' ideology should be equal to 0 for voters whose preferences lie exterior to those of the candidates. Voters' preferences should only have an effect for voters that lie between the two candidates. To examine this hypothesis, we estimate separate linear probability regression models for voters that lie 1) to the left of the Democratic and Republican candidates, 2) between the ideological positions of the two candidates, 3) to the right of the two candidates.[29] The models looks like:

$$P(y = R) = v + d + r + PID + controls \tag{4}$$

In this analysis, we use the same set of controls as Adams et al. (2016), including incumbency status, church attendance, gender, race, age, education, and home ownership.

Column (1) of Table 5 shows the results for voters whose ideological position lies to the left of the two candidates (configuration 1 from Fig. A1). In contrast to the prediction of the model, there is a substantial effect of voter ideology on candidate choice, with more conservative voters being more likely to support the Republican candidate even among the subset of voters who are to the left of both candidates. There is a much smaller effect of candidate position. These voters are slightly more

[28] It is important to note, however, that the task of estimating voter positions in the space of legislators is a difficult one. It requires assuming equivalence between some set of behaviors that are driven by policy position: for instance, that casting roll call votes in a legislature can be considered equivalent to answering survey questions about roll call votes, or that campaign contributions are given to more spatially proximate candidates. Lewis and Tausanovitch (2013) and Jessee (2016) find that jointly scaling voters and legislators in the same space requires very strong modeling assumptions. Moreover, Lewis and Tausanovitch (2013) show that the data often do not support these assumptions.

[29] We find substantively similar results with logistic regression models.

Table 5 Spatial voting in 2010 congressional elections using a linear utility model

	Dependent variable		
	Vote for Republican Candidate		
	Left (1)	Middle (2)	Right (3)
Voter ideal point	0.105***	0.174***	0.040***
	(0.011)	(0.010)	(0.012)
Republican candidate ideal point	−0.030*	−0.021	0.050
	(0.016)	(0.014)	(0.032)
Democratic candidate ideal point	0.037**	0.007	0.002
	(0.015)	(0.011)	(0.010)
Independent	0.207***	0.426***	0.219**
	(0.031)	(0.019)	(0.091)
Republican	0.571***	0.668***	0.293***
	(0.033)	(0.013)	(0.088)
Constant	0.230***	0.209***	0.600***
	(0.041)	(0.029)	(0.097)
Controls	X	X	X
Observations	6,875	15,465	3,482
R^2	0.467	0.664	0.222
Adjusted R^2	0.466	0.664	0.219

Note Standard errors are clustered by congressional district

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

likely to vote for the Democratic candidate when she adopts more liberal positions, and more likely to support the Republican candidate when the Democratic candidate adopts more conservative positions. In contrast, they are less likely to vote for the Republican when the Republican candidate adopts more conservative positions. Column (2) of Table 5 shows the results for voters whose ideological position lies between the two candidates (configuration 2 from Fig. A1). For these voters, the positions of the candidates have no effect on their vote. Finally, Column (3) of Table 5 shows the results for voters whose ideological position lies to the right of the two candidates (configuration 3 from Fig. A1). Once again, the positions of the candidates have no significant effect on the voting behavior of these voters. The effect of voter ideology is non-zero but small, coming closer to the prediction of the linear voting model.

Overall, the results in Table 5 are strongly consistent with the party-centered theory of spatial voting and only modestly consistent with candidate-centered spatial voting theory. In all three preference configurations, party identification has large and significant effects on voting behavior, and voter ideology has a substantial effect in two of these configurations. In contrast, the effects of candidates' ideological positions are all substantively small. For example, a one standard deviation move to the right by Democratic candidate only leads to a 2.5% decline in the probability that liberal voters will support them. In addition, changes in the

positions of candidates have no effect on the voting behavior of moderate or conservative voters.

Extrapolating Legislator Vote Shares

Having examined what these results mean for theories of electoral accountability and spatial voting, what do they imply for representation in American politics? We can use the results of our individual-level model of voting behavior in U.S. House elections to estimate the effects of candidate positioning on vote margins in House elections from 2006–2012. This enables us to compare the aggregate implications of our individual-level model with the results of previous electoral studies (e.g., Canes-Wrone et al. 2002; Montagnes and Rogowski 2015; Wilkins 2012). We simulate vote shares for each legislator in the 2006–2012 elections from the sample of their actual electorate in our dataset using a model derived from the models presented in columns 1 and 2 of Table 4.[30] For each district, we calculate the change in vote share that would result from a one standard deviation move toward the center by the legislator. Note that due to our large sample of voters' ideal points, we have an average of roughly 350 people in every congressional district.

Figure 4 shows the predicted increase in vote shares from a one standard deviation move toward the center by each legislator. The left panel shows the kernel density plot of predicted changes in vote share for all districts represented by Democrats, and the right panel shows this density for all districts represented by Republicans. For Democrats, moderating their position by one standard deviation increases their vote share by an average of 1.0%. In every case, Democrats are projected to change their voteshares by less than 3%, and in the large plurality less than 2%. For Republicans, moderating their position by one standard deviation increases their vote share by an average of 1.1%. Likewise, in every case Republicans would increase their voteshares by less than 5%, and most of these changes are less than 3%.

Overall, legislator positions appear to have relatively small cumulative effects on their vote shares. Our survey-based analysis indicates that legislators can expect to increase their vote share between 0 and 3 percentage points from moderating their positions by one standard deviation.[31] These results provide a micro-level foundation for the modest effect of candidates' ideological positions shown in most aggregate studies of congressional elections. Indeed, like our study, most electoral studies find that shifting from the middle of their party to the extremes

[30] We use a logistic regression form of these models, which is more difficult to interpret but more appropriate for modeling a binary vote choice.

[31] In contrast, most previous survey-based studies of spatial voting suggest much larger effects of candidate moderation on vote share. These large effects are inconsistent with the results in electoral studies.

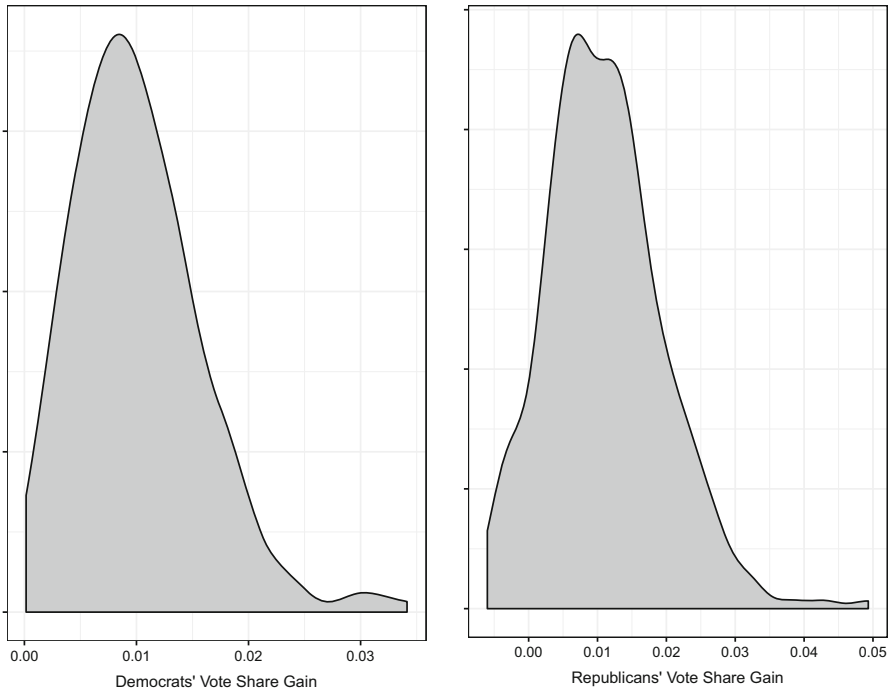

Fig. 4 Relationship between Representatives' Ideal Point and Expected Vote Share in the U.S. House: 2006–2012—This graph shows the distribution of potential vote gains from legislators that moderate their position by one standard deviation. The left panel shows the expected vote gains among Democratic incumbents, while the right panel shows the expected vote gains among Republican incumbents

lowers an incumbent's vote share by 0–3 percentage points (Canes-Wrone et al. 2002; Hall and Snyder 2013; Montagnes and Rogowski 2015).[32]

Conclusion

The Founding Fathers thought that frequent elections were the key mechanism for ensuring that the "will of the people" is carried out. This electoral connection provides the foundation for the study of congressional behavior and lawmaking and for theories of representation more broadly. A number of recent survey-based studies have provided an empirical foundation for the assumption that voters in recent congressional elections hold their representatives accountable at the ballot box for their roll call voting behavior (Ansolabehere and Jones 2010; Jessee 2009; Jones 2011; Shor and Rogowski 2016). Yet these studies are puzzling considering the modest rewards for candidate moderation in most macro-level electoral studies (e.g., Canes-Wrone et al.

[32] Our results leave open the possibility that highly salient individual votes, such as the one on the Affordable Care Act, could have larger effects on election results than the aggregate measures of candidates' ideological positions that we examine here (Brady et al. 2011; Nyhan et al. 2012).

2002; Wilkins 2012; Montagnes and Rogowski 2015). They are also puzzling in light of the polarization and lack of responsiveness in the contemporary Congress.

In this study, we resolve the disjuncture between electoral and survey-based studies. Unlike other recent survey-based studies, we separate the effect of voter and candidate ideology. Previous studies assume that these variables have no direct effect—that is, that they only affect vote choice via the *distance* between voters and candidates.

We find that the distance between voter preferences and the roll call records of individual candidates has a relatively small association with citizens' voting behavior. Indeed, a causal interpretation of our results would imply that most candidates only gain a percentage point or two in congressional elections from ideological moderation. These results reinforce previous work providing evidence that ideological positioning matters in congressional elections (e.g., Canes-Wrone et al. 2002). However, our findings indicate that the substantive electoral benefits of ideological moderation in general elections for the U.S. House are small. Thus, there are only modest electoral incentives for legislators to take ideologically moderate positions in the modern Congress.

We also find that voters' policy preferences are highly predictive of which party they will support: liberal voters almost always support Democrats and conservative voters almost always support Republicans. Overall, our results suggest that citizens vote on the basis of spatial proximity to parties, rather than candidates, in recent U.S. House elections. This nationalization of U.S. House elections could be caused by the growing alignment of ideology and partisanship in the electorate (Fiorina and Abrams 2008). It could also be caused by growing polarization between the parties (Poole and Rosenthal 2000), which makes the party that controls the chamber more consequential than the roll call behavior of individual legislators. Alternatively, it could be caused by the fact that voters have difficulty differentiating liberal Democrats from moderate Democrats, and conservative Republicans from moderate Republicans (Ansolabehere and Jones 2010; Dancey and Sheagley 2013). In contrast, voters are quite capable of distinguishing between the parties, particularly in an era of growing elite polarization.[33] They may be able to roughly observe the proximity of their own desired policies to the policies supported by each party, and vote accordingly.[34]

Our findings are consistent with work that attempts to incorporate spatial voting in the context of party reputations (e.g., Sniderman and Stiglitz 2012). The electoral connection in Congress *may* be alive and well, but at the level of parties rather than individual legislators. In other words, there may be collective accountability for ideological extremity by parties in Congress, rather than ideological extremity by individual legislators.

This paper also suggests a number of pathways for future work. One important question is whether candidate-centered spatial voting played a more important role in earlier historical eras. Indeed, spatial voting in House elections may have been more prevalent in periods with less nationalized voting behavior (Hopkins 2018)

[33] Of course, it is possible that spatial voting for candidates may have been more important in earlier eras when the parties were less polarized.

[34] However, it is important to note that this theory is observationally equivalent to several others. It may be the case the voters attempt to vote on the basis of candidate positions, but do so with extremely low acuity. Alternatively, the strength of affective party attachments may determine both policy positions and votes. Future work should seek to distinguish between these potential theoretical mechanisms.

and a less sorted electorate (Fiorina and Abrams 2008). Moreover, the greater availability of local news in earlier periods may have helped voters place candidates on a spatial continuum. Future work should also examine the role of spatial voting in other legislatures, such as the U.S. Senate or state legislatures. There should also be more research on spatial voting theories in primary elections. It is possible that the lack of party cues in these elections lead to more proximity-based voting (Hirano et al. 2015).

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