Electoral Choice, Ideological Conflict, and Political Participation*

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Abstract

The responsible party model posits that clearly-defined alternatives between candidates and parties increase political participation. But though party polarization is at historic levels, the effects of this development for participation remain deeply ambiguous. Using candidate survey data from Project Vote Smart to characterize the level of ideological conflict between pairs of candidates in U.S. House and Senate races, this paper reports new evidence that polarization has a demobilizing impact on voter turnout. These results are robust to a wide range of empirical specifications and contexts. Furthermore, the results provide no support for existing explanations that emphasize ideological or partisan intensity for the relationship between polarization and turnout. Instead, I find that increasing levels of candidate divergence reduce turnout primarily among citizens with lower levels of political sophistication. These findings are the most robust evidence to date of the impact of polarization on political participation.

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Schattschneider famously described *democracy* (1960, 138) as "a competitive political system in which competing leaders and organizations define the alternatives of public policy in such a way that the public can participate in the decision-making process." The putative attractiveness of such a system is that it allows citizens to exercise popular rule in determining the future course of governance. And as the policy positions of the two major political parties have moved ever farther apart over the last several decades, age-old claims about the importance of *how* these alternatives are defined have regained prominence. Since Republican presidential nominee Barry Goldwater promised to offers voters "a choice, not an echo" in the 1964 election, Republicans have been associated with increasingly conservative—and Democrats with increasingly liberal—policy positions (McCarty, Poole, and Rosenthal 2006; Poole and Rosenthal 1984, 1997), prompting an army of scholars and journalists to speculate about its causes and consequences for the American public.

According to the foremost scholars and observers of American politics, including Toqueville (1963 [1840]), Wilson (1901 [1884]), Bryce (1995 [1888]), and Schattschneider (1960), increasing the scope of conflict—that is, expanding the range of policy alternatives—engages more citizens in the democratic process and thereby generates more democratic outcomes. Ideological conflict has the capacity to affect mass political behavior because, as Sniderman writes (2000, 68), "[c]itizens do not operate as decision makers in isolation from political institutions" (see also Carmines and Stimson 1989; Zaller 1992). As a consequence of contemporary partisan polarization, voters are better able to associate each of the parties with a distinct set of policy positions (e.g., Hetherington 2001; Levendusky 2009). Yet the veracity of claims about the implications of increased ideological conflict for political participation remains deeply ambiguous. Though Abramowitz (2010) and Fiorina (2011) present competing arguments about how polarization affects political participation, for the most part, existing empirical analyses provide limited evidence for either account due to an inability to convincingly identify the impact of polarization net of a variety of other individual-level and contextual factors that also influence citizens' decisions to engage in politics.

This paper examines how ideological conflict between candidates affects voter turnout. I use

candidate survey data to generate estimates of the campaign platforms that pairs of candidates present to voters in congressional elections, where gretaer dissimilarity in the estimates characterizes higher levels of policy conflict. The results weigh against claims made by Schattschneider and others, and contrast sharply with conclusions reached elsewhere (Abramowitz and Saunders 2008; Abramowitz and Stone 2006; Hetherington 2008). Rather than stimulate voter turnout, increasing policy differences between candidates *reduce* voter turnout. Citizens in districts in which the candidates adopted clearly distinct sets of policy positions were between three and seven percentage points less likely to vote than citizens in districts where the candidates' policy differences were not as strong, and these results are robust to a wide range of model specifications.

Furthermore, upon investigating plausible explanations for these results, I find no evidence that demobilization is due to increased alienation based on either ideology or partisanship, as Fiorina argues. Instead, I find that political sophistication strongly moderates the effects of ideological conflict; citizens with lower levels of sophistication are disproportionately demobilized as ideological conflict increases. Political sophistication may play an important role in understanding the relationship between polarization and political participation by generating increased levels of uncertainty among citizens who typically rely among non-policy cues. The results shown in this paper, then, highlight the ways in which mass political behavior is conditioned by the nature of the political choices that are offered to the electorate, and suggest the importance of qualitative differences in the availability of information that citizens use to make political decisions.

Responsible Party Government and Mass Political Behavior

Generations of scholars and observers argue that ideologically differentiated parties are vitally important for a well-functioning democracy. The core of these arguments focuses on voters' ability to choose among clearly defined political alternatives, and to replace an incumbent party or candidate with an opponent if the voters are dissatisfied with the current state of government. This

argument was made most forcefully by responsible party theorists in mid-twentieth century, who proposed a wide-ranging set of reforms aimed at strengthening the two-party system. Chief among their proposals was that that the parties must present ideologically distinct choices to the electorate to ensure popular support of government. The report issued by the APSA Committee on Political Parties concluded that nonvoters "can be converted into voters when they become sufficiently convinced that voting is important, which in turn depends upon whether a real choice is presented on matters they consider critically important" (1950, 90). And even more directly, E.E. Schattschneider, a member of the APSA panel, asserted that "[t]he root of the problem of nonvoting is to be found in the way in which the alternatives in American politics are defined" (1960, 107). For Schattschneider, political participation could be increased only if the parties expanded the "scope of conflict," or offered candidates and policy alternatives that were more clearly differentiated.

Modern-day parties appear to conform to this standard quite well. By virtually every measure, contemporary political elites are more ideologically polarized than their partisan predecessors (e.g., Fiorina and Abrams 2008; Hetherington 2009; McCarty, Poole, and Rosenthal 2006; Poole and Rosenthal 1984). As Hetherington (2009, 427) puts it, "One outgrowth of polarization has been the development of party government, which is exactly what political science reformers had in mind in the post-Second World War years."[1]

Because changes at the elite level have the capacity to substantially reshape mass attitudes and behavior (e.g., Carmines and Stimson 1989; Key 1966; Zaller 1992), the consequences of increased polarization may have major implications for mass political behavior. In particular, political participation is an important barometer of democratic health because, as Dalton writes (1988, 35), "citizen involvement in the political process is essential for democracy to be viable and meaningful." The ideological differences between competing parties have been shown to have significant

[1]Of course, the APSA committee proposed a variety of other reforms, too, including better integration of the parties between the national, state, and local levels, and more levers by which congressional parties are held responsible for their legislator actions (or inaction). This paper focuses mainly on the panelists' concern for the articulation of clear and ideologically distinct platforms.

consequences in other contexts. For instance, decreased turnout in the 1997 British parliamentary elections may have resulted from the absence of any important policy differences between the Labour and Conservative parties (Pattie and Johnson 1997), while American historians often attribute record-high levels of voter turnout during the Gilded Age to the intense party conflict during this era (for reviews of this literature, see Summers 2004). And though not focused specifically on the impact of polarization on mass behavior, Sartori (1976) attributes the breakdowns of the Weimar Republic and the French Fourth Republic to high levels of party polarization, arguing that the vast policy differences between the parties promoted high levels of disaffection among the public and made governance impossible.

Polarized Parties-in-Elections and Political Participation

While congressional research provides ample evidence of polarization among the parties-in-government (e.g., McCarty, Poole and Rosenthal 2006; Poole and Rosenthal 1984), to borrow from V.O. Key's tripartite characterization of American political parties, ideological conflict between parties also extends to elections, in which opposite-party candidates almost always adopt platforms composed of contrasting sets of issue positions (e.g., Ansolabehere, Snyder, and Stewart 2001; Burden 2004; Fiorina 1974; Sullivan and O'Connor 1972; Sullivan and Minns 1976; Wright and Berkman 1986). Furthermore, the increase in congressional polarization over the last several decades suggests that the level of ideological differentiation between candidates has also increased.

Ideological divergence in election platforms, though, contrasts with the predictions offered by the Downsian model of electoral competition, in which, under a variety of assumptions, office-seeking candidates in two-party elections are expected to adopt identical platforms that correspond with the preferences of the median voter. Subsequent models explain candidate divergence with a variety of factors, and one class of these models are based on the premise that candidates adopt platforms conditional on their expectations about how platform choice influences voter turnout.[2]

[2]Other models emphasize the roles of policy motivations (e.g., Calvert 1985; Cox 1984; Wittman 1983), party activists

These models posit that citizens will not vote if neither candidate's platform sufficiently reflects their preferences (e.g., Adams and Merrill 2003; Callander and Wilson 2008; Hinich and Ordeshook 1969), in which case parties may adopt more extreme positions to motivate turnout among their core supporters (e.g., Ensley 2010; Peress 2011). To the extent that theories of electoral competition incorporate the possibility of voter abstention as an influence on the platforms chosen by candidates and parties, they do so by characterizing a citizen's choice to vote based upon the relative position of the citizen's ideal point vis-à-vis the candidates' platforms.[3]

Some recent arguments about the behavioral consequences of elite polarization draw upon the formal models described above to explain how polarization might affect levels of voter turnout. For instance, Fiorina (2011) argues that most of the public holds relatively moderate political views, and expects that many of these citizens become alienated and thus withdraw from politics as elites embrace more ideologically extreme policy positions. The key supposition in this argument is that citizens choose to abstain when they feel that neither party sufficiently represents their policy views.[4] Abramowitz, on the other hand, argues that polarization increases citizens' stakes in the election outcome, and thereby generates higher levels of turnout (2010; Abramowitz and Stone 2006). This argument emphasizes the difference in benefits that citizens expect to receive should one party win over the other, such that citizens are expected to turn out at higher rates when the parties are highly polarized because the difference in benefits is greater (see, e.g., Riker and Ordeshook 1968).

Existing literature on voter turnout generates a variety of possible explanations for how ideological conflict may affect voter turnout. Standard models of turnout (e.g., Downs 1957) posit that citizens vote when the rewards exceed the costs, where the rewards are based upon the probability

(e.g., Aldrich 1983*a*, *b*), primary systems (e.g., Adams and Merrill 2008; Burden 2000; Coleman 1971), the threat of entry by a third party (e.g., Callander and Wilson 2008; Palfrey 1984), and valence considerations (e.g., Ashworth and Bueno de Mesquita 2009; Groseclose 2001). For in-depth reviews of the literature that explains why candidates adopt divergent platforms, see Fiorina (1999) and Grofman (2004).

[3]Note that these models bear more than a passing similarity to empirical models that integrate candidate preference and turnout decisions (e.g., Burden and Lacy 1999; Dubin and Rivers 1990).

[4]See also Dionne (1991) and Plane and Gershtenson (2004).

that a citizen's vote is decisive times the increase in benefits the citizen expects to receive if her preferred candidate wins. Thus, ideological conflict may increase turnout by increasing the stakes associated with an election outcome, as Abramowitz argues (2010; Abramowitz and Stone 2006), which could occur by increasing either or both of these terms.

On the other hand, ideological conflict could decrease voter turnout by increasing the number of citizens who feels that neither party or candidate sufficiently represents their interests. Downs (1957) argued that this form of alienation would lead parties to choose a few rather ideologically extreme issue positions to motivate turnout among ideologues. Fiorina (2011) uses this logic to explain why party polarization decreases turnout.

Alternatively, ideological conflict could affect voter turnout by altering the strength of citizens' preferences over candidates. Political information, for instance, has long been shown to be a strong predictor of turnout. One explanation for this relationship is that political information decreases a citizen's uncertainty about the accuracy of her voting decision, and thereby increases her confidence that she has selected the "correct" candidate given her preferences and the candidates' policy views (e.g., Matsusaka 1995). The "swing voter's curse" (Feddersen and Pesendorfer 1996) offers a related explanation, in which uninformed swing voters strategically delegate the voting decision to better-informed voters because they are wary of choosing the incorrect candidate. Thus, rather than alienating citizens, ideological conflict could decrease turnout by increasing citizens' uncertainty about whom to support.

These three sets of explanations implicate a variety of mechanisms for the relationship between ideological conflict and turnout, but they also generate specific expectations about which citizens are more likely to be demobilized by high levels of conflict. If conflict increases turnout because citizens perceive larger benefits (or rewards), then we should expect these effects to be strongest among citizens with strong party attachments and/or whom most closely share the views of one of the candidates, as these citizens are more likely to stand to gain from the election of their preferred candidate compared to citizens with weaker party attachments or for whom neither candidate is

obviously preferable. If conflict decreases turnout by alienating citizens, however, we would expect citizens with weaker ideological and/or party attachments to be demobilized most by ideological conflict because partisan warriors and ideologues have the most to lose if their preferred candidate does not win.

If ideological conflict generates higher levels of uncertainty, however, the demobilizing impact should be concentrated most strongly among citizens with lower levels of political sophistication, which refers to the quantity and organization of an individual's political cognitions (Luskin 1987) and thereby influences the processes by which citizens make political decisions. Citizens with relatively low levels of political sophistication tend to rely heavily on simple cues and heuristics when making political decisions, whereas high sophisticates use more complicated evaluative criteria (e.g., Goren 1997; Lau and Redlawsk 2001; Lavine and Gschwend 2006; Lodge and Hamill 1986; Zaller 1992; Zaller and Feldman 1992). As Lavine and Gschwend (2006, 158-9) put it, "For non-ideological voters—those for whom the organizing principle of the liberal-conservative continuum is not an available cognitive construct—the information costs associated with learning the candidates' issue positions and calculating issue distances are prohibitive." Furthermore, the salience of ideological considerations for citizen decision-making increases with the level of ideological conflict between the candidates (e.g., Highton 2004; Wright and Berkman 1986). When the candidates are highly differentiated, these policy differences play an especially prominent role in guiding voting decisions.

Thus, electoral contests between highly divergent pairs of candidates may demobilize citizens who are least equipped to make voting decisions on the basis of purely ideological considerations. The increased emphasis on ideological differences induces citizens to use more sophisticated decision-making criteria in these kinds of races (e.g., Kahn and Kenney 1997), but not all citizens are equally equipped to do so. Just as voters are less likely to support candidates about whom they are uncertain (Alvarez 1998), citizens may be less likely to vote when they are uncertain about which candidate they prefer (e.g., Matsusaka 1995). Thus, lacking the cues on which they normally rely to determine which candidate to support, citizens with lower levels of sophistication may be less

likely to vote as the level of divergence increases. I test each of these sets of hypotheses in turn.

Existing Evidence

The standard conclusion in the literature is that, as Hetherington (2009, 443) writes, "Certainly [polarization] does not seem to have demobilized the electorate." But though Abramowitz's argument that polarization increases turnout appears to enjoy more empirical support in the current literature (Abramowitz 2010; Abramowitz and Saunders 2008; Abramowitz and Stone 2006; Hetherington 2006; Jacobson 2005), these tests are fraught with conceptual and empirical limitations. Virtually all such tests assess the effect of polarization using some measure of congressional polarization, and many of these analyses are based on voter turnout in presidential elections (Abramowitz and Saunders 2008; Hetherington 2006). It is difficult to know what to make of these tests, however, without a theoretical explanation for the connection between congressional polarization and voter turnout decisions in elections that, at least in practice, have little to do with the dynamics of Congress. Furthermore, the national character and high level of intensity that characterize presidential campaigns are likely to significantly attenuate whatever influences of congressional-level factors may play in citizens' turnout decisions, which calls into question the face validity of results showing significant turnout effects due to congressional polarization.[5]

These conceptual questions notwithstanding, existing tests for the effect of polarization also are unconvincing because the analyses are subject to range of possible confounding variables. In particular, they unable to attribute differences in turnout to polarization net of other time-varying characteristics and contextual factors that also affect citizens' participation decisions. For instance, Hetherington analyzes data from the 1980-2004 National Election Studies and observes increasing levels of participation that correspond with increases in congressional polarization, and concludes that "elite polarization has stimulated participation at the mass level" (2006, 29). More-

[5]And to raise a more minor point, even if we acknowledge these complaints but are willing to accept the results of analyses that using congressional polarization as an acceptable way to assess the effects of polarization on turnout in presidential elections, it is altogether unclear whether polarization in the House or Senate is the more relevant measure.

over, Abramowitz and his coauthors (Abramowitz and Saunders 2008; Abramowitz and Stone 2006) show that increases in turnout in the 2004 presidential election corresponded with polarization over George W. Bush's performance as president.[6] But as Hetherington (2009, 443) points out, "Surely the parties' increased efforts at mobilization [in 2004] matter as well."[7] Examining a wider time span, Abramowitz (2010) assesses trends in participation over the last three decades, during which time congressional polarization has increased, and concludes that elite polarization has stimulated participation levels among the attentive public.

But the political world has changed in many ways over this time period: the McGovern-Fraser reforms provided for citizens to directly select party nominees for president, voter registration requirements have been changed or made easier through programs like motor-voter, and hot-button issues like abortion, race, and gay marriage have emerged and (to some degree) receded. Because polarization has increased during a time of significant political and cultural change, proper tests of the relationship between turnout and polarization must account for these other potential explanations for variation in turnout.[8] The conceptual and empirical limitations of these studies make it difficult to properly evaluate the theories these analyses were designed to test.

The empirical strategy used in this paper addresses both sets of limitations. First, I characterize polarization using the level of ideological divergence between candidates running for the same office. Just as congressional polarization is measured by the ideological distance between Republicans and Democrats, the measure that I use characterizes the extent of ideological difference between two candidates seeking the same office. Because these alternatives are the electoral choices that are offered to citizens, this measure is more conceptually relevant to citizens' turnout decisions.[9] Characterizing ideological conflict in this way focuses specifically on the incentives for the platforms

[6] Jacobson (2005) conducts a similar analysis.

[7] See Bergan et al. (2005) for a detailed study of grassroots mobilization during the 2004 election.

[8] Fiorina (2011) devotes an appendix to one of his chapters to a discussion of other identification challenges in this body of research.

[9] This approach stands in stark contrast to those used by other scholarship that investigates the form and consequences of ideological conflict using measures such as interparty polarization, intraparty unity, congressional agreement with the president, and the platform congruence between presidential candidates.

that candidates adopt, rather than on citizens' perceptions of them.[10]

I use two sets of elections to examine the relationship between divergence and turnout. First, I examine a sample of elections for the U.S. Senate that took place between 1996 and 2006, and complement these data with a sample of U.S. House races that took place in the same election year (2006). The combination of these two sources of data allows me to examine the effects of divergence across a wide swath of time and contexts, and, particularly important, the House elections data allows me to implicitly control for all of the other time-varying features of the political environment that may also affect levels of turnout. Focusing on a single election year sharply reduces the possibility that the results are confounded by time-varying characteristics and contextual factors that are otherwise unaccounted for. The main identification strategy, then, uses the variation in the level of ideological divergence between pairs of candidates in a large number of U.S. House and Senate races. Thus, I examine citizens' willingness to vote as a function of the level of ideological conflict between candidates in the district in which they live. Employing this strategy yields dramatically different results from the research described above. Rather than increase voter turnout, I find that increasing levels of ideological divergence *reduce* turnout, casting doubt on the argument posed by Abramowitz and, more significantly, on a key premise of arguments presented by Schattschneider and other responsible party proponents.

Data

I use candidate survey data collected by Project Vote Smart to characterize candidate platforms in U.S. House and Senate races. Project Vote Smart is a not-for-profit, non-partisan organization that collects information about candidates for distribution to voters and the media. During each

[10]The principle theoretical problem with using citizen perceptions is that, lacking a theory for how objective levels of polarization map into citizens' perceptions, the results from such a study have ambiguous implications for the theoretical arguments discussed above. Moreover, from an empirical standpoint, standard methods of using citizen perceptions are biased toward well-informed survey respondents, as education and informedness are strongly correlated with a respondent's ability to position a candidate along an ideological scale.

federal and state election Project Vote Smart distributes questionnaires to candidates for president, the U.S. House and Senate, governor, and state legislatures. These questionnaires are completed prior to each state's filing deadline, and include approximately 150 questions over a comprehensive range of policy areas. These questions bear a close resemblance to roll-call votes, as the format of most questions asks candidates to indicate whether they would support or oppose a particular policy proposal.[11] Both major-party candidates completed the survey in 37 Senate races between 1996 and 2006 (19% of all contested races over this period) and 50 House races in 2006 (13% of all contested races).[12] Fortuitously, both samples of elections are quite representative of all contested races that occurred over this time period, affirming this study's external validity.[13]

To study the relationship between candidate divergence and turnout, I use two sets of individual-level survey data. For the Senate races, I use the November voting supplements to the Current Population Studies (CPS) for election years between 1996 and 2006, each of which includes a nationally representative sample of approximately 150,000 people. The large sample sizes make the CPS an attractive source of data, and the time-series nature of the study enables me to examine the extent to which candidate divergence affects voter turnout across time and context. To study voter turnout in the 2006 House elections, I use the 2006 Cooperative Congressional Election Study (CCES). The CCES contains a nationally representative sample of 36,421 respondents, with good coverage across 432 of the 435 congressional districts (Alaska and Hawaii were not included in this study).[14]

Several tradeoffs accompany the use of the CPS and the CCES. While the CPS have significantly larger sample sizes and are available across many election years, the CCES contains a much richer set of political variables. These variables—such as partisanship, policy attitudes, and questions about mobilization—are important to include in analyses of voter turnout, and are also important

[11] Most, but not all, questions follow this format. I dropped all questions related to budgetary matters, which asked candidates to indicate their preferred levels of funding for various programs on a six-point scale. The substantive policy issues contained in these budgetary questions are addressed by other questions on the survey.

[12] A complete list of all Senate races and House districts included in the sample can be found in tables A.1 and A.2, respectively, in the supplementary appendix.

[13] These comparisons are found in table **??**

[14] A complete table of variable summaries is available in table A.4 in the supplementary appendix.

for testing potential explanations for the relationship between candidate divergence and turnout. In addition, the CCES provides validated voter turnout for all of its respondents, while the CPS contain self-reports of voter turnout. Validated turnout information guards against fears of over-reports of voter turnout that are common in studies of political participation, and to the extent that over-reports are correlated with candidate divergence, produces more precise estimates of the relationship between turnout and divergence. Thus, I use the CPS and the CCES as complements to identify the main effects of divergence, but then rely mainly on the CCES to examine these findings more closely.[15]

Estimates of Candidate and Citizen Ideology

Though the surveys completed by the House and Senate candidates contain most of the same questions, for convenience I generated separate estimates for each set of candidates. In addition, testing existing hypotheses about the relationship between divergence and turnout requires measures of candidate and citizen preferences that are directly comparable, and thus I focus on generating joint estimates of candidate and citizen ideology using the CCES. The CCES contains a relatively large number of policy-oriented questions—21 in all, and these 21 questions can be further partitioned into 25 unique responses with which to assess citizen ideology.[16] Fortunately, seven of these questions are nearly identical to the questions asked of the candidates on the Vote Smart survey, and using the same approach found in Herron and Bafumi (2010), Jessee (2009) and Shor and Rogowski (2010), allow me to jointly estimate citizen and candidate ideology in common space. These seven questions are termed "bridge items" because they are the "glue" that helps to link

[15]Verified voter registration status and a full set of demographic controls are available for 2,249 of the CCES respondents, but the results are nearly identical when the analysis is expanded to include all 4,435 respondents that reside in one of these districts.

[16]Most of the CCES policy questions were accompanied by dichotomous response options; several questions, however, offered more than two responses choices. For these cases, I created k-1 response entries, where k indicates the number of response options. For instance, a question on abortion preferences offered four response options, ranging from a total ban on abortion to lifting all restrictions on abortion. From these four categories, I created three distinct responses.

citizens' policy views to the candidates'.[17]

Candidate and citizen ideal points are estimated using the Bayesian procedure detailed in Clinton, Jackman, and Rivers (2004). Specifically, I model the probability that a candidate or citizen i supports a particular policy proposal j as a probit model, $P(y_{ij} = 1) = \Phi(\beta_j \; x_i - \alpha_j)$, where β_j is an item discrimination parameter that indicates how well survey item j distinguishes liberals and conservatives, α_j is the item difficulty that describes the ideological location of an individual who is indifferent between supporting and opposing survey item j, and x_i corresponds to individual i's ideal point. The joint density of latent ideology and all model parameters α_j, β_j, and x_i are estimated from the data. Repeated iterations of the Markov chain Monte Carlo (MCMC) algorithm generate random samples from the joint posterior density of the latent traits, which characterizes the full distribution of each of the model parameters.[18] As is standard in the literature, I assume that a single dimensional adequately characterizes the candidates' and citizens' positions on the set of issues used to generate these estimates.[19]

First, the candidate platform estimates have a great deal of face validity. In every race, the Republican candidate adopted a more conservative platform than the Democratic candidate. The left panel of figure 1 shows the distributions of House and Senate candidates' platforms. These platform estimates also have a high degree of correspondence with the winning candidates' subsequent roll call voting records. The right panel of the figure below shows the relationship between candidate platforms and DW-NOMINATE scores for the winning candidates in the subsequent Congress. The correlation between the two measures for both sets of candidates is 0.92. Furthermore, and particularly crucial, there is a strong correspondence between the candidates' platform estimates and

[17] The CCES and bridging questions and the distribution of responses is shown in table A.3. Though seven questions is not an extremely large number of bridge items, McCarty and Shor (2008) show that bridging can be accomplished successfully with as few as four items. The main consequence of this approach is simply that the candidate ideal points are estimated with greater precision simply because there are more issue positions available for them.

[18] The Senate candidates' platforms are estimated using the same procedure using a separate matrix of candidates and survey responses.

[19] I ran 50,000 iterations after a burnin period of 10,000, thinning by 100. This generates posterior distributions of candidate ideal points with sample size 500.

CCES respondents' placements of the candidates along a 101-point ideological scale.[20]

Figure 1 goes here.

Armed with these estimates, I calculate the level of ideological divergence between the candidates running in the same election, which is characterized by the absolute value of the difference between the candidates' ideology scores. For instance, if the Democratic candidate's platform estimate is -1, and the Republican candidate's platform estimate is +1, the amount of candidate divergence is 2. Figure 2 shows the platform positions of the candidates in these races, ordered by the level of divergence between the candidates. The dashed lines show the mean platform estimates among each group of candidates. In the Senate contests, the candidates were least divergent in the 1998 open seat race in Indiana between Evan Bayh (D) and Paul Helmke (R), while highest level of divergence was in the Alaska race in the same year between incumbent Frank Murkowski (R) and challenger Joe Sonneman. Among House races, the candidates were least divergent in the MS-2 race between incumbent Bennie Thompson (D) and challenger Yvonne Brown (R), and most divergent in the race in WA-7 between Democratic incumbent Jim McDermott and Republican challenger Steve Beren.

Figure 2 goes here.

The estimates of citizen ideology obtained for the CCES respondents are also quite reasonable. As the left plot in figure 3 shows, Democratic respondents have more liberal ideal point estimates than Republican respondents, and Independents have ideal point estimates somewhere in between. Furthermore, the correlation between these estimates and the respondents' ideological self-placements is remarkably high (0.76), shown in the right plot in figure 3. Thus, the ideal point estimation procedure used here produces reasonable estimates of ideology for both candidates and citizens and enables me to evaluate the relative ideological proximity between pairs of candidates, and between citizens and the candidates in their districts.

[20] See figure A.1.

Figure 3 goes here.

It is worth mentioning, however, that this empirical strategy constitutes a hard test of the relationship between electoral choices and voter turnout. While Senate elections often can be hard-fought contests, the attention they receive often pales in comparison to presidential campaigns, and House races generally are low-information contests. Though 2006 was an off-year election, virtually every state had at least one higher profile election in the form of a gubernatorial or Senate race. It would not be altogether unsurprising, then, to find null effects, especially in the House analyses, as citizens' turnout decisions are likely to be more heavily influenced by the nature of electoral competition in more high-profile contests.

Statistical Model

To begin, I estimate the following model to examine the relationship between candidate divergence and voter turnout:

$$Pr(\text{Vote}_{ijk}) = \text{logit}^{-1}(\beta_0 + \beta_1 \text{ Divergence}_j + \beta_2 \text{ Competitiveness}_j + \beta_3 \text{ Age}_i + \beta_4 \text{ Education}_i + \beta_5 \text{ Female}_i + \beta_6 \text{ Black}_i + \beta_7 \text{ Latino}_i + \beta_8 \text{ Asian}_i + D_k),$$

in which i, j, and k index individuals, electoral contests, and states, respectively; $Vote_{ijk}$ is the probability that an individual in a given electoral contest and state reported voting. The estimate of β_1 describes the relationship between ideological divergence and voter turnout, where positive estimates indicate that individuals are more likely to vote as ideological conflict increases, and negative estimates indicate that individuals are less likely to vote as divergence increases.[21] The

[21]The recovered estimates of β_1 could be biased, if, for instance, citizens self-select into electoral races based upon the characteristics of the electoral environment. For example, suppose that citizens who enjoy voting all choose to live in congressional districts or states in which candidates adopt highly divergent platforms, and citizens who prefer *not* to vote all choose to live in districts or states where the candidates choose highly convergent platforms. In this case, the statistical model outlined above will produce positive estimates of β_1, indicating that divergence increases turnout, but this estimate is likely to be biased because the statistical model does not account for the endogeneity between these

estimates for β_2 - β_8 describe the relationship between voter turnout and a standard set of political and demographic controls. *Competitiveness* indicates the winning candidate's margin of victory. In a recent review, Blais (2006, 119) concludes that the positive relationship between competitiveness and turnout is "the most firmly established result in the literature."[22] I follow previous scholars in using the margin of victory (of the two-party vote) (e.g., Abramson et al. 2007; Ansolabehere and Iyengar 1995; Matsusaka 1993), and transform it such that larger values indicate more competitive electoral environments.[23]

Finally, D_k represents state fixed-effects that are included to account for state-specific attributes—such as the presence of another state-wide contest or ballot proposition—that may also contribute to an individual's decision to vote.[24] I also cluster the standard errors by election contest to account for the intra-race correlation in the error terms among respondents that are exposed to the same campaign, the level at which divergence is measured.[25]

Results

Table 1 shows the results for the regression model shown above using the Senate data. The coefficient for divergence is negative and statistically significant, indicating that respondents are

variables. Though this may be a valid concern when cities, towns, or counties are the political units of interest—in which geographic borders delineate political environments and constituencies that may be quite different, it is unlikely to be a concern here. Thus, under the assumption that the covariates discussed in the paragraphs above account for all other relevant differences in respondents' "assignment" to districts with varying levels of divergence, the estimates of β_1 will be unbiased.

[22]See also Cox and Munger (1989).

[23]These data were gathered from the official election statistics published by the Office of the Clerk of the U.S. House of Representatives.

[24]In the Senate analysis, the inclusion of state fixed-effects implies that the model is identified by comparing turnout decisions across Senate races in the same state but in different years, and, in the House analysis, across districts within the same state. This implicitly adjusts for variation in the competitiveness of statewide races (and the levels of mobilization activity that may accompany them) that may also generate differential levels of turnout across states.

[25]Green and Vavreck (2008) raise concerns that standard errors are biased downward when there are too few clusters. This is unlikely to be a concern in these analyses because, as Arceneaux and Nickerson (2009, 188) argue, "If the number of clusters is plentiful (i.e., above 20), clustered [standard errors], random effects, and [hierarchical linear models] are equally adequate for precise estimates of group-level effects." Nevertheless, multilevel models yield substantively similar results to those shown here.

less likely to vote as the level of divergence between Senate candidates increases. In addition to the coefficient estimates, the table displays the substantive impact of divergence, which is assessed by comparing the predicted probability of voting at different levels of divergence. Specifically, I estimated the predicted probability of voter turnout when divergence is at its 25th and 75th percentile values (0.99 and 2.07, respectively), while all other continuous, categorical, and dichotomous variables are held at their mean, median, and modal values, respectively. The difference in the predicted probability of turnout when *Divergence* is at its 25th and 75th percentile levels indicates that citizens are about 2.50 percentage points less likely to vote in races with the higher level of divergence, and this difference is statistically significant. Ti evidence indicates that ideological conflict between candidates *reduces* voter turnout.

Table 1 goes here.

The CCES data provide an opportunity to examine the relationship between divergence and turnout in altogether different context and level of elections, while also addressing many of the limitations of the CPS data that are enumerated in the previous section. The results for the analysis of voter turnout in House elections are shown in table 2 below. The first column of coefficient entries reflects the results when I estimate exactly the same model used in table 1. The results are quite similar across the two sets of elections. In addition to the statistical model shown in equation 1, I also estimate a model that includes additional covariates that may also confound the relationship between divergence and turnout. In particular, because candidate or party contact is a significant predictor of voter turnout (e.g., Green and Gerber 2008; Rosenstone and Hansen 1993), I control for whether or not the respondents reported being contacted to vote by a party or organization (*Mobilized*). I also include the estimates of citizen ideology described in the previous section to account for variation in turnout that corresponds to ideology. Finally, I include an indicator for whether respondents identify with one of the two major political parties, as partisans tend to vote at higher levels and independents.[26] Across both models, the coefficients for divergence are neg-

[26]Following Keith et al. (1992), I classified "leaners" as partisans.

ative and large in magnitude. Using the estimates from both models, the predicted probability of voting when divergence increases from its 25th to 75th percentile levels (0.68 and 1.15, respectively) decreases by about four percentage points.

Table 2 goes here.

Figure 4 below plots the substantive effects of ideological divergence using the estimates shown in the second column of table 2. The plotted points show the predicted probability of voter turnout across the full range of values of divergence. The figure clearly shows that voter turnout decreases with increasing levels of ideological divergence, and that this relationship is both statistically and substantively significant. This set of results weighs heavily against Schattschneider's and Abramowitz's claims that ideological conflict stimulates voter turnout, and instead indicates that citizens are less likely to vote as competing candidates adopt increasingly incongruent platforms.

Figure 4 goes here.

These results, moreover, are not artifacts of any particular modeling strategy. Genetic matching (Sekhon 2011) produces substantively similar results, demonstrating that the findings shown about above are robust to concerns about common support among the covariates, dependence upon parametric assumptions, and the additive functional form assumed about the relationship between the covariates and voter turnout.[27]

Testing Potential Mechanisms

The evidence shown here does not support the claim that high levels of ideological conflict increase turnout. While citizens may indeed associate greater stakes with electoral contests between highly divergent candidates, as Abramowitz contends, the findings shown here indicate that they

[27] A complete discussion of this procedure and the accompanying estimates is available in Appendix B.

do not vote at higher levels as a consequence. While the results are consistent, however, with Fiorina's argument that polarization reduces voter turnout, it remains unclear whether the mechanism Fiorina implicates—alienation—is indeed responsible for the observed patterns.

Alienation

Using the CCES data, I examine whether ideological conflict decreases turnout by alienating citizens from the candidates. First, and most simply, I compare the distribution of voters' and nonvoters' preferences within each district. If a citizen's decision to vote depends upon her position in the distribution of citizen preferences in the district, relative to the candidates' platforms, in each district the distribution of voters' preferences should be significantly different from the distribution of nonvoters' preferences.[28] I evaluate the similarity of the distribution of preferences among voters and nonvoters in each district using a Kolmogorov-Smirnov (K-S) test, for which statistically significant results indicate that the distributions of ideology for voter and nonvoters are distinct. Second, and more directly, the likelihood of voting may decrease as the congruence between the citizen's interest and the most proximate candidate's platform decreases. I include a measure of the spatial distance between each respondent's ideal point and the candidate whose platform estimate is most similar to the respondent's. If Fiorina is correct, the coefficient for this measure should be negative, indicating that citizens are less likely to vote when neither candidate sufficiently represents their interests.[29]

The results of these analyses do not provide any support for the claim that divergence decreases turnout by alienating large segments of the population on the basis of ideology. First, the distributions of voter and nonvoter ideologies are statistically different at $p < 0.10$ in only three (MD-2,

[28]Note that the ways in which these distributions differ depends upon the level and form of candidate divergence. When candidates are highly divergent, moderate citizens should be less likely to vote than citizens with more ideologically extreme views. Similarly, in a race with two relatively moderate candidates, ideologically extreme citizens should be less likely to vote than citizens with more moderate views.

[29]Prior research finds evidence of abstention due to alienation of this form, but none of these tests have investigated this questions using joint estimates of candidate and citizen preferences.

NJ-3, and PA-18) of the 50 congressional races examined in this study, indicating that voters are not disproportionately more moderate or extreme relative to nonvoters. As table 3 shows, I also do not find evidence that citizens are less likely to vote as the distance increases between their ideal point and the most proximate candidate's ideal point.[30] This finding further shows that ideology does not play a significant role in mobilizing (or demobilizing) patterns of turnout as a function of the level of ideological conflict between candidates.

Ideological conflict could demobilize citizens on the basis of their ideological or partisan attachments, however, in a way that does not depend on their relative proximity to the candidates. First, increased levels of divergence may reduce turnout among citizens with moderate views. To test this, I include a measure of respondent ideological extremity and its interaction with candidate divergence. If divergence significantly decreases turnout among moderates, the coefficient on this interaction term should be positive. Alternatively, to examine whether ideological conflict reduces turnout primarily among citizens who do not have strong party loyalties, I include a term for the interaction between divergence and an indicator for partisan strength.[31] If the demobilizing impact of divergence is concentrated among Independents, the coefficient for this interaction term should be positive, and we should expect that pure Independents are demobilized at higher rates than strong partisans.

As shown in table 3, the relationship between divergence and turnout also is not explained by either ideological or partisan alienation. Though ideologically extreme citizens *are* more likely to vote, citizens with strongly ideological views are not affected by divergence to any greater or lesser degree than their more moderate counterparts.[32] Moreover, ideological conflict does not disproportionately demobilize citizens on the basis of partisan strength. The coefficient is negative

[30]To the contrary, I find that citizens are significantly *more* likely to turn out to vote as this distance increases.

[31]This measure is created by recoding the seven-point party identification scale such that pure Independents are zero, "leaners" are coded 1, "weak" partisans are coded 2, and "strong" partisans are coded 3.

[32]The predicted probability of voting decreases by 3.84 percentage points for ideologically moderate citizens as *Divergence* increases from its 25th to 75th percentile values, and by 3.58 percentage points for citizens with more extreme ideological views. Both of these differences are statistically significant, but the differences between them are not statistically or substantively significant.

for the term for the interaction between partisan strength and divergence, in contrast to what would be expected if the demobilizing effects of divergence were concentrated among individuals with weak party ties. Examining the decrease in predicted probability of turnout among pure Independents and strong partisans as divergence increases from its 25th to 75th percentile levels reveals no difference in the extent to which these groups of citizens are demobilized by increasing levels of divergence.[33]

Table 3 goes here.

Uncertainty, Sophistication, and Turnout

Alternatively, if ideological conflict demobilizes citizens who are least equipped to make political decisions on the basis of ideology, the demobilizing effects of candidate divergence should be greatest among citizens with lower levels of sophistication. Lacking a precise measure of sophistication, I test this hypothesis using three indicators that are closely related to it: educational attainment, policy sophistication, and political knowledge.[34] I estimate the same regression shown in column (2) of table 3, and include each of these variables along with its interaction with *Divergence*. If the demobilizing effects of divergence are concentrated among citizens with lower levels of sophistication, the coefficient estimates for these interaction terms should be positive, which indicates that the negative effects of divergence attentuate among citizens with increasing sophistication. I again use predicted probabilities to assess the substantive relationship between divergence and these measures of sophistication.

[33]Pure Independents are nearly four percentage points less likely to vote, while strong partisans are 3.29 percentage points less likely to vote. The difference between these figures are neither statistically nor substantively significant, which indicates that the participatory consequences of demobilization are not related to strength of partisanship.

[34]Education attainment is measured on a four-point scale, ranging from no high school diploma to four-year college degree. Policy sophistication is measured by the number of "don't knows" that respondents gave to the twenty-six policy items used to generate estimates of CCES respondent ideology, where larger numbers indicate less sophistication. Political knowledge is measured using respondents' knowledge of their Senators' votes on the seven key roll call votes from the 109th Congress included in the 2006 CCES (see Ansolabehere and Jones 2010). I generate an additive index of the sum of the roll call votes on which respondents correctly identified their Senators' vote.

Consistent with the hypothesis, the interaction of education and divergence is positive and statistically significant, indicating that the demobilizing effects of divergence are strongest among citizens with lower levels of education, and attenuate among citizens with higher levels of education. Figure 5 graphically compares the relationship between divergence and turnout among citizens with lower levels of education (high school diploma) and higher levels of education (four-year college degree). Note that the probability of voting for respondents with both low and high levels of education are quite similar (0.82 and 0.85, respectively) when divergence is low. However, the probability of voting decreases dramatically among less educated respondents as divergence increases. Turnout among better-educated respondents, however, is barely sensitive to the level of divergence; none of the point estimates are statistically distinct.

Figure 5 goes here.

I find similar results for the relationship between divergence and the other indicators of political sophistication. As divergence increases from its 25th to 75th percentile values, citizens with low levels of policy sophistication are considerably less likely to vote (-4.49 percentage points), while the effects are considerably weaker (-3.03 percentage points) among citizens with high levels of sophistication. The same relationship holds for political knowledge: the demobilizing effects are about twice as large among citizens with low levels of political knowledge (-2.65 percentage points) compared with among citizens with high levels of political knowledge (-1.37 percentage points). Though more research is clearly needed, this general pattern of results strongly suggests that high levels of ideological conflict between candidates in elections disproportionately demobilize citizens who typically rely on non-ideological considerations to make political decisions.

Discussion

The findings offered in this paper give rise to something of a paradox: though clearly defined differences on policy grounds may increase the relevance of programmatic differences for electoral

decision-making, fewer citizens are prepared to fully participate in the exercise of collective choice. This pattern contradicts the reasons offered by responsible party theorists in support of their recommendation that the political parties adopt easily distinguishable positions on the major issues of the day.

The patterns that I uncover related to divergence and its asymmetric effects across citizens with varying levels of political sophistication are broadly consistent with the predictions generated from formal models that relate information and abstention (e.g., Feddersen and Pesendorfer 1996; Matsusaka 1995). The explanation I offer, though, differs with each of these models in at least one important respect. Matsuska's model (1995) implicates the *quantity* of information as the mechanism by which citizens are more likely to vote. Rather, the explanation I have proposed depends upon *qualitative* differences in the kinds of informatin that is available and that citizens use to guide their voting decisions. When non-policy information is not available, citizens that usually rely such cues are less likely to vote. On the other hand, the swing voter's curse (Feddersen and Pesendorfer 1996) predicts that turnout is a function of a citizen's place in the distribution of preferences. Instead, the account I have offered suggests that it is about the *strength* of a citizen's ideological attachments that conditions participation decisions.

Moreover, the results shown in this paper revise our understanding about how strategic position-taking by elites–and in particular, the process that leads to increased partisan and ideological polarization–affects the mass public. In perhaps the most developed theory of how ideological conflict at the elite level affects mass political attitudes, Layman and Carsey (2002, 786) outline the concept of "conflict extension" to argue that increased elite polarization produces a "limited mass response" that is confined mainly to politically aware partisans. In the realm of political behavior, as this paper demonstrates, ideological conflict among political elites appears to evoke a more widespread response than Layman and Carsey's account might expect. On the other hand, consistent with the findings presented in the previous section, the conflict extension perspective also identifies political sophistication (or as Layman and Carsey put it, "political awareness") as a key

factor that delineates which citizens are affected most (and least) by elite polarization. These key comparisons and contrasts are worth noting in future work that theorizes the contributors to and consequences from ideological conflict among elites.

Conclusion

For generations, scholars have argued quite consistently that ideological conflict is a normatively desirable feature of democratic elections because it expands the range of choices available to voters, thereby increasing political participation and enhancing the quality of popular rule. But for all the ink that has been spilled about the "culture war" that divides America, prior research has provided limited evidence about how these developments have affected broad patterns of political participation. Challenging a key component of Schattschneider's argument in support of party reform in the 1950s, this paper provides strong and persistent evidence that ideological conflict in elections has a demobilizing effect on voter turnout. Moreover, these effects are robust to a wide range of empirical specifications and political contexts.

Furthermore, this paper demonstrates that the observed relationships are inconsistent with existing theoretical accounts. Alienation does not explain why abstention rates increase as ideological conflict increases. Instead, the demobilizing effects of divergence appear to be concentrated among citizens with lower levels of political sophistication. Among electoral contests with high levels of ideological conflict, the relevant chasm between voters and nonvoters is not based on ideological or partisan intensity, but rather is defined by which citizens possess the appropriate level of sophistication that is required to navigate a complex decision-making environment.

This paper highlights the importance of understanding political behavior through the context—especially the information context—in which citizens make behavioral decisions. Alvarez (1998) shows that voters are less inclined to support candidates about whom they are uncertain, and this paper extends that key insight by providing suggestive evidence that citizens are less likely to vote when

they are uncertain which candidate best represents their policy views. Furthermore, the theoretical and empirical accounts offered here extend our understanding of the importance of information by emphasizing the *kinds* of information that are important for understanding political participation.

The electoral implications of these findings are somewhat ambiguous. Though Bartels (1996) shows that the outcomes of several presidential elections would have been different if all voters had been fully informed, the swing voter's curse predicts that, for large electorates, increasing levels of turnout do not affect the election outcome because strategic voter behavior improves the information aggregation properties of elections. Thus, it is not clear that candidate divergence systematically benefits one candidate over the other. If there *is* some systematic relationship between divergence, participation, and electoral outcomes, scholars will have to take seriously the possibility that strategic candidates are more successful at generating their preferred electoral outcomes than is generally presumed. Nevertheless, increasing citizens' level of political sophistication may better equip more citizens to make voting decisions on the basis of policy considerations, which would then increase turnout *and*, to the extent that citizens' reliance on non-policy cues leads some citizens to choose candidates they might not otherwise choose, could also change election outcomes.

The empirical findings presented here, however, have a few limitations of their own. The ideal research design would be to randomly assign citizens to an election in which the candidates have adopted varying levels of platform divergence. Lacking the advantages of such an approach, the results on offer rely upon observational data. The primary concern is that citizen behavior is endogenous to the platforms candidates have selected. That is, strategic candidates likely chose platforms based upon their expectations of citizen behavior. But candidates vary in quality and resources, and their strategic decisions might better be described as boundedly rational. In this case it need not be true that candidates have fully optimized when choosing their platforms, which thereby poses less of a problem for the current study. Second, if candidate divergence is endogenous to expectations about citizen behavior, this likely means that the results shown here *understate* the true magnitude of the relationship between divergence and turnout. That the results are consistent across vari-

ous data sets and a range of election years, types of races, and contexts provides strong evidence of a systematic relationship between divergence and turnout that merits additional study in more controlled settings.

Considerable theoretical and empirical work remains. Given these results, for instance, how might strategic candidates adopt platforms that reflect a particular mobilization strategy based upon ideology? How sensitive are election outcomes to abstention produced by candidate divergence? Given earlier scholars' insistence on the importance of ideologically distinct choices, is there an ideal level of candidate differentiation that ensures an "optimal" level of turnout? Do these results transfer into other modes of political participation? In the absence of formal institutions that regulate the platforms candidates select, the normative and positive implications of the patterns identified here merit further scrutiny.

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Tables

Table 1: Individual-Level Turnout in U.S. Senate Races, 1996-2006

Independent Variables	(1)
Divergence	−0.15**
	(0.03)
Competitiveness	−0.20
	(0.21)
Black	0.48**
	(0.09)
Latino	−1.06**
	(0.07)
Asian	−0.30**
	(0.10)
Age (*decades*)	0.41**
	(0.01)
Education	0.49**
	(0.03)
Income	0.10**
	(0.01)
Sex (Female)	0.10**
	(0.02)
1996	0.97**
	(0.04)
1998	0.14**
	(0.03)
2000	0.72**
	(0.04)
2002	0.20**
	(0.04)
2004	1.41**
	(0.06)
(Intercept)	−4.00
	(0.14)
N	51407
Log-pseudolikelihood	−29031.27
AUC	0.76
Change in probability of voting	−2.51**
Number of races	37
State fixed effects	Yes

Data: Pooled 1996-2006 November Voting and Registration Supplement to the Current Population Study. Entries are logistic regression coefficient estimates and standard errors, clustered by Senate race. State fixed effects were also estimated but are not shown. The row labeled "Change in probability of voting" represents the reduction in the predicted probability of turnout (in percentage points) as polarization increases from the 25th to 75th percentile levels (continuous, categorical, and dichotomous variables are held at their mean, median, and modal levels, respectively).
** denotes $p < 0.05$, two-tailed tests.

Table 2: Individual-Level Voter Turnout in U.S. House Races, 2006

Independent Variables	(1)	(2)
Divergence	−0.60*	−0.62*
	(0.33)	(0.34)
Competitiveness	0.03*	0.03*
	(0.02)	(0.02)
Mobilized		0.45*
		(0.16)
Partisan Identifier		0.61*
		(0.17)
Ideology		−0.09
		(0.08)
Black	−0.26	−0.27
	(0.29)	(0.29)
Latino	−0.56*	−0.53*
	(0.29)	(0.30)
Asian	−0.21	−0.25
	(0.34)	(0.32)
Age (*decades*)	0.26*	0.23*
	(0.05)	(0.05)
Education	0.08	0.04
	(0.06)	(0.06)
Income	0.07*	0.06*
	(0.02)	(0.02)
Sex (Female)	−0.24*	−0.33*
	(0.10)	(0.11)
(Intercept)	1.58	1.16
	(0.54)	(0.57)
N	2249	2249
Log-pseudolikelihood	−789.34	−778.55
AUC	0.85	0.86
Change in probability of voting	−4.37*	−3.95*
Number of races	50	50
State fixed-effects	Yes	Yes

Data: 2006 Cooperation Congressional Election Study. The dependent variable is validated voter turnout. Entries are logistic regression coefficient estimates and standard errors, clustered by House race. State fixed effects were also estimated but are not shown. The row labeled "Change in probability of voting" represents the reduction in the predicted probability of turnout (in percentage points) as polarization increases from the 25th to 75th percentile levels (continuous, categorical, and dichotomous variables are held at their mean, median, and modal levels, respectively).
* denotes $p < 0.10$, two-tailed tests.

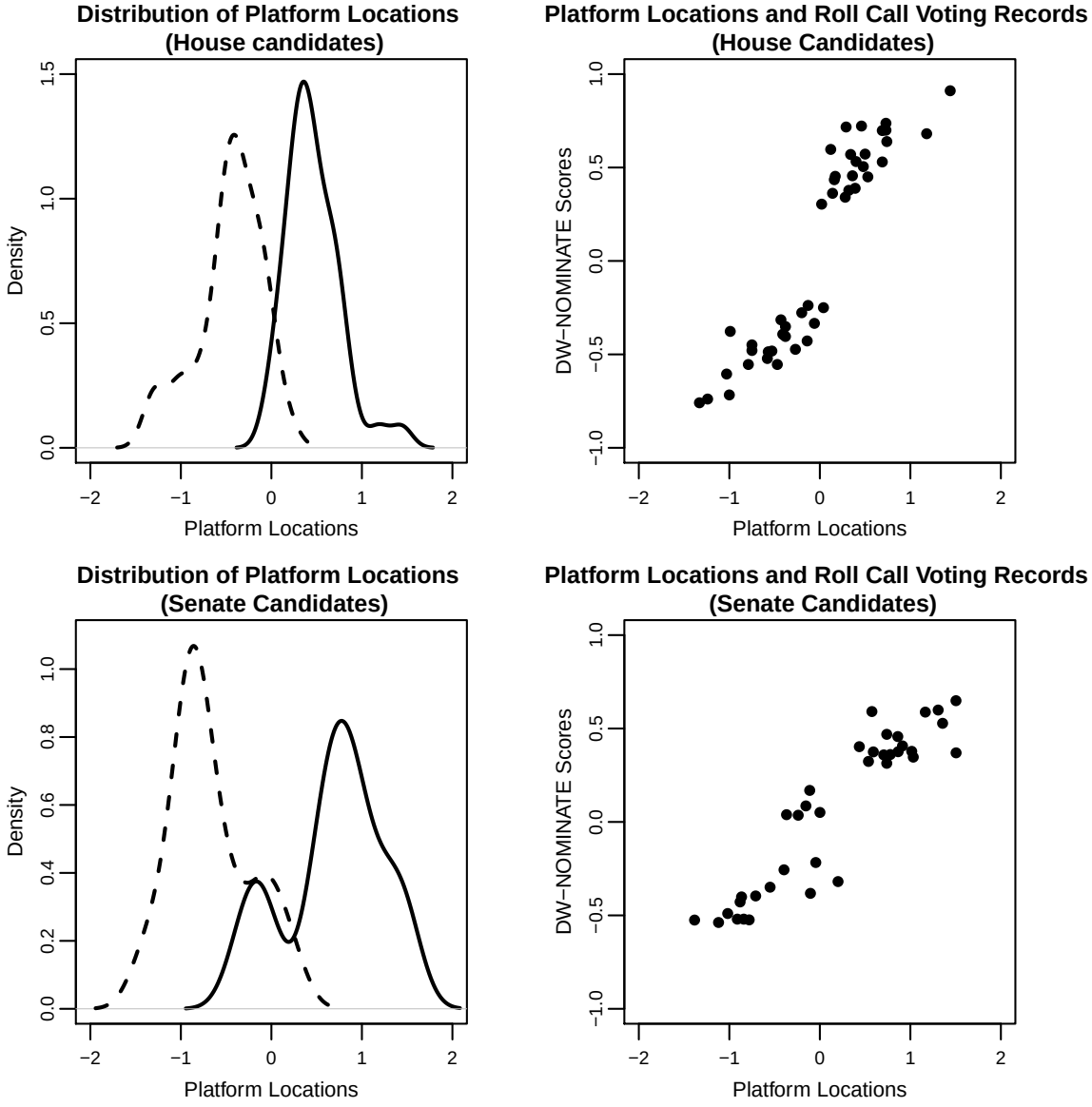
Table 3: Examining Potential Explanations for the Effects of Divergence on Turnout

Independent Variables	(3)	(4)	(5)
Divergence	−0.43		−0.50
	(0.48)		(0.48)
Ideological Extremity	1.08**		
	(0.49)		
Divergence ×	−0.24		
Ideological Extremity	(0.44)		
Ideological Distance		0.77**	
		(0.23)	
Partisan Strength			0.28
			(0.19)
Divergence ×			−0.06
Partisan Strength			(0.17)
(Intercept)	0.74	0.51	1.16
	(0.73)	(0.58)	(0.79)
N	2249	2249	2249
Log-pseudolikelihood	−760.49	−771.39	−776.68
AUC	0.87	0.86	0.86
Effect (low)	−3.84**		−3.93**
Effect (high)	−3.58**		−3.29**
Number of races	50	50	50
State fixed-effects	Yes	Yes	Yes

Data: 2006 Cooperation Congressional Election Study. Entries are logistic regression coefficient estimates and standard errors, clustered by House race. State fixed effects were also estimated but are not shown.
** denotes $p < 0.05$, two-tailed tests.

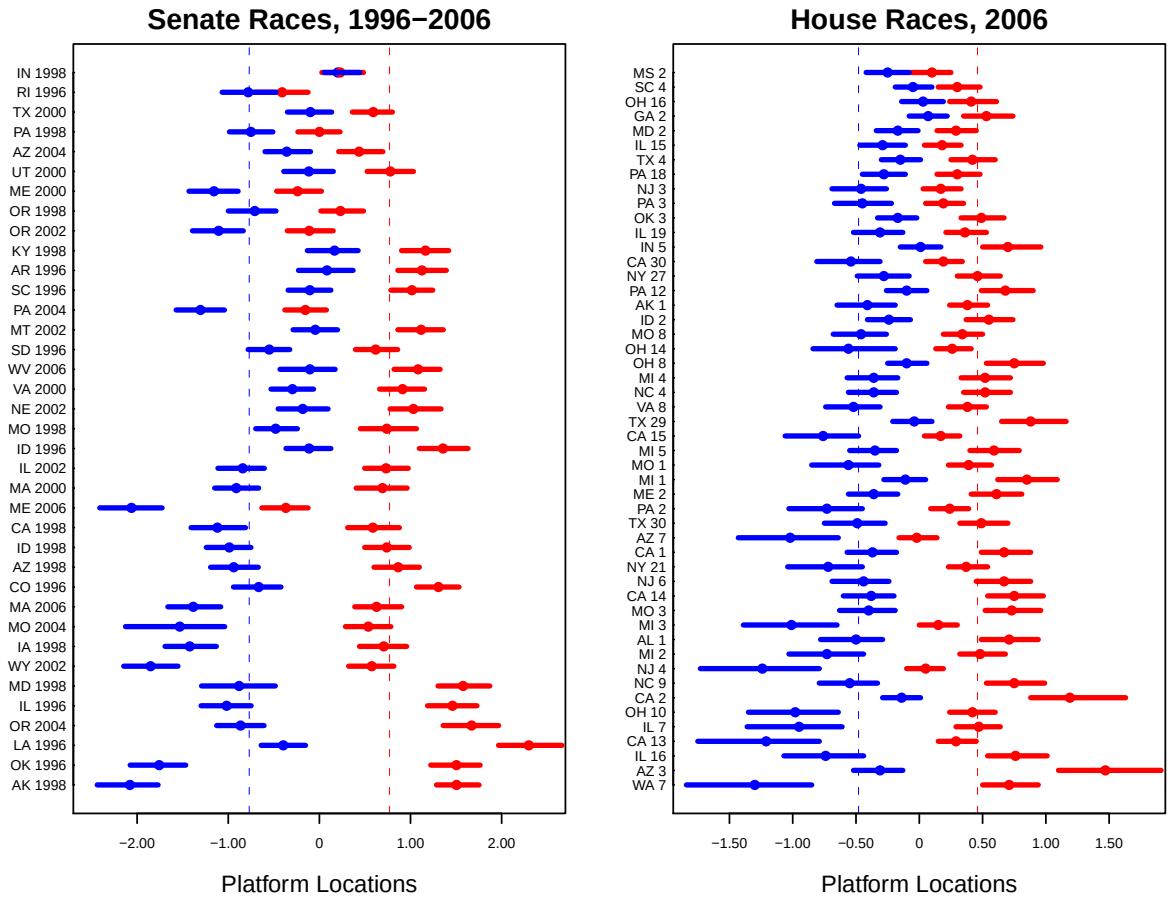
Figures

Figure 1: Candidate Platforms



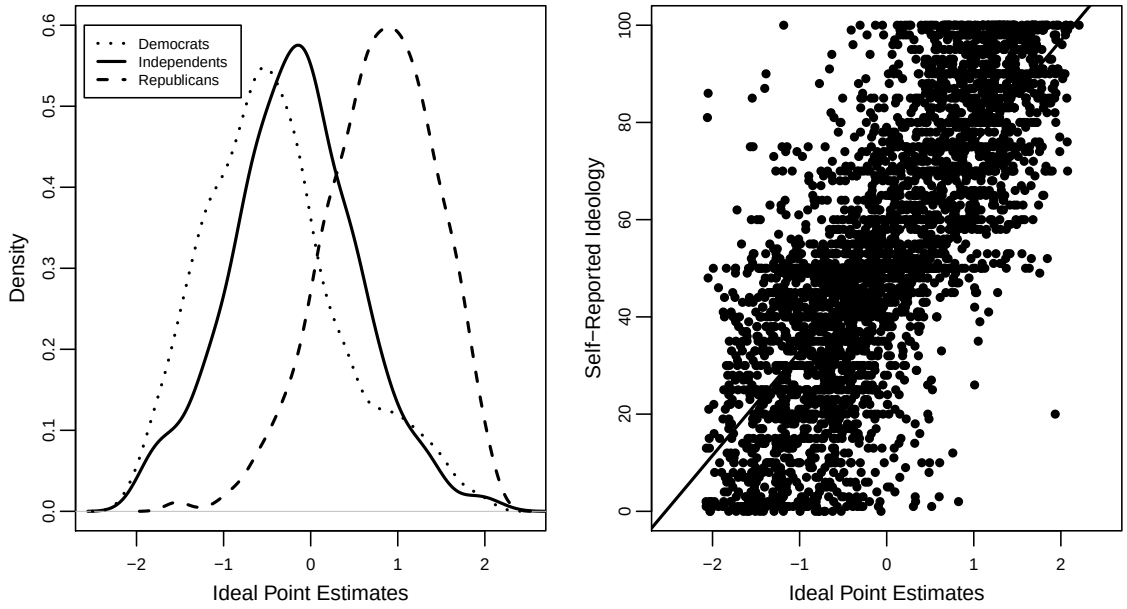
The left plot shows the distribution of House candidates' platform locations. Democratic candidates' platforms are shown by the solid lines; Republicans are shown with the dotted lines. The right plot shows the relationship between platform locations and roll call voting records for the successful House candidates in the 2006 congressional elections. The DW-NOMINATE scores reflect legislative voting records in the 110th (2007-2008) House. The correlation between the two measures is 0.92.

Figure 2: Candidate Platforms and Ideological Divergence



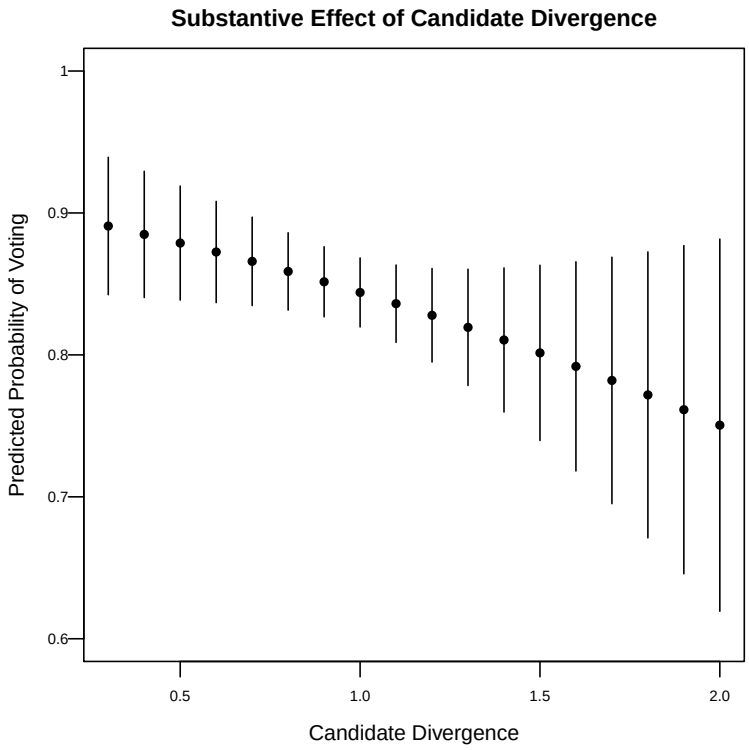
The circles represent the point estimates for each candidate's platform, and the horizontal lines are the 95% credible intervals from the posterior distribution. Republicans are shown in red and Democrats are shown in blue. The dashed lines display the mean platform estimates.

Figure 3: Citizen Ideal Point Estimates



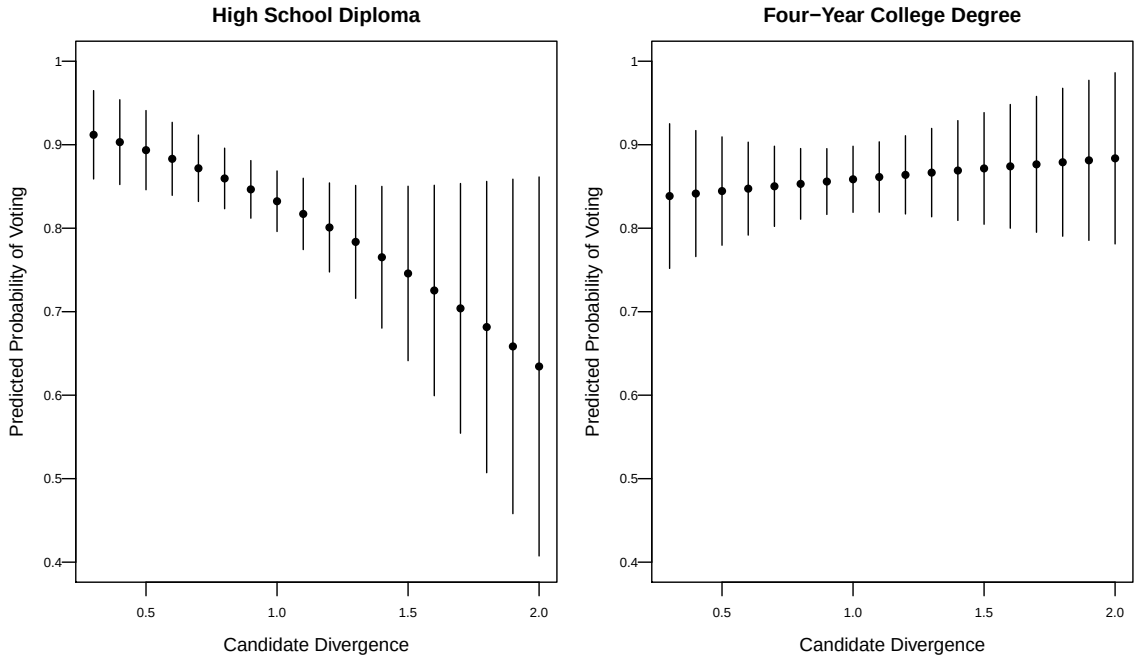
The plot on the left shows the distribution of CCES respondent ideal point estimates by self-identified party affiliation. The plot on the right displays the relationship between ideal point estimates and self-reported ideology. The correlation between the two measures is 0.76, and the solid line results from a bivariate linear regression.

Figure 4: Candidate Divergence and Voter Turnout



Predicted probability of voting over the range of values of candidate divergence, while all other covariates are held at their means (dichotomous variables are held at their modes and categorical variables are held at their medians). The points represent the predicted probability of turning out to vote, and the vertical lines are the 95% confidence intervals.

Figure 5: Education Level and the Impact of Candidate Divergence



The plots show the predicted probability of turning out to vote for varying levels of platform divergence. The plot on the left shows the probability of voting for a range of values of divergence among respondents with high school diplomas, and the plot on the right shows the probability of voting among respondents with four-year college degrees. The dots are the point estimates, and the vertical lines are the 95% confidence intervals associated with the probability estimates.

A Supplementary Appendix

Table A.1: Senate Races Included in the Sample

Year	State	Republican Candidate	Platform Estimate	Democratic Candidate	Platform Estimate	CPS (N)
1996	AR	Hutchinson*	0.86	Bryant	0.08	1925
1996	CO	Allard*	1.31	Strickland	−0.67	1881
1996	ID	Craig*	1.36	Minnick	−0.11	2126
1996	IL	Salvi	1.46	Durbin	−1.02	5533
1996	LA	Jenkins	2.30	Landrieu*	−0.40	1890
1996	OK	Inhofe*	1.50	Boren	−1.76	2158
1996	RI	Mayer	−0.41	Reed*	−0.78	1368
1996	SC	Thurmond*	1.02	Case	−0.11	1475
1996	SD	Pressler	0.62	Johnson	−0.55	2006
1998	AK	Murkowski*	1.51	Sonneman	−2.08	1633
1998	AZ	McCain*	0.87	Ranger	−0.94	2110
1998	CA	Fong	0.59	Boxer*	−1.12	11437
1998	IA	Grassley*	0.71	Osterberg	−1.42	1729
1998	ID	Crapo*	0.74	Mauk	−0.99	2196
1998	IN	Helmke	0.23	Bayh	0.20	1798
1998	KY	Bunning	1.17	Baesler	0.17	1795
1998	MD	Pierpont	1.58	Mikulski*	−0.88	1468
1998	MO	Bond*	0.74	Nixon	−0.48	1591
1998	OR	Lim	0.23	Wyden	−0.71	1685
1998	PA	Specter*	0.00	Lloyd	−0.75	5886
2000	MA	Robinson	0.69	Kennedy*	−0.91	2980
2000	ME	Snowe*	−0.24	Lawrence	−1.16	1552
2000	TX	Hutchison*	0.59	Kelly	−0.10	6807
2000	UT	Hatch*	0.78	Howell	−0.12	1881
2000	VA	Allen	0.91	Robb*	−0.30	2076
2002	IL	Durkin	0.73	Durbin*	−0.84	5390
2002	MT	Taylor	1.12	Baucus*	−0.05	1817
2002	NE	Hagel*	1.03	Matulka	−0.18	2619
2002	OR	Smith*	−0.11	Bradbury	−1.11	2457
2002	WY	Enzi*	0.58	Corcoran	−1.85	2242
2004	AZ	McCain*	0.44	Starky	−0.36	2171
2004	MO	Bond*	0.54	Farmer	−1.53	2615
2004	OR	King	1.67	Wyden*	−0.87	2268
2004	PA	Specter*	−0.15	Hoeffel	−1.31	5262
2006	MA	Chase	0.63	Kennedy*	−1.38	2296
2006	ME	Snowe*	−0.37	Bright	−2.06	2964
2006	WV	Raese	1.08	Byrd*	−0.10	1889

* Denotes incumbent. The final column lists the number of CPS respondents from each state and election year.

Table A.2: Districts Included in the Sample

State	District	Republican Candidate	Platform Estimate	Democratic Candidate	Platform Estimate	CCES (N)
AK	1	Young*	0.26	Benson	−0.44	73
AL	1	Bonner*	0.69	Beckerle	−0.52	30
AZ	3	Shadegg*	1.44	Paine	0.33	48
AZ	7	Sweeney	−0.04	Grijalva*	−1.03	54
CA	1	Jones	0.64	Thompson*	−0.40	49
CA	2	Herger*	1.18	Sekhon	−0.40	38
CA	13	Bruno	0.26	Stark*	−1.24	43
CA	14	Smith	0.74	Eshoo*	−0.41	47
CA	15	Chukwu	0.14	Honda*	−0.79	37
CA	30	Jones	−0.16	Waxman*	−0.57	46
GA	2	Hughes	0.51	Bishop*	0.04	22
ID	2	Simpson*	0.53	Hansen	−0.22	71
IL	7	Hutchinson	0.45	Davis*	−0.99	45
IL	15	Johnson*	0.16	Gill	−0.31	56
IL	16	Manzullo*	0.74	Auman	−0.77	64
IL	19	Shimkus*	0.34	Stover	−0.34	52
IN	5	Burton*	0.69	Carr	−0.01	73
MD	2	Mathis	0.28	Ruppersberger*	−0.20	63
ME	2	D'Amboise	0.58	Michaud*	−0.37	75
MI	1	Hooper	0.84	Stupak*	−0.14	64
MI	2	Hoekstra*	0.46	Kotos	−0.77	65
MI	3	Ehlers*	0.12	Rinck	−1.03	75
MI	4	Huckleberry*	0.50	Camp	−0.38	60
MI	5	Klammer	0.57	Kildee*	−0.38	74
MO	1	Byrne	0.37	Clay*	−0.58	60
MO	3	Bertelsen	0.71	Carnahan	−0.43	65
MO	8	Emerson*	0.32	Hambacker	−0.48	42
MS	2	Brown	0.08	Thompson*	−0.27	18
NC	4	Acuff	0.51	Price*	−0.38	69
NC	9	Myrick*	0.73	Glass	−0.58	47
NJ	3	Saxton*	0.14	Sexton	−0.49	60
NJ	4	Smith*	0.12	Gay	−1.29	44
NJ	6	Bellew	0.64	Pallone*	−0.47	44
NY	21	Redlich	0.35	McNulty*	−0.75	57
NY	27	McHale	0.44	Higgins	−0.31	56
OH	8	Boehner*	0.73	Meier	−0.13	70
OH	10	Dovilla	0.40	Kucinich*	−1.00	57
OH	14	LaTourette*	0.24	Katz	−0.59	52
OH	16	Regula*	0.39	Shaw	0.00	67
OK	3	Lucas*	0.48	Barton	−0.19	43
PA	2	Gessner	0.23	Fattah*	−0.75	21
PA	3	English*	0.17	Porter	−0.48	61
PA	12	Irey	0.68	Murtha*	−0.13	51
PA	18	Murphy*	0.28	Kluko	−0.30	59
SC	4	Inglis	0.29	Griffith	−0.07	57
TX	4	Hall*	0.40	Melancon	−0.17	68
TX	29	Story*	0.87	Green	−0.06	25
TX	30	Aurbach*	0.46	Johnson	−0.53	32
VA	8	O'Donoghue	0.36	Moran*	−0.55	34
WA	7	Beren	0.70	McDermott*	−1.33	81

* Denotes incumbent. The final column lists the number of CCES respondents for whom registration status was validated.

Table A.3: Survey Questions Used to Estimate Ideology

Variable number	Question text	Y-N-NR (citizens)	Y-N-NR (candidates)
V3019	By law, abortions should never be permitted.	9-84-7	10-90-0
V3019	By law, a woman should always be able to obtain an abortion as a matter of personal choice.	49-44-6	25-75-0
V3019	The law should permit abortion for reasons other than rape, incest, or danger to the woman's life, but only after the need for the abortion has been clearly established.	68-25-7	
V3066	If you were faced with this decision, would you vote for or against a plan to start withdrawing troops this year?	34-56-10	38-46-16
V3069	If you were faced with this decision, would you vote for or against a proposal to offer immigrants more opportunities to become legal citizens?	55-35-10	9-91-0
V3072	If you were faced with this decision, would you vote for or against increasing the minimum wage?	22-73-6	59-41-0
V3075	If you were faced with this decision, would you vote for or against cutting taxes on capital gains?	45-41-14	
V3078	If you were faced with this decision, would you vote for or against a trade agreement to reduce barriers on trade between the U.S. and Central America?	52-24-23	32-51-17
V3060	If you were faced with this decision, would you vote for or against banning late-term abortion?	38-50-12	
V3063	If you were faced with this decision, would you vote for or against federal funds for stem cell research?	27-62-10	
V2095	The U.S. is doing too much to resolve the Israel-Lebanon conflict.	6-1-93	
V2095	The U.S. is not doing enough to resolve the Israel-Lebanon conflict	4-3-93	
V2096	U.S. military aid to Israel should be increased.	28-9-63	

Table A.3: Survey Questions (Continued)

Variable number	Question text	Y-N-NR (citizens)	Y-N-NR (candidates)
V2096	U.S. military aid to Israel should be decreased or stopped entirely.	25-12-63	
V2101	Support immigration reform through stricter enforcement of current restrictions.	15-29-56	
V2102	Favor expanding federal funding for embryonic stem cell research, which is the practice of conducting scientific research on cells extracted from human embryos in an attempt to find cures or treatments for diseases.	12-28-60	
V2103	Do you support a Constitutional amendment banning gay marriage?	23-19-57	
V3025	Do you favor allowing people to put a portion of their Social Security payroll taxes into personal retirement accounts that would be invested in private stocks and bonds?	40-45-15	37-63
V3027	Should companies that have discriminated against blacks have to have an affirmative action program?	48-34-19	
V3029	Would you approve of the use of U.S. military troops to ensure the supply of oil?	80-20-0	
V3030	Would you approve of the use of U.S. military troops to destroy a terrorist camp?	31-69-0	
V3031	Would you approve of the use of U.S. military troops to intervene in a region where there is genocide or a civil war?	47-53-0	
V3032	Would you approve of the use of U.S. military troops to assist the spread of democracy?	78-22-0	
V3033	Would you approve of the use of U.S. military troops to protect American allies under attack by foreign nations?	20-80-0	
V3034	Would you approve of the use of U.S. military troops to help the United Nations uphold international law?	44-56-0	

Table A.4: Summary Statistics

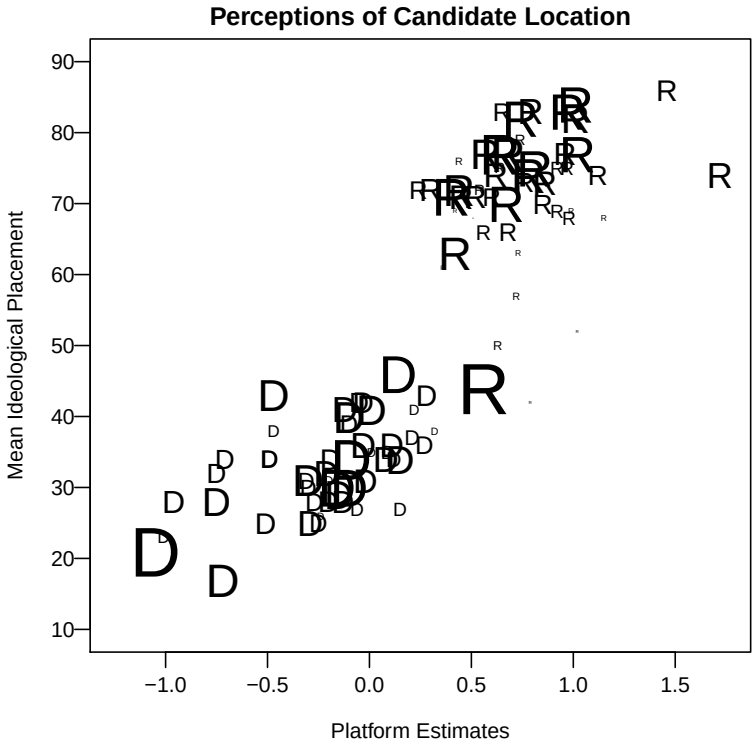
	Current Population Studies (1996-2006)				Cooperation Congressional Election Study (20			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Voted	0	1	0.60	(0.49)	0	1	0.76	(0.43)
Education	1	6	3.66	(1.21)	1	6	3.05	(1.40)
Age	18	90	46.63	(17.49)	20	91	47.68	(13.00)
Black	0	1	0.07	(0.26)	0	1	0.10	(0.30)
Latino	0	1	0.06	(0.24)	0	1	0.07	(0.25)
Asian	0	1	0.01	(0.10)	0	1	0.04	(0.19)
Income	1	16	9.84	(3.82)	1	16	8.18	(3.37)
Female	0	1	0.53	(0.50)	0	1	0.52	(0.50)
Partisan					0	1	0.90	(0.30)
Ideology					-2.07	2.21	0.02	(0.23)
Mobilized					0	1	0.61	(0.49)
Competitiveness	0.34	69.94	28.20	(19.18)	6.00	40.60	18.30	(7.54)
Divergence	0.03	3.58	1.54	(0.78)	0.35	2.03	0.95	(0.36)
N	CPS N: 51407				CCES N: 2249			

Table A.5: Sample Comparisons

	Senate Races		House Races	
	All Contested Races	Sample Races	All Contested Races	Sample Races
Democratic presidential vote	0.49	0.49	0.48	0.51
(most recent election)	(0.09)	(0.09)	(0.14)	(0.15)
Presidential margin of victory	0.14	0.15	0.11	0.12
(most recent election)	(0.11)	(0.11)	(0.08)	(0.09)
Democratic Senate/House candidate vote share	0.51	0.46	0.54	0.55
(current election)	(0.14)	(0.17)	(0.18)	(0.19)
Senate/House election margin of victory	0.22	0.28	0.15	0.18
(current election)	(0.17)	(0.19)	(0.10)	(0.08)
N	193	37	382	50

Cell entries are sample means with standard deviations in parentheses.

Figure A.1: Citizen Awareness of Candidate Platforms



The plots show the relationship between candidate platforms estimated from candidate survey data, and CCES respondents' ideological placements of the candidates. The platform estimates are shown along the x-axis, and the mean ideological placement of each candidate is shown along the y-axis. Republican candidates are indicated with an "R" and Democratic candidates are indicated with a "D." The size of the "R" and "D" is proportionate to the number of respondents used to calculate the mean ideological placement.

B Technical Appendix: Matching Estimates

In a simple scenario in which some individuals enrolled in a study are exposed to a treatment while others are not, the intuition behind matching techniques is that the treatment effect is identified by comparing individuals who received a treatment to individuals who did not, but are otherwise similar on every observable dimension. Matching assumes that, conditional on a set of observable covariates, every individual has an equal probability of being assigned to the treatment group (Rubin 1974). Thus, by matching individuals in the treatment group with individuals in the control group who are otherwise similar on every observable that could account for assignment to treatment or control group, this technique significantly reduces the possibility that the estimated treatment effect is a consequence of selection into the treatment or control group. Conditioning on observables frees the researcher from making any assumptions as to the form of the relationship between the covariates and the outcome. After individuals are matched across treatment and control groups, nonparametric estimates of the average treatment effect on the treated are obtained by simply subtracting the mean outcome for members of the control group from the mean outcome for the treatment group.

I apply this general approach to the CCES and candidate data, but modify it somewhat to adjust for the continuous nature of *Divergence* (the treatment variable). Most matching applications are settings in which assignment to treatment is a binary variable; instead, *Divergence* requires a continuous generalization of what is termed *multi-valued treatment* (e.g., Hirano and Imbens 2004). Such an approach requires a variety of pairwise comparisons between individuals who live in districts with varying degrees of divergence, which potentially imposes additional assumptions and computational costs. Instead, because the goal of using matching in this setting is to test the robustness of the regression estimates shown above, I employ a simpler approach in which I select several rather arbitrary cutoff values of divergence that distinguish respondents in "high divergence" districts from those in "low divergence" districts. In particular, I define three complementary sets of treatment and control groups based upon whether respondents are in districts in which the level of divergence falls in the upper three quartiles, upper two terciles, and top half of the distribution. For shorthand purposes, I refer to these groups as the "treatment" and "control" groups, respectively. For the purposes of matching, it is important to select pre-treatment covariates that plausibly affect respondents' assignment to treatment or control group. The demographic and political covariates included in the models shown above are obvious candidates for inclusion, with the exception of *Mobilization*, which would have occurred *after* citizens were "placed" in a district with a particular level of divergence. Doing so means that we compare levels of turnout among citizens who are otherwise identical with respect to age, sex, race/ethnicity, ideology, partisanship, education, and income. It it also appropriate to match on attributes of the districts, such that we compare citizens who live in districts with different levels of divergence but are otherwise the same. These covariates must also be "pre-treatment" covariates. Thus, I use the average ideology score (estimated from the citizen CCES ideal point estimates), the heterogeneity of district preferences (the standard deviation of the mean ideology score), the degrees of competitiveness in the 2004 presidential and congressional races in the district, the level of voter turnout in the district in ther 2004 election, and state

primary type (open, closed, or a hybrid of the two).[35]

To further ensure that the matching results are not artifacts of particular choices regarding the inclusion of matching covariates, I generate three sets of matching estimates for each distinction of treatment and control groups: one that matches on demographic covariates only, a second that matches only on contextual covariates, and a third that matches on both. In assessing the matching estimates, then, we are interested in whether turnout is indeed lower among the treament (high divergence) groups than among the control (low divergence) groups, which would generate a negative turnout effect. Further, these results should be generally consistent across the three sets of covariates on which observations were matched.

As mentioned above, before matching results can be assessed, we must evaluate how well the matching procedure improved covariate balance. Ideally, matching would eliminate any differences between the groups along each of the covariates. The matching algorithm successfully improved balance across virtually every covariate for each definition of treatment and for the specified set of covariates.[36] Though not all of the covariates were perfectly balanced after the matching procedure was performed, in most of these instances matching substantially reduced the differences between the treament and control observations. Though the magnitudes of these differences are substantively trivial, to once again ensure the veracity of the matching results, I estimate a fourth set of estimates in which I use matching to pre-process the observations and generate a set of weights (Ho, Imai, King, and Stuart 2011), which I then use in the same logistic regression shown in column (2) of table 2 above. This procedure recovers a set of treatment and control observations that are as comparable as possible, and including the same covariates on which I matched adjusts for any outstanding differences that remain between the treatment and control observations. Furthermore, it also allows me to control for "post-treatment" factors, by which I mean other kinds of factors that may plausibly account for variation in turnout–primarily *Mobilization* and *Competitiveness*–to which individuals were exposed *after* their "assignment" to treatment or control group, which would otherwise be inappropriate to use in a matching procedure.

Table B.2 summarizes the estimated effects of divergence on turnout. The first column of estimates results from a naive regression of divergence on turnout, where the same model from column (3) in table 2 is estimated, but in which I substitute the dichotomous treatment indicators for the continuous measure of divergence, and then use those regression estimates to generate the predicted probability of turnout for citizens in the treatment group and the control group. As before, the difference between these estimates is the treatment effect of divergence. As the first column of table B.2 shows, all of these estimated effects are negative, just as was found in table 2. This suggests that these three ways for distinguishing exposure to treatment and control are broadly consistent with the results we find using *Divergence* as a continuous measure.

Turning now to the matching estimates, they display consistent and broad support for the results obtained in the previous section.[37] Across all three ways of distinguishing treatment observations from control observations, eleven of the twelve effects estimates are negative, indicating that divergence reduces turnout, nine of which are statistically significant. These results are robust not only

[35]Voter turnout was calculated by dividing the total number of votes cast for president in the district in 2004 by the U.S. Census estimates of district population 18 years or older for the 107th (2005-2006) Congress.

[36]The full table of balance statistics can be found in table B.1.

[37]The full summary of results is shown in B.2.

to the way in which treatment status is characterized, but are also robust to each of the procedures (described above) in which matching estimates were generated.

The estimates effects are consistently negative when treatment and control observations are matched on demographic covariates only, contextual covariates only, or both. And in perhaps the most stringest test, the regression estimates generated after using matching to pre-process the data again provide strong evidence to support the findings shown in the previous section. The matching results shown here, then, confirm the negative relationship between *Divergence* and turnout, and demonstrate that this finding is robust to problems of common support and assumptions about functional form.

Table B.1: Balance Statistics

Treatment Definition	Covariate	All Observations			Matching Criteria		
		Control (Mean)	Treatment (Mean)	Difference	Demographics (Difference)	Contextual Variables (Difference)	All Covariates (Difference)
Top Half	Age	51.43	52.69	1.26	0.32		0.29
	Education	3.12	3.29	0.17	0.01		0.22
	Income	8.13	8.28	0.15	0.02		0.09
	Race	1.26	1.37	0.11	0		0.05
	Female	0.54	0.50	0.04	0		0
	Party identification	4.07	3.68	0.39	0.01		0
	Ideology	0.09	−0.10	0.19	0		0.08
	Primary type	3.29	2.59	0.70		0.35	0.22
	Heterogeneity	0.86	0.90	0.04		0.01	0
	Ideological Extremity	0.19	0.20	0.01		0.03	0.01
	Margin of victory, 2004 presidential election	21.11	25.26	4.15		1.64	3.81
	Margin of victory, 2004 House election	37.64	41.05	3.39		3.43	0.66
	Turnout (2004)	62.82	60.32	1.50		0.77	3.72
	State	27.51	22.43	5.08		2.10	1.24
Top Two Terciles	Age	51.83	52.16	0.33	0.18		0.18
	Education	3.06	3.26	0.20	0		0.04
	Income	8.08	8.25	0.17	0.04		0.04
	Race	1.25	1.34	0.09	0		0.08
	Female	0.51	0.52	0.01	0		0.02
	Party identification	4.11	3.77	0.34	0		0.08
	Ideology	0.12	−0.06	0.18	0		0.06
	Primary type	3.33	2.77	0.55		1.01	0.83
	Heterogeneity	0.87	0.89	0.02		0	0.01
	Ideological Extremity	0.20	0.19	0.01		0	0.02
	Margin of victory, 2004 presidential election	21.59	23.89	2.30		0.06	2.57
	Margin of victory, 2004 House election	34.86	41.28	4.59		0.18	1.03
	Turnout (2004)	60.83	61.87	1.04		0	0.26
	State	28.82	23.30	5.52		0.17	1.13
Top Three Quartiles	Age	52.27	52.00	0.27	0.37		0.68
	Education	3.01	3.26	0.25	0.02		0.17
	Income	7.98	8.27	0.29	0.14		0.05
	Race	1.24	1.34	0.10	0		0.01
	Female	0.52	0.52	0	0		0
	Party identification	4.13	3.80	0.33	0.03		0.07
	Ideology	0.16	−0.05	0.21	0.01		0.05
	Primary type	3.32	2.82	0.50		0.80	0.55
	Heterogeneity	0.86	0.89	0.03		0	0
	Ideological Extremity	0.18	0.20	0.02		0.01	0
	Margin of victory, 2004 presidential election	19.21	24.42	5.21		4.08	5.97
	Margin of victory, 2004 House election	35.84	40.42	4.59		1.09	2.50
	Turnout (2004)	60.13	62.00	1.87		0.35	0.54
	State	31.47	22.96	8.51		1.36	1.16

Table B.2: The Effect of Polarization on Voter Turnout, Matching Results

Treatment Level		Matching Criteria			
	Naive Regression	Demographics	Contextual	All Covariates	Pre-Processed Regression
Above the median	-6.72^{**}	-9.11^{**}	-11.43^{**}	-17.15^{**}	1.99
Top two terciles	-6.04^{**}	-1.21	-8.86^{**}	-8.83^{**}	-8.44^{**}
Top three quartiles	-10.68^{**}	-2.27	-9.44^{**}	-8.66^{**}	-8.29^{**}

Data: 2006 Cooperative Congressional Election Study. Cell entries are the decrease in turnout for respondents in the "treatment" and "control" groups ($\text{turnout}_{treatment}$ - $\text{turnout}_{control}$). Regression-based figures were obtained by estimating the predicted probability of voting while holding all other demographic and contextual variables at their means (dichotomous variables are held at their modes and categorical variables are held at their medians). Matching estimates were generated via genetic matching and are the effect of the treatment on the treated. Clustered standard errors were estimated for the regression-based estimates, and Angrist-Imbens standard errors were estimated for the matching estimates.

** denotes differences are significant at $p < 0.05$, two-tailed tests.