Supplementary Material for
Voter Decision-Making with Polarized Choices

April 7, 2015

A Supporting Information: Robustness Checks

Table A.1: Sample Comparisons

	2006		2010	
	All Contested Races	Sample Races	All Contested Races	Sample Races
Democratic presidential vote (most recent election)	0.48 (0.14)	0.51 (0.15)	0.55 (0.14)	0.56 (0.13)
Presidential margin of victory (most recent election)	0.11 (0.08)	0.12 (0.09)	0.12 (0.10)	0.11 (0.09)
Democratic House candidate vote share (current election)	0.54 (0.18)	0.55 (0.19)	0.49 (0.17)	0.51 (0.15)
House election margin of victory (current election)	0.15 (0.10)	0.18 (0.08)	0.27 (0.18)	0.24 (0.17)
Proportion of open seat contests	0.08	0.10	0.09	0.07
N	382	50	403	288

Cell entries are sample means with standard deviations in parentheses.

Table A.2: Candidate Divergence, Ideology, and Vote Choice in Congressional Elections (Competitive districts only)

Independent Variables	(1) 2006	(2) 2010	(3) 2006	(4) 2010
Divergence			0.38	0.35*
			(0.64)	(0.16)
Republican advantage	1.53*	0.85**	2.70*	1.59**
	(0.30)	(0.05)	(0.65)	(0.14)
Divergence × Republican advantage			−1.35*	−0.44**
			(0.63)	(0.07)
Education	−0.20	0.00	−0.22	0.00
	(0.12)	(0.04)	(0.12)	(0.04)
Female	0.43	−0.16	0.39	−0.16
	(0.29)	(0.12)	(0.29)	(0.12)
Black	0.19	−0.94**	0.21	−0.94**
	(0.60)	(0.30)	(0.61)	(0.30)
Latino	0.98	0.06	0.86	0.02
	(0.74)	(0.27)	(0.75)	(0.27)
Age	−0.09	0.03	−0.09	0.03
	(0.10)	(0.08)	(0.10)	(0.08)
Income	0.01	0.06*	0.01	0.06*
	(0.05)	(0.02)	(0.05)	(0.02)
Party identification	0.68*	0.93**	0.64*	0.91**
	(0.09)	(0.04)	(0.09)	(0.03)
Incumbent party	0.37*	−0.68*	0.39*	−0.61*
	(0.18)	(0.22)	(0.19)	(0.21)
(Intercept)	−1.30	−3.81*	−1.35	−4.16*
	(0.82)	(0.42)	(0.98)	(0.47)
N	665	5447	665	20837
Number of races	17	73	17	73
DIC	392.7	2281.5	384.1	2239.9
σ_{α_j}	0.26	0.41	0.37	0.36
σ_{α_k}	0.00	0.26	0.00	0.14
σ_{β_j}	0.81	0.16	0.64	0.20

Data: 2006 and 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts. Data are for respondents in districts where the congressional election was decided by 15 percentage points or fewer (2006) or 10 percentage points or fewer (2010).
* denotes $p < 0.05$, two-tailed tests.

Table A.3: Candidate Divergence, Ideology, and Vote Choice in Congressional Elections: Subsets of Voters

	Voters internal to the candidates		Voters between -1 and +1	
Independent Variables	2006	2010	2006	2010
Divergence	0.38	−0.21	0.17	−0.04
	(0.94)	(0.11)	(0.38)	(0.10)
Republican advantage	1.62*	1.25*	2.31*	1.36*
	(0.54)	(0.11)	(0.40)	(0.09)
Divergence ×	−0.67	−0.31*	−1.03*	−0.36*
Republican advantage	(0.42)	(0.05)	(0.31)	(0.04)
Education	−0.07	−0.06*	−0.09	−0.03
	(0.12)	(0.03)	(0.09)	(0.02)
Female	0.62*	0.00	0.28	0.06
	(0.28)	(0.07)	(0.20)	(0.06)
Black	0.54	−0.97*	0.22	−0.94*
	(0.43)	(0.14)	(0.38)	(0.13)
Latino	0.67	0.02	0.21	−0.03
	(0.62)	(0.15)	(0.48)	(0.14)
Age	−0.04	0.09	−0.01	0.12*
	(0.10)	(0.05)	(0.07)	(0.04)
Income	0.01	0.04*	0.00	0.02*
	(0.04)	(0.01)	(0.03)	(0.01)
Party identification	0.46*	1.00*	0.54*	0.99*
	(0.08)	(0.02)	(0.06)	(0.02)
Incumbent party	0.66*	0.36*	0.83*	0.39*
	(0.17)	(0.07)	(0.12)	(0.06)
(Intercept)	−2.44*	−2.79*	−1.85*	−3.12*
	(1.11)	(0.29)	(0.69)	(0.26)
N	801	12486	1090	14626
Number of races	50	287	50	288
DIC	421.5	6173	799.4	7599.2
σ_{α_j}	0.74	0.69	0.41	0.68
σ_{α_k}	0.57	0.08	0.40	0.14
σ_{β_j}	0.16	0.28	0.20	0.26

Data: 2006 and 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts. The first two columns report results with the subset of respondents whose policy-based estimates fall between the two candidates' estimates. The last two columns report results on the subset of respondents whose estimates fall between -1 and +1.

* denotes $p < 0.05$, two-tailed tests.

Before proceeding, there are at least two reasons to doubt that accounting for the directional model will seriously alter the findings shown above. First, as Tomz and Van Houweling (2008) point out, for a wide range of possible configurations of candidate platforms and voter preferences, the predictions from the proximity model and the directional model are indistinguishable. Thus, for most voters in most situations, it seems likely that similar inferences will result from analyses that use either model to characterize the relationship between ideology and vote choice. Second, the experimental results reported by Tomz and Van Houweling (2008) show that a relatively small proportion of voters (14.7%) made voting decisions on the basis of directional logic, while four times as many (57.7%) of respondents used a proximity rule. In combination, these two considerations would appear to significantly reduce concerns that the results shown above are due to the way in which voters' decision rules were characterized.

Table A.4: Accounting for Competing Theories of Vote Choice: 2010 Congressional Elections Results

Independent Variables	Voter between midpoint and neutral point	External voters
Divergence	−0.30	0.04
	(0.15)	(0.10)
Republican advantage	0.81	1.26*
	(0.43)	(0.07)
Divergence ×	−0.35	−0.32*
Republican advantage	(0.21)	(0.03)
(Intercept)	−2.98*	−3.05*
	(0.48)	(0.27)
N	2381	18456
DIC	1523.6	7084.2
Number of races	268	288
Controls	Yes	Yes
σ_{α_j}	0.42	0.68
σ_{α_k}	0.33	0.12
σ_{β_j}	0.18	0.19

Data: 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate positioning across districts. Controls included partisanship, race, gender, education, income, age, and incumbent party.
* denotes $p < 0.05$, two-tailed tests.

Table A.5: Partisanship, Candidate Divergence and Vote Choice in the 2010 Congressional Elections

Independent Variables	Partisans	Independents
Divergence	−0.01	0.04
	(0.10)	(0.13)
Republican advantage	1.30*	0.98*
	(0.08)	(0.14)
Divergence ×	−0.34*	−0.17*
Republican advantage	(0.04)	(0.07)
Education	−0.05*	−0.03
	(0.03)	(0.05)
Female	0.12	−0.11
	(0.07)	(0.13)
Black	−0.78*	−1.21*
	(0.13)	(0.29)
Latino	0.14	−0.35
	(0.15)	(0.26)
Age	0.14*	0.05
	(0.05)	(0.09)
Income	0.02*	0.01
	(0.01)	(0.02)
Party identification	0.98*	
	(0.02)	
Incumbent party	0.46*	0.24*
	(0.07)	(0.08)
(Intercept)	−3.21*	1.05*
	(0.28)	(0.41)
N	19083	1754
Number of races	288	283
DIC	6959.2	1681.8
σ_{α_j}	0.71	0.48
σ_{α_k}	0.13	0.18
σ_{β_j}	0.27	0.00

Data: 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts.
* denotes $p < 0.05$, two-tailed tests.

Table A.6: Candidate Divergence, Ideology, and Vote Choice in Congressional Elections: Partisans versus Non-partisans

Independent Variables	2006	2010
Republican advantage	3.02*	1.84*
	(0.45)	(0.07)
Divergence	0.37	−0.11
	(0.51)	(0.12)
Partisan	0.47	−0.29
	(0.53)	(0.15)
Divergence ×	−1.45*	−0.48*
Republican advantage	(0.37)	(0.04)
Republican advantage ×	0.49	0.50*
Partisan	(0.44)	(0.10)
Divergence ×	−0.66	0.11
Partisan	(0.53)	(0.08)
Republican advantage ×	−0.15	−0.13*
Divergence × Partisan	(0.35)	(0.05)
(Intercept)	0.48	0.98*
	(0.68)	(0.26)
N	1730	20837
Number of races	50	288
DIC	1130.4	12662.7

Data: 2006 and 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts. Indicators for race, education, sex, income, age, and incumbent party are also included.
* denotes $p < 0.05$, two-tailed tests.

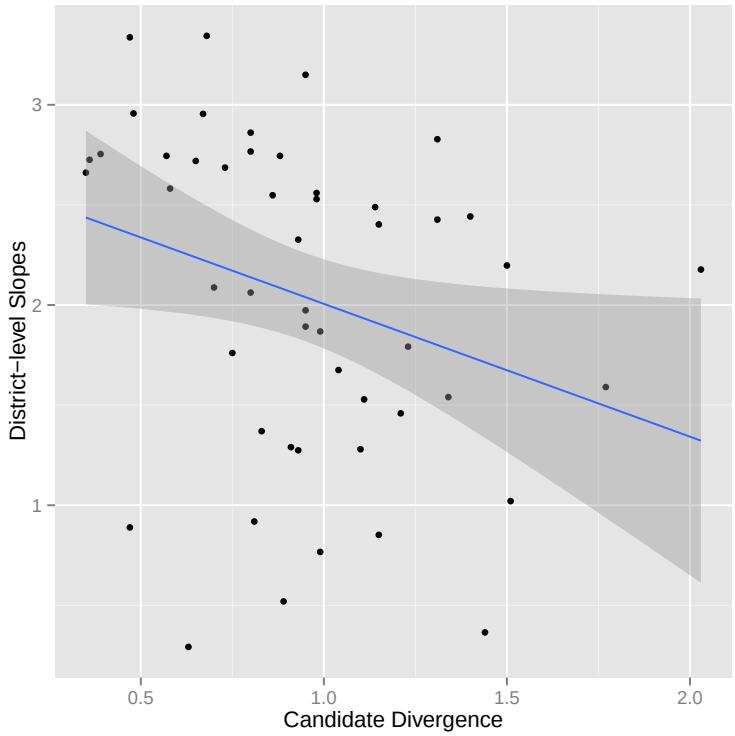
Table A.7: Candidate Divergence, Ideology, and Vote Choice in a Survey Experiment: Ideological Extremism

Independent Variables	(1)	(2)
Divergence	−0.17	−0.13
	(0.20)	(0.20)
Candidate A advantage	0.17*	0.13*
	(0.02)	(0.02)
Ideologically extreme	6.43*	7.30*
	(0.39)	(0.41)
Divergence ×	−0.11*	−0.08*
Candidate A advantage	(0.02)	(0.02)
Candidate A advantage ×	0.25*	0.29*
Ideologically Extreme	(0.03)	(0.03)
Divergence ×	−6.29*	−7.14*
Ideologically Extreme	(0.64)	(0.64)
Candidate A advantage ×	−0.29*	−0.33*
Divergence × Ideologically Extreme	(0.03)	(0.03)
(Intercept)	−0.10	0.00
	(0.13)	(0.54)
N	1336	1336

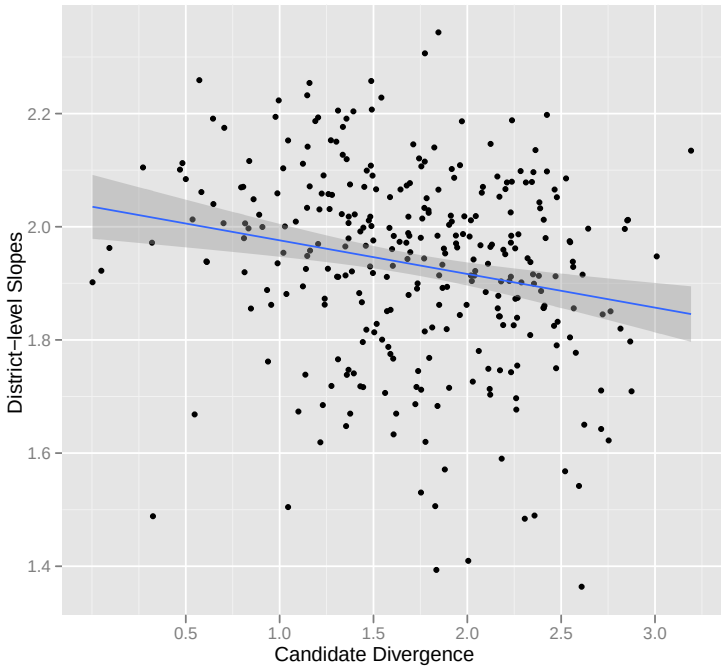
Data: 2011 survey experiment administered by Knowledge Networks. The dependent variable is the probability of reporting a vote for candidate A. Entries are logistic regression coefficient estimates and standard errors. Demographic controls include partisanship, age, education, race, gender, and income.
* denotes $p < 0.05$, two-tailed tests.

Figure A.1: Candidate Divergence and Varying Slopes across Congressional Districts

(a) 2006



(b) 2010



Plot shows the relationship between the district-level coefficients for *Republican spatial advantage* and level of candidate divergence. District-level coefficients in the plot for 2006 were obtained from the model estimates shown in column (1) of table 1. The coefficient of the fitted bivariate regression line is -0.13 with a standard error of 0.06. District-level coefficients in the plot for 2010 were obtained from the model estimates shown in column (2) of table 1. The coefficient of the fitted bivariate regression line is -0.06 with a standard error of 0.02.

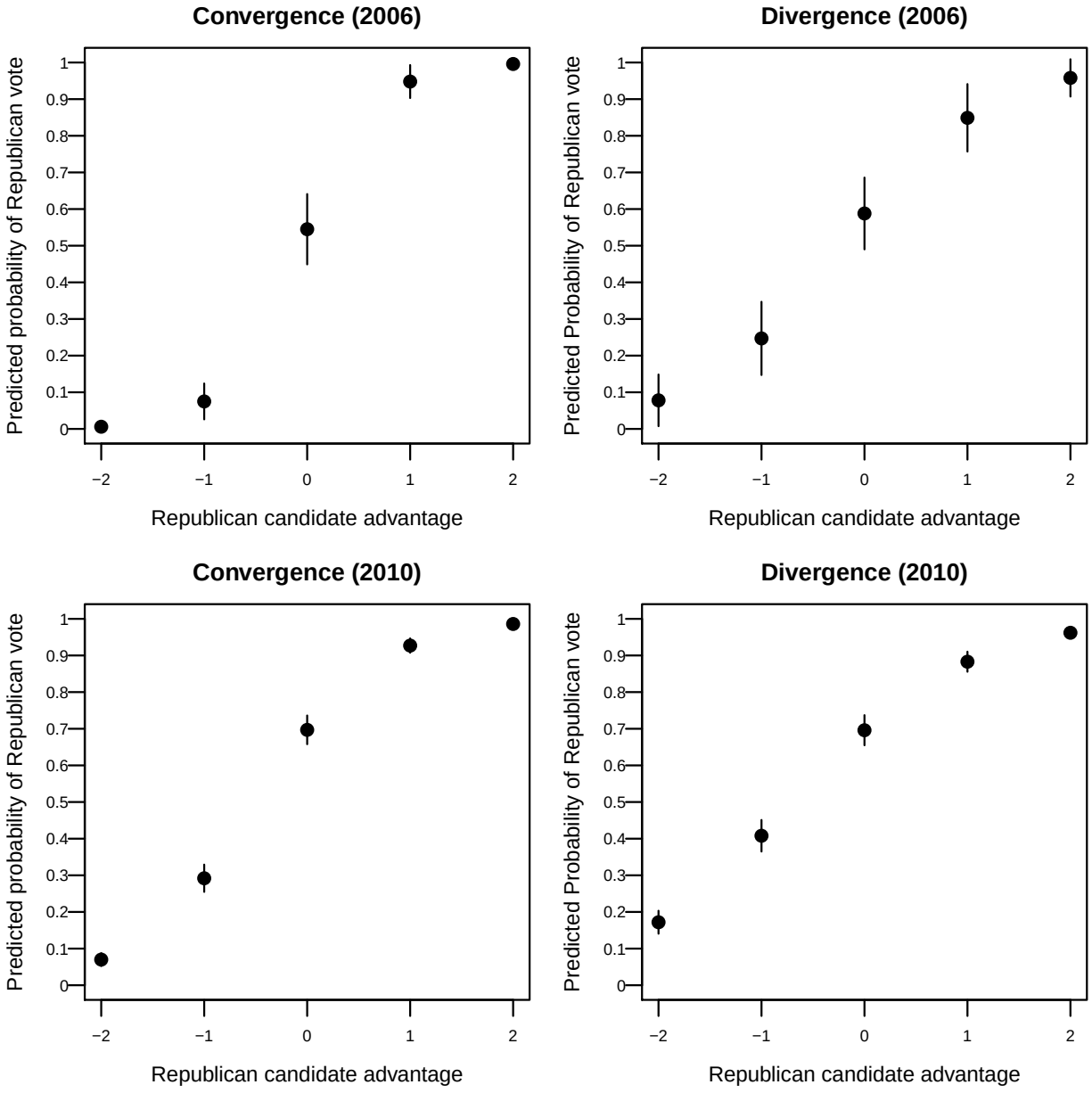
B Reviewers' Appendix

Table B.1: Candidate Divergence, Ideology, and Vote Choice in Congressional Elections: Calculating Republican advantage using Absolute Differences

Independent Variables	(1) 2006	(2) 2010	(3) 2006	(4) 2010
Divergence			0.35	0.03
			(0.38)	(0.10)
Republican advantage	2.02*	1.42*	3.60*	2.07*
	(0.22)	(0.04)	(0.60)	(0.14)
Divergence × Republican advantage			−1.44*	−0.35*
			(0.52)	(0.07)
Education	−0.12	−0.06*	−0.13	−0.06*
	(0.07)	(0.02)	(0.07)	(0.02)
Female	0.32	0.07	0.32	0.06
	(0.17)	(0.06)	(0.17)	(0.06)
Black	0.05	−0.80*	0.06	−0.83*
	(0.35)	(0.12)	(0.35)	(0.12)
Latino	0.43	0.04	0.44	0.03
	(0.41)	(0.13)	(0.41)	(0.13)
Age	−0.05	0.09*	−0.05	0.08*
	(0.06)	(0.04)	(0.06)	(0.04)
Income	0.00	0.02*	0.01	0.02*
	(0.03)	(0.01)	(0.03)	(0.01)
Party identification	0.60*	1.01*	0.56*	1.00*
	(0.05)	(0.02)	(0.05)	(0.02)
Incumbent party	0.81*	0.38*	0.78*	0.42*
	(0.12)	(0.06)	(0.11)	(0.06)
(Intercept)	−1.75*	−3.08*	−1.80*	−3.01*
	(0.53)	(0.19)	(0.63)	(0.25)
N	1730	20837	1730	20837
Number of races	50	288	50	288
DIC	1063.1	8820.1	1048.9	8791.5
σ_{α_j}	0.00	0.69	0.49	0.69
σ_{α_k}	0.93	0.34	0.87	0.29
σ_{β_j}	0.50	0.24	0.21	0.24

Data: 2006 and 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts.
* denotes $p < 0.05$, two-tailed tests.

Figure B.1: Candidate Divergence, Ideological Proximity, and Vote Choice (Republican advantage calculated using absolute distance)



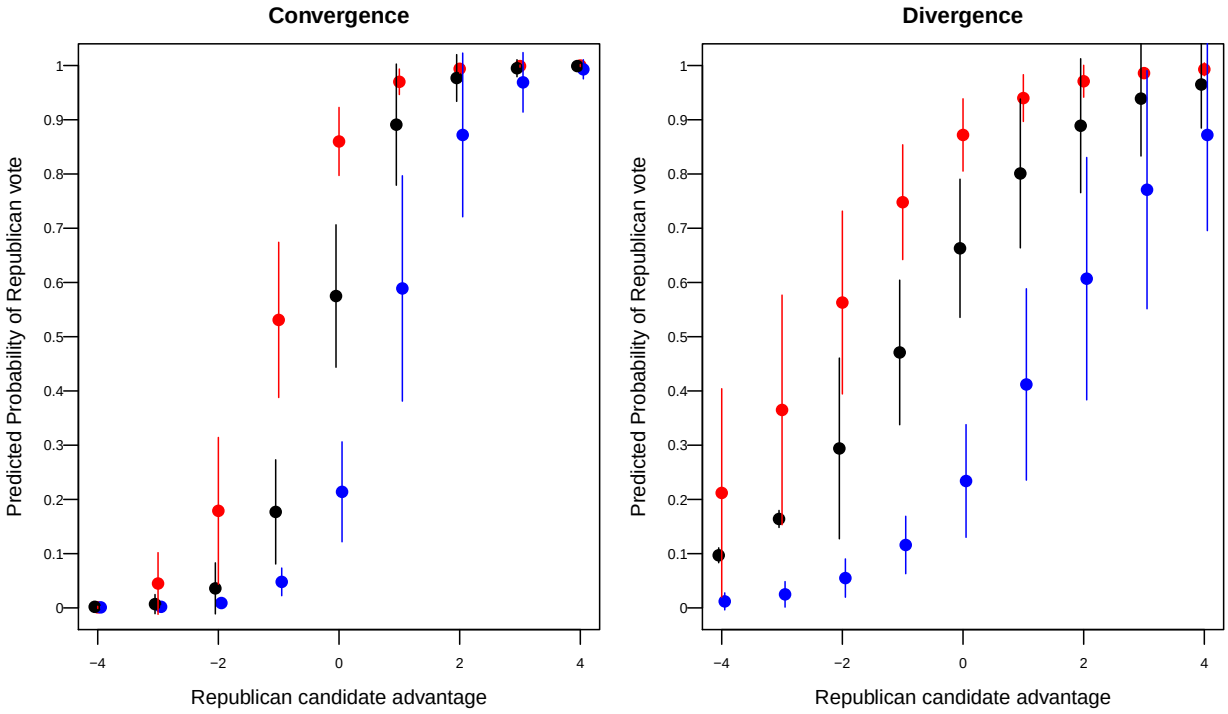
Plots show the predicted probabilities of voting for the Republican House candidate in the 2006 and 2010 congressional elections across a range of values of relative proximity to the Republican candidate. The plots on the left show the predicted probabilities when candidate divergence is at its 10th percentile value, and the plots on the right show the predicted probabilities when divergence is at its 90th percentile value. All other variable are held at their mean values. The vertical lines are the 95 percent confidence intervals (confidence intervals for 2010 are too small to observe). Across both election years, while the probability of voting for the Republican candidate increases as the Republican candidate's proximity advantage increases, vote choice is more sensitive to policy proximity among voters when the candidates are relatively ideologically convergent.

Table B.2: Candidate Divergence, Ideology, and Vote Choice in the 2010 Congressional Elections (Subsets of districts)

	Divergence equal to or less than:				
	0.50	1.00	1.50	2.00	2.50
Divergence	−1.28	1.36*	0.31	−0.07	0.06
	(2.33)	(0.55)	(0.27)	(0.17)	(0.11)
Republican advantage	5.35	1.94*	1.38*	1.45*	1.32*
	(4.54)	(0.53)	(0.22)	(0.13)	(0.08)
Divergence ×	−6.99	−0.84	−0.33*	−0.43*	−0.35*
Republican advantage	(10.90)	(0.64)	(0.17)	(0.08)	(0.04)
N	470	2029	7666	13598	18986
Number of races	7	30	106	187	263

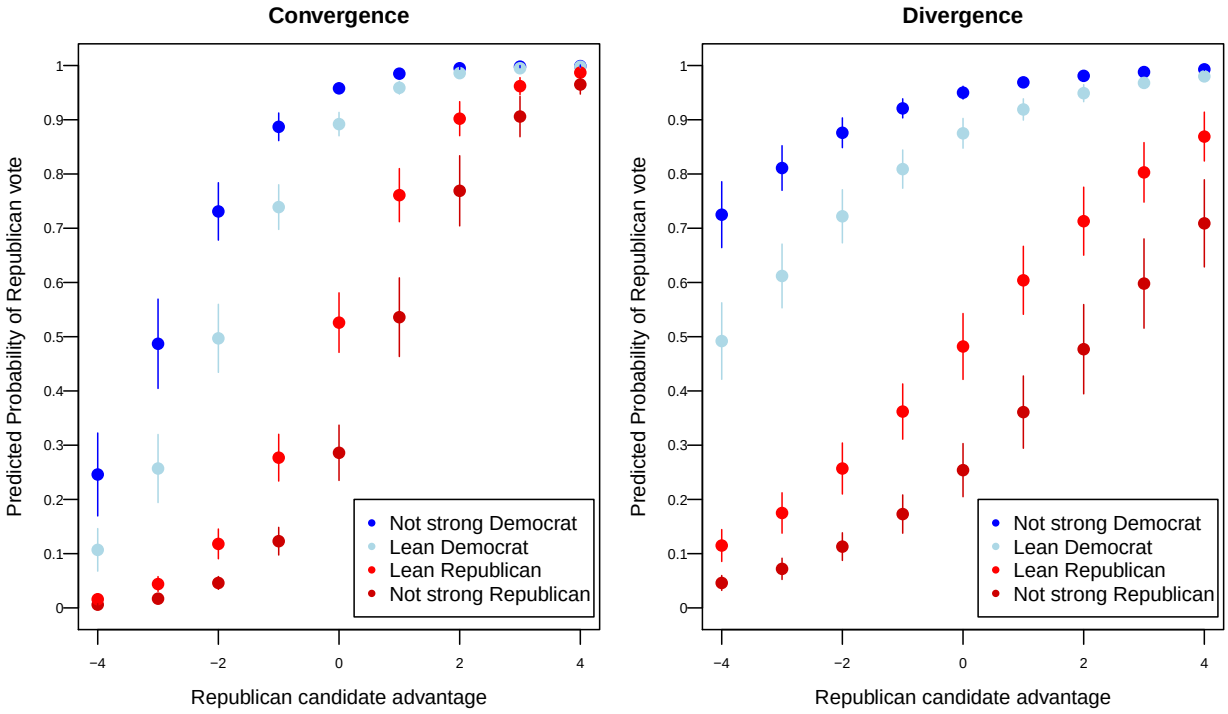
Data: 2010 Cooperation Congressional Election Study. The dependent variable is whether respondents reported voting for the Republican House candidate. Entries are logistic regression coefficient estimates and standard errors, with varying intercepts by states and congressional districts, and varying slopes for candidate divergence across districts. The column headings indicate the district-level values of *Divergence* for which respondents were included in the models. * denotes $p < 0.05$, two-tailed tests.

Figure B.2: Predicted Probability of Voting Republican (Including the quadratic form of candidate divergence)



Plots show the predicted probabilities of voting for the Republican House candidate in the 2006 and 2010 congressional elections across a range of values of relative proximity to the Republican candidate. Predicted probabilities are calculated from a model y = x + z + z^2 + x*z + x*z^2, where y is vote choice, x is *Republican advantage*, and z is *Candidate divergence* (controls were also included). The plots on the left show the predicted probabilities when candidate divergence is at its 10th percentile value, and the plots on the right show the predicted probabilities when divergence is at its 90th percentile value. All other variable are held at their mean values. The vertical lines are the 95 percent confidence intervals. While the probability of voting for the Republican candidate increases as the Republican candidate's proximity advantage increases, vote choice is more sensitive to policy proximity when the candidates are relatively ideologically convergent.

Figure B.3: Candidate Divergence, Partisanship, and Vote Choice in the 2010 Congressional Elections



Plots show the predicted probabilities of voting for the Republican House candidate in the 2010 congressional elections across a range of values of relative proximity to the Republican candidate. The plots on the left show the predicted probabilities when candidate divergence is at its 10th percentile value, and the plots on the right show the predicted probabilities when divergence is at its 90th percentile value. All other variable are held at their mean values. The vertical lines are the 95 percent confidence intervals.

C Questions used to measure individual-level ideology

2006 Cooperative Congressional Election Study

*V3019 There has been some discussion about abortion during recent years. Which one of the opinions on this page best agrees with your view on this issue?
V3066 If you were faced with this decision, would you vote for or against a plan to start withdrawing troops this year?
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?
V3072 If you were faced with this decision, would you vote for or against increasing the minimum wage?
V3075 If you were faced with this decision, would you vote for or against cutting taxes on capital gains?
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?
V3060 If you were faced with this decision, would you vote for or against banning late-term abortion?
V3063 If you were faced with this decision, would you vote for or against federal funds for stem cell research?
*V2095 Do you think the United States is doing too much, about the right amount, or not enough to resolve [the Israel-Lebanon] conflict?
*V2096 Do you think U.S. military aid to Israel should be increased, kept the same, decreased, or stopped altogether?
V2101 Support immigration reform through stricter enforcement of current restrictions.
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.
V2103 Do you support a Constitutional amendment banning gay marriage?
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?
V3027 Should companies that have discriminated against blacks have to have an affirmative action program?
V3029 Would you approve of the use of U.S. military troops to ensure the supply of oil?
V3030 Would you approve of the use of U.S. military troops to destroy a terrorist camp?
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?
V3032 Would you approve of the use of U.S. military troops to assist the spread of democracy?
V3033 Would you approve of the use of U.S. military troops to protect American allies under attack by foreign nations?
V3034 Would you approve of the use of U.S. military troops to help the United Nations uphold international law?

2010 Cooperative Congressional Election Study

CC305: All things considered, do you think it was a mistake to invade Iraq?
CC306: All things considered, do you think it was a mistake to invade Afghanistan?
CC307: Do you think the United States should send more troops to Afghanistan to fight the Taliban and al Qaeda?
*CC320: In general, do you feel that the laws covering the sale of firearms should be made more strict, less strict, or kept as they are?
CC322_1: What do you think the U.S. government should do about immigration: fine businesses?
CC322_2: What do you think the U.S. government should do about immigration: Grant legal status to all illegal immigrants who have held jobs and paid taxes for at least 3 years, and not been convicted of any felony crimes?
CC322_3: What do you think the U.S. government should do about immigration: Increase the number of guest workers allowed to come legally to the US.
CC332_4: What do you think the U.S. government should do about immigration: Increase the number of border patrols on the US-Mexican border.
CC322_5: What do you think the U.S. government should do about immigration: Allow police to question anyone they think may be in the country illegally.
CC322_6: What do you think the U.S. government should do about immigration: None of these.
*CC324: Which one of the opinions on this page best agrees with your view on abortion?
*CC325: Some people think it is important to protect the environment even if it costs some jobs or otherwise reduces our standard of living. Other people think that protecting the environment is not as important as maintaining jobs and our standard of living. Which is closer to the way you feel, or haven't you thought much about this?
CC326: Do you support a Constitutional Amendment banning Gay Marriage?
CC327: Affirmative action programs give preference to racial minorities in employment and college admissions in order to correct for past discrimination. Do you support or oppose affirmative action?
*CC328: The federal budget is approximately $600 billion this year. If the Congress were to balance the budget it would have to consider cutting defense spending, cutting domestic spending (such as Medicare or Social Security), or raising taxes to cover the deficit. What would you most prefer that Congress do - cut domestic spending, cut defense spending, or raise taxes?
CC332A: Roll call–support or oppose: Authorizes $787 billion in federal spending to stimulate economic growth in the U.S.
CC332B: Roll call–support or oppose: Program insures children in low income households. Act would renew the program through 2014 and include 4 million additional children.
CC332C: Roll call–support or oppose: Imposes a cap on carbon emissions and allows companies to trade allowances for carbon emissions. Funds research on renewable energy.
CC332D: Roll call–support or oppose: Requires all Americans to obtain health insurance. Allows people to keep current provider. Sets up health insurance option for those without coverage. Increase taxes on those making more than $280,000 a year.
CC332E: Roll call–support or oppose: Appoint Elena Kagan to the U.S. Supreme Court

CC332F: Roll call–support or oppose: Protects consumers against abusive lending. Regulates high risk investments known as derivatives. Allows government to shut down failing financial institutions.
CC332G: Roll call–support or oppose: Would allow gays to serve openly in the armed services
CC332H: Roll call–support or oppose: Allow U.S. spy agencies to eavesdrop on overseas terrorist suspects without first getting a court order
CC332I: Roll call–support or oppose: Allow federal funding of embryonic stem cell research
CC332J: Roll call–support or oppose: $700 billion loans to banks to stabilize finance
CC414_1: Would you approve of the use of U.S. military troops in order to ensure the supply of oil?
CC414_2: Would you approve of the use of U.S. military troops in order to destroy a terrorist camp?
CC414_3: Would you approve of the use of U.S. military troops in order to intervene in a region where there is genocide or civil war?
CC414_4: Would you approve of the use of U.S. military troops in order to assist the spread of democracy?
CC414_5: Would you approve of the use of U.S. military troops in order to protect American allies under attack by foreign nations?
CC414_6: Would you approve of the use of U.S. military troops in order to help the United Nations uphold international law?

* Due to the nature of the response options, these CCES questions were split up into multiple indicators of respondent opinion.