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Representation, neighboring districts, and party loyalty in the U.S. Congress

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Abstract Legislative scholars often assume that legislators are motivated by concerns over re-election. This assumption implies that legislators are forward-looking and are motivated by a concern over what their re-election constituency will look like during their next electoral cycle. In this research, we show how the forward-looking nature of legislators motivates members of the U.S. House of Representatives to represent both their home district and their neighboring districts in their choices regarding when to support their own party. Using survey responses to the 2006, 2008, and 2010 Cooperative Congressional Elections Study to construct measures of Congressional District ideology, empirical analysis is strongly supportive of our claims. Legislators' choices are strongly influenced both by the ideology of their home district and that of the districts that neighbor their home district. Thus, the electoral connection between citizens and representatives extends beyond a legislator's own constituents to include the constituents in neighboring districts.

Keywords Representation · Legislative behavior · Party loyalty · District ideology

JEL Classification D-72 · D-70 · D-80

1 Introduction

“What worries me is not that I will neglect my district and lose it...What worries me is that my district will change.”- Gary Ackerman [D- NY] (Fenno 2007, p.155)

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In February of 2013, the 113th U.S. House of Representatives voted to reauthorize the Violence Against Women Act. The re-authorization of this particular act is noteworthy because a majority of the majority party Republicans opposed the bill, making the bill's passage the second "Hastert Rule" violation in the 113th House.¹ Despite a majority of the majority party opposing the bill's passage, the minority party Democrats and a small coalition of Republican Party members were able to pass the bill with 286 votes. Of the 86 Republicans who voted in favor of the bill's passage, more than 74 % of them came from states won by President Obama in 2012.² That is, the Republicans who broke ranks with their more conservative co-partisans came from largely liberal states. Even though their own home district elected a Republican to the House, these members were surrounded by other districts full of citizens willing to vote liberally in elections and seem to have responded to those citizens' preferences. This suggests to us that House members may be considering the preferences of constituents beyond their own district when deciding how to vote on legislation. Indeed, our leading quote by Gary Ackerman indicates that House members are not only concerned with what their own constituents want from them but they are also motivated by a concern over what their districts will look like in the future, and those same legislators recognize that the makeup of their home districts can change quite quickly. House members' forward-looking concern over the future makeup of their districts suggests that they have good reason to incorporate the preferences of citizens in other districts in their state when choosing how to vote on bills.

In this research, we develop a theory explaining legislators' choices regarding party loyalty during roll call voting as a function of both the ideology of their own home district and the ideology of their neighboring districts. Because legislators are concerned about the impact of their choices on re-election, legislators' decisions regarding the support or opposition of their own party will be responsive to both the preferences of their current constituents and the preferences of constituents who may move into their districts before their next election. Regular migration between neighboring legislative districts and changes in constituencies due to redistricting force these forward-looking legislators to consider the ideology of nearby citizens they do not actually represent when making decisions about how to vote on legislation. To test our theory, we develop measures of party cohesion from roll call votes and measures of district ideology using survey responses to the 2006–2010 Cooperative Congressional Elections Study (CCES). We then develop a model predicting the probability of legislators voting against their party as a function of both the ideology of their own district and the ideology of their neighboring districts. Our results are strongly supportive of our hypotheses. We conclude that the strong motivation towards re-election keeping legislators responsive to their own constituents also causes legislators to respond to the ideology of constituents they do not yet represent.

2 Neighboring districts and party cohesion

To connect the partisanship of neighboring constituencies to the party loyalty of an individual legislator, we begin with a few assumptions. First, we assume that, when a legislative proposal comes up for a floor vote, legislators decide whether to support the bill according to a traditional proximity model (Canes-Wrone and Cogan 2002; Brady et al 2007; Carson et al. 2010; Nyhan et al. 2012). Legislators weigh the ideological distance

¹ The first violation was the passage of relief aid to areas struck by Hurricane Sandy.

² Only 35 % of the Republicans opposing the bill came from states won by President Obama.

between the preferences of their district's median voter, the implications of the proposal, and the current status quo. If the preferences of the legislator's district median voter are more proximate to the proposal than they are to the status quo, the legislator votes for the proposal. Otherwise, the legislator votes to maintain the status quo. Further, we assume that legislative parties tend to propose and attempt to pass legislation that is to the left (Democrat) or right (Republican) of the current status quo (Cox and McCubbins 2005).³ This is not the same as assuming the legislative parties are ideologically extreme. It simply suggests that, when a bill sponsored by a Republican legislator comes to the floor for a vote, that bill tends to move public policy in a conservative direction, and likewise in a liberal direction for bills from the Democrats.

These two assumptions immediately imply that legislators with moderate district median voters should be the least loyal members of their party.⁴ To see why, consider the following scenario: a Republican legislator must choose between the conservative Republican Party proposal and the necessarily less conservative current status quo. If that legislator's district median voter is extremely conservative, then the legislator votes for the party's proposal and appears loyal. If that legislator's district median voter is moderate, then the legislator's district median voter may prefer the status quo to the conservative proposal, and thus the legislator may face competing goals (satisfying his or her constituency and being loyal to his or her party). The greater this cross-pressuring between party loyalty and constituent representation is for an individual legislator, the more likely the legislator should be to vote against his or her party.⁵ Thus, our first hypothesis is that legislators with moderate district median voters will be the most likely to shirk their party's proposed legislation during roll call votes.⁶

Our final and most critical assumption is that legislators are motivated by their desire for re-election and as such are *forward-looking*. When a legislator makes a choice about whether or not to support his or her party, that choice is informed by the legislator's projections about how that vote will affect his or her electoral fortunes in the future. This concern about the long-term implications of choices means that a legislator is simultaneously concerned about how his or her choice will be viewed by current constituents and how that choice will be viewed by future potential constituents. Legislators worried about their electoral fortunes in the future must simultaneously balance the need to satisfy their current constituencies with the need to satisfy constituents who will be voting for them in the future. The distribution of preferences in a legislator's future constituencies should be very similar to the distribution of preferences in his or her current constituents. However, U.S. legislative districts are subject to two forces that alter the makeup of districts from one

³ When each party is satisfied with the legislative status quo, those parties do not propose legislation at all. This immediately implies that proposed legislation attempting to move the status quo tends to do so in a consistent ideological direction.

⁴ Our theory focuses on the relationship between the ideology of constituents and the party loyalty of legislators because there are under appreciated consequences of proximity models of representation for the party loyalty of legislators.

⁵ Hereafter, we will refer to individual legislators voting against the majority of their party as "shirking" or "being disloyal."

⁶ This spatial account of legislative voting and cross-pressuring already has substantial support in the U.S. legislative politics literature. Research has consistently shown that U.S. legislators from moderate districts face electoral difficulty if they vote with their parties too often (Canes-Wrone and Cogan 2002; Carson et al. 2010; Snyder and Ting 2003; Griffin 2006). It is also worth noting that this hypothesis is not uniformly supported in comparative legislative research. A number of parliamentary legislatures actually exhibit ends-against-the-middle voting in spite of the fact that such behavior is irrational in a proximity-based model of legislative voting (Kam 2009).

election to the next. First, constituents are free to migrate from one district to another. Second, regular decennial redistricting moves constituents from one district to another.⁷ This regular and somewhat predictable change in legislative districts implies that, when legislators are drawing inferences about what their future constituencies will look like, the most likely citizens to become their future constituents should come from neighboring legislative districts. Neighboring legislative districts are the most likely districts from which new constituents might be redistricted into a legislator's home district, and are the most likely place from which citizens might migrate into a legislator's home district. This implies that forward-looking legislators, seeking to balance the wishes of their current constituents with the preferences of future constituents, are likely to consider the preferences of citizens in neighboring legislative districts when choosing whether or not to support their party's legislation.⁸

To illustrate this point, again consider a Republican legislator who must choose between voting for a Republican Party-backed piece of legislation and the necessarily more moderate status quo. Further, suppose this Republican legislator is from a moderate district surrounded by many ideologically liberal districts. Any migration from those surrounding districts into the legislator's moderate district, or any redistricting that moves constituents from those surrounding districts into the legislator's moderate district, is much more likely to pull the legislator's district preferences in a liberal direction. This further increases the pressure on the Republican legislator to shirk supporting the Republican Party's proposal. If that Republican legislator from a moderate district were surrounded by many ideologically conservative districts, then any incoming constituents from those districts would make that same legislator's district more conservative, and thus make that legislator more likely to support his or her party. Accordingly, we should expect that Republican legislators whose home districts are surrounded by ideologically liberal legislative districts are less loyal to the Republican Party during roll call votes than are Republican legislators whose home districts are surrounded by ideologically conservative districts, controlling for the ideology of those legislators' home districts. The reverse should be true for Democrats. Democratic legislators surrounded by ideologically conservative districts should be less loyal to their party than Democratic legislators surrounded by liberal districts.⁹

While our theory of party cohesion focuses largely on the connection between a legislator's constituents and his or her legislative choices, institutional forces and party activists

⁷ Because legislators are forward-looking, and thus always making choices in the shadow of the future, redistricting need not actually have occurred to worry a legislator. A legislator worried about the future will anticipate problems that result from redistricting before that redistricting ever occurs.

⁸ There is an implicit assumption here that U.S. residents are more likely to move short distances than they are to move long distances. That is, we assume that moving within a city or county is more common than moving great distances like across states or to a different state entirely. While this is an assumption of our theory, it has robust empirical support. The 2012–2013 Census Migration Data indicates that 17,000,000 citizens aged 16 or older moved within counties while only 9,000,000 such residents moved out of their county into a new one. Additionally, within the inter-county migrants, 3.5 million moved less than 50 miles, while 2 million moved between 50 and 199 miles, 1.3 million residents moved 200–499 miles and 2.3 million moved more than 500 miles. Thus, even amongst those moving across county lines, the most common migration distance is less than 50 miles. Census Migration Data can be viewed at: <http://www.census.gov/hhes/migration/data/cps/cps2013.html>. Additionally, geography research has known that short-distance migration was more common than long-distance migration since at least Ravenstein (1885).

⁹ We are not suggesting the neighboring districts are *more* important than a legislator's home constituency, or that the effects of neighboring districts on legislative behavior will be extremely large. Instead, we are suggesting that legislators have an incentive to consider the preferences of neighboring constituencies as one of many factors when deciding how to vote on bills.

may condition the degree to which a legislator actually responds to his or her district's median voter (Masket 2007; Layman and Carsey 2002; Layman et al. 2010; Brady et al. 2007; McCann 1995). In many states, in order to advance to the general election, nominees must first win a primary. Voters participating in primary elections tend to hold more ideologically extreme preferences and tend to be more politically sophisticated than voters in general elections (Brady et al. 2007). In particular, legislators from states using "closed" primary elections in which only partisans can vote in a primary election have incentives to respond to both the preferences of the district's median voter and the median voter of the primary election constituency. Because closed primary election constituencies are by default more ideologically extreme than general election constituencies, we expect that legislators in states using closed primary elections will consistently be more loyal to their party than legislators from states with open primary systems.¹⁰

This conception of the link between party loyalty during roll call voting and district preferences leads to several testable hypotheses. First, we expect that legislators from ideologically moderate districts are less loyal to their party during roll call voting than are legislators from ideologically extreme districts. Second, controlling for the ideology of a legislator's home district, Republican legislators from districts neighbored by liberal districts will be less loyal to their party than Republican legislators from districts neighbored by conservative districts, and the reverse for Democratic legislators. Finally, we expect that legislators from states using closed primary elections to nominate candidates for general elections are more loyal to their party during roll calls than legislators from states using more open primary nominating systems.¹¹

While all forward-looking legislators have some incentive to concern themselves with the preferences of citizens in neighboring districts, this concern is unlikely to be uniform across legislators. Some legislative districts are more likely to experience change than other districts. For example, some districts experience more population change as a result of migration than others. To the degree that a legislator can recognize increased migration in their district, high levels of short-distance migration ought to cause a legislator to pay elevated attention to their neighboring districts. This implies a final conditional hypothesis from our theory. Legislators in districts experiencing high levels of short-distance migration ought to exhibit stronger relationships between their neighbors' district ideology and their own voting behavior.

2.1 Progressive ambition

While our account of legislators responding to their neighbors focuses on geographic causes like migration and redistricting, progressive ambition may also cause this type of

¹⁰ Brady et al. (2007) found that legislators in states using primary elections position themselves closer to the primary electorate than the general election electorate. McCann (1995) found evidence that reinforced the traditional view that primaries lead to more extreme candidates. While these articles do not distinguish between open and closed primaries, the logic suggests that with the even more restricted and ideological electorate found in a closed primary there would be even more extreme candidates. There remains, however, some uncertainty about how strongly closed primaries influence candidates' ideological extremism (McGhee et al. 2014).

¹¹ It is worth noting that legislative scholarship is already quite comfortable with the notion that legislators respond to changes in their constituencies by changing their voting behavior. Bertelli and Carson (2011) state that "it is clear from both [of our] models that geographic boundary change and the corresponding uncertainty that arises from representing 'new' voters affects congressional voting decisions" (p. 205). We are simply asserting that forward-looking legislators are likely to anticipate these changes to their district, rather than waiting for them to happen.

responsiveness. A U.S. House member who intends to run for U.S. Senate, governor, or other statewide offices has an incentive to cultivate a positive image among constituents beyond those who currently reside in their district. Thus, they may be motivated to represent those constituents during roll call voting in order to prepare themselves for pursuit of a higher office. Note, however, that such a motivation requires that a House member cast their gaze beyond their home district and neighboring districts towards the *entire state*. Such an account of representation would hypothesize that legislators do not prioritize representing their neighbors over citizens dispersed across the entire state. For reasons of space, we test this hypothesis in the supplemental appendix, and find evidence that legislators prioritize their neighboring districts over those in the same state, but to which they are not neighbors. Such a result would seem to discount progressive ambition as the primary mechanism for the patterns we observe.

3 Measuring district ideology

In order to test our expectations regarding the relationship between district ideology and party loyalty, we require measures of the latent ideology of citizens that we can aggregate up to Congressional Districts. To measure district ideology, we utilize the factor analytic techniques proposed by Harden and Carsey (2012). That is, we take survey respondents' answers to social policy questions from the 2006, 2008, and 2010 CCES and use factor analysis to estimate a latent "mood" value for each respondent to each survey that is simply the factor score on the first latent dimension from the factor analysis.¹² Factor analysis standardizes factor scores such that the average factor score of citizens in each year is zero. We then aggregate factor scores by Congressional District and code the average first dimension factor score of respondents from a particular Congressional District in a particular year as the average ideology of that district. This provides us with the average ideology of all 435 Congressional Districts in 2006, 2008, and 2010.¹³ Our district ideology scores are coded such that high values represent liberal ideology and low values represent conservative ideology. Figure 1 plots the ideology of Congressional Districts across the U.S. estimated from survey responses to the 2010 CCES. Darker shades represent higher, and thus, more liberal ideology in a particular district.

Having estimated the ideology of Congressional Districts, we now wish to measure the ideology of the districts surrounding a legislator's home district. To do so, we code two legislative districts as neighbors if the two districts reside in the same state and share a border. Using this definition of neighboring districts, we calculate two different measures of neighboring district ideology.¹⁴ The first measure is simply the average ideology of the districts bordering a legislator's home district. The second measure is the sum of the ideologies of the district bordering a legislator's home district.¹⁵ For legislative districts

¹² In 2006, we used questions asking respondents about their feelings towards abortion, stem cell research, affirmative action, environmental protection and immigration. In the 2008 and 2010 CCES, the immigration question on the survey was dropped, and so we replace it in our estimates with a question asking respondents their preference for the provision of health insurance to under privileged children.

¹³ The correlation between our estimates of district ideology are 0.76 between 2006 and 2008 estimates and 0.82 between 2008 and 2010 estimates.

¹⁴ It is worth pointing out that this definition also means that some Congressional Districts have no neighbors. For example, Wyoming only has one Congressional District and so has no districts in the same state with which it shares a border. Districts without neighbors are dropped from our analysis.

¹⁵ In other words, we simply add together the estimated ideologies of a legislator's neighboring districts.

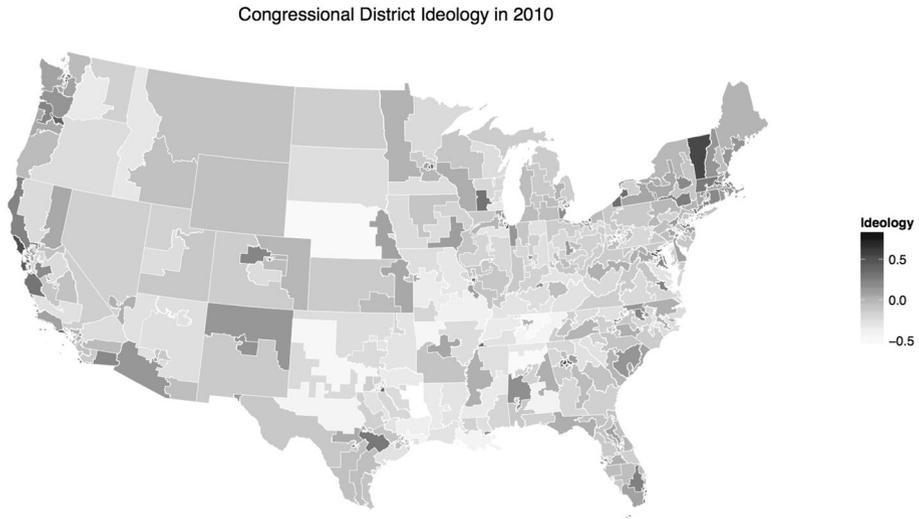


Fig. 1 The ideology of U.S. Congressional Districts based on survey responses to the 2010 CCES

with only one neighbor, these two quantities will be equivalent, but for legislative districts with many neighbors, there will be important differences between the measures. By using the sum of neighboring districts' ideology in addition to the average, we can capture the influence of being surrounded by many districts of different ideologies. For example, suppose District A was neighbored by a single district with slightly liberal ideology, while District B was neighbored by five districts with slightly liberal ideology. The average of neighboring district ideologies would treat these situations as equivalent. However, because Congressional districts are of roughly equivalent populations, the legislator in District B has many more liberal neighbors about which to worry. District A may only border 700,000 slightly liberal citizens (the general size of Congressional Districts), while District B may border as many as 3.5 million slightly liberal neighbors. The summed measure will distinguish both the ideology of and number of neighboring districts to a legislator's home district while the average ideology of neighboring districts fails to capture quantity.

Thanks to the geographic sorting of the U.S. electorate (Bishop 2009), political ideology tends to be clustered in Congressional Districts. This makes it relatively rare, for example, to encounter Republican legislators neighbored by ideologically liberal districts, but not so rare as to never occur. Figure 2 plots the ideology of the districts surrounding the 13th Congressional District of New York state and the 5th Congressional District of Alabama based on survey responses to the 2006 CCES. In 2007, immediately following the administration of the survey, Republican Vito Fosella represented New York's 13th District. While the 13th District elected a Republican representative to Congress, its neighboring districts are some of the most ideologically liberal Congressional Districts in the country. Likewise, Alabama's 5th Congressional District was represented by Democrat Robert "Bud" Cramer in 2007. Cramer's immediate neighbor to the south, Alabama's 4th Congressional District, is one of the most conservative districts in the nation. Thus, our

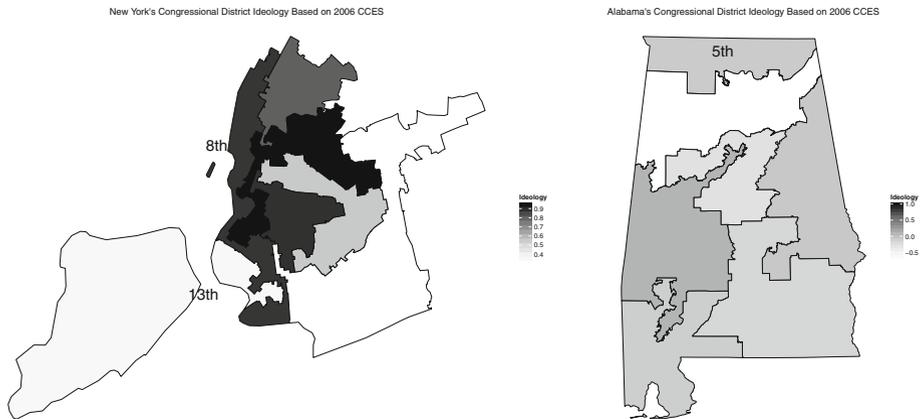


Fig. 2 The ideology of New York's 13th and Alabama's 5th Congressional Districts and their neighbors

data do contain many examples of legislators being elected from legislative districts surrounded by ideologically opposed citizens.¹⁶

4 Analysis and results

Having developed measures of a legislator's home district ideology and the ideology of the districts neighboring a legislator's home district, we now turn to the estimation of the effects of these covariates on the party loyalty of House members during roll calls. To measure party loyalty, we gathered party unity data from *voteview.com* (Poole and Rosenthal 2007). To create party unity scores, most scholars classify roll call votes as “party line” votes if the majority of one party opposes the majority of the other party. A legislator's party unity score is the percentage of these party line votes on which a legislator votes with the majority of his or her party. Many scholars use these party unity percentages in standard OLS models (Cantor and Herrnson 1997; Roberts and Smith 2003; Crespín and Vander Wielen 2013; Meinke 2012). Unfortunately, because these percentages (like all percentages) are capped between 0 and 100, OLS is an inappropriate model choice. An alternative is to consider a beta regression, which is appropriate for dependent variables on the (0,1) scale. Again, however, beta regression assumes that dependent variables do not ever actually take on values of 0 or 1. Legislators frequently have perfect party unity scores, thus making beta regression also inappropriate as a tool for analysis of party unity scores.

The appropriate approach to this sort of data is “grouped” logistic regression, where the dependent variable is the number of successes given some number of trials (Agresti

¹⁶ We can be more precise about how many districts are surrounded by ideologically opposed districts. Using an ideology estimate of zero as the midpoint, we can calculate the percentage of Congressional Districts with ideology on one side of zero and an average neighboring district ideology on the other side of zero. Let us call these “Enemy Territory Districts.” According to the 2006 CCES 28.7 % of Congressional Districts were in enemy territory. According to the 2008 CCES, 27.1 % of Congressional Districts were in enemy territory. According to the 2010 CCES, 29.8 % of Congressional Districts were in enemy territory.

2007, p. 106).¹⁷ For example, we may observe 100 instances of a legislator opposing his or her party out of 1000 party line votes. This implies there are 100 1's and 900 0's in a binary coding of that legislator's opposition to his or her party during roll call votes. From this setup emerges a standard logistic regression predicting the probability of an outcome, given some attributes of the groups (in this case, legislators), but with no information about the trials (in this case, votes) themselves. Since our theory focuses on which legislators are most likely to be *disloyal* to their party, we code instances of party disloyalty as the quantity of interest (the 1's in our logit model).

Using this grouped logit approach, we estimate the probability a legislator votes against his or her party on party line votes in the 110th–112th U.S. House of Representatives. As independent variables in the model, we include a legislator's lagged rate of party disloyalty, which is simply the percentage of times a legislator voted against his or her party on party line votes in the prior session,¹⁸ the legislator's home district ideology, the average or summed ideology of a legislator's neighboring districts, and a dummy variable coded 1 if a legislator comes from a state that uses closed primary legislative elections and 0 otherwise.¹⁹ We use district ideology scores from the 2006 CCES to estimate party disloyalty in the 110th, the 2008 CCES to estimate party disloyalty in the 111th, and the 2010 CCES to estimate party disloyalty in the 112th.²⁰ Because our measurement scale for ideology codes conservative districts as having low values and liberal districts as having high values, and we expect the effects of a legislator's home district's liberalism and neighboring districts' liberalism to be different for Democrats and Republicans, we also include a Republican identifier coded 1 if a legislator is a Republican and 0 otherwise. We then interact home district and neighboring district ideology with this Republican identifier. For example, we should expect that increasing home district liberalism drives up Democratic loyalty and drives down Republican loyalty. Our interaction term captures this conditional expectation and allows district ideologies to have opposing effects on Republican and Democratic House members. The results of these models are reported in Table 1.²¹

As the table shows, even after including statistical controls for a legislator's rate of disloyalty in the prior Congress, and the ideology of his or her home district, the average ideology of a legislator's neighboring districts is a negative and statistically significant predictor of party disloyalty in all three sessions we examine. The interaction term of

¹⁷ This approach is also sometimes referred to as “fractional” logistic regression.

¹⁸ For legislators new to the House who do not have lagged party disloyalty scores, we use the party disloyalty of the legislator from the new legislator's home district in the prior session. Our lagged rate of disloyalty helps control for the endogeneity that may exist between party disloyalty and district preferences. As an alternative, we could drop new legislators from the analysis. Neither choice influences the substantive findings of our analyses.

¹⁹ Because our estimates of Congressional District ideology come from a factor analysis of survey responses, they necessarily contain measurement error. This measurement error could potentially pose a problem for the inferences we draw. In the supplemental appendices, we attempt to address this measurement error using a sensitivity analysis approach similar to Blackwell et al. (2010).

²⁰ While none of these sessions are themselves subject to a redistricting cycle (one of the mechanisms motivating our theory), forward-looking legislators need not actually experience redistricting to worry about redistricting. Forward-looking legislators will anticipate redistricting's effect on their constituency and adapt their behavior accordingly.

²¹ In the supplemental appendices, we provide models with specifications that include the ideology of a legislator's neighboring districts in other states. These models help us rule out the possibility that our results are driven entirely by progressive ambition. Progressively ambitious House members have no reason to respond to neighboring districts in other states, and yet our results suggest that they do respond to such neighbors.

Table 1 Logistic regression model predicting the party disloyalty during roll call votes in 110th–112th U.S. House as a function of the average ideology of a House member's neighboring districts

Variable name	110th House	111th House	112th House
Lagged rate of disloyalty	0.048* (0.001)	0.067* (0.001)	0.035* (0.001)
Home district ideology	-1.319* (0.046)	-2.051* (0.050)	-2.872* (0.043)
Average ideology of neighboring districts	-0.362* (0.053)	-1.186* (0.057)	-1.081* (0.045)
Closed primary	0.208* (0.013)	-0.127* (0.017)	0.091* (0.012)
Republican party dummy variable	1.058* (0.014)	0.226* (0.016)	-0.834* (0.013)
Home district Ideology × Republican dummy	1.737* (0.063)	2.922* (0.077)	3.940* (0.071)
Ideology of neighboring districts × Republican dummy	0.688* (0.073)	0.672* (0.084)	1.648* (0.073)
Intercept	-3.698* (0.015)	-3.244* (0.014)	-2.114* (0.010)
AIC	18,649	13,871	17,617

Cell entries report coefficient values from logistic regression models predicting the probability of a House member voting against his or her party on party lines votes as defined by Poole and Rosenthal (1991). Standard errors are reported in parentheses

AIC Akaike's information criterion

* $p < 0.05$

neighboring district ideology and the Republican dummy is also positive and statistically significant in all three models.²² Recall that we code district ideology such that high values represent more liberal district ideologies. These results then imply that, as the average ideology of a Democratic legislator's neighboring districts becomes increasingly liberal, that legislator becomes increasingly less likely to be disloyal to his or her party. The interaction term implies that Republicans respond to the increasing liberalism of their neighboring districts significantly differently than their Democratic colleagues.²³

Table 1 uses the average ideology of a legislator's neighboring districts, but, as articulated in the description of our measures, the total or summed ideology of neighboring

²² Some may worry that (1) a legislator's home district's ideology and neighboring district's ideology may be spatially correlated and (2) a legislator's home district's ideology may be correlated across observations. Spatial correlation between a legislator's home district's ideology and neighboring district ideology would imply that our measures of ideology are collinear. Collinearity drives up standard errors and results in excessively conservative hypothesis tests. Thus, spatial correlation between a legislator's home district and neighboring district is not harming our hypothesis tests. It is in fact, making them more conservative. Spatial correlation across observations (rather than within two covariates on the same unit) would be problematic were it in the dependent variable, but spatial correlation in independent variables causes no problems for linear models. Neither of these concerns would result in excessive tendency to reject the null hypothesis.

²³ Supplemental tests indicate that residual spatial autocorrelation in party unity scores is not a problem for our analyses.

Table 2 Logistic regression model predicting the party disloyalty during roll call votes in 110th–112th U.S. House as a function of the summed ideology of a House member’s neighboring districts

Variable name	110th House	111th House	112th House
Lagged rate of disloyalty	0.048* (0.001)	0.067* (0.001)	0.036* (0.001)
Home district ideology	-1.394* (0.047)	-2.237* (0.051)	-2.851* (0.043)
Summed Ideology of neighboring districts	-0.050* (0.014)	-0.182* (0.016)	-0.287* (0.012)
Closed primary	0.194* (0.013)	0.069* (0.016)	0.082* (0.012)
Republican party dummy variable	1.048* (0.014)	0.205* (0.016)	-0.866* (0.013)
Home district Ideology × Republican dummy	1.774 (0.063)	3.056* (0.077)	3.988* (0.071)
Ideology of neighboring districts × Republican dummy	0.177* (0.020)	0.097* (0.023)	0.395* (0.019)
Intercept	-3.687* (0.015)	-3.198* (0.014)	-2.091* (0.010)
AIC	18,636	14,206	17,653

Cell entries report coefficient values from logistic regression models predicting the probability of a House member voting against his or her party on party line votes as defined by Poole and Rosenthal (1991). Standard errors are reported in parentheses

AIC Akaike’s information criterion

* $p < 0.05$

districts is an important alternative operationalization of neighboring district ideology. As such, Table 2 replaces the average ideology of neighboring Congressional Districts with the summed ideology of neighboring Congressional Districts. Again, across all three models summed neighboring district ideology has a negative and statistically significant effect on party disloyalty, and the interaction term is positive and significant across all three models. Interestingly, in two of the three models, model fit statistics favor the average ideology of neighboring districts as the more useful predictor, but our models of the 110th House favor the summed neighboring district ideology measure.

Moving beyond our estimates of the effect of neighboring districts’ ideology on party disloyalty, the ideology of a legislator’s home district and its interaction term has the predicted effect in all three models reported in both Tables 1 and 2. That is, in each legislative session, Democratic legislators from more liberal districts were much less likely to be disloyal to their party than Democrats from more conservative districts. The positive coefficients on the interaction terms again suggest that Republican legislators respond to the liberalism of their home districts in the reverse direction, becoming less loyal to their party as their districts become more liberal. The coefficients on closed primary elections take on a positive and statistically significant effect in five of the six models in Table 2. This runs counter to our expectations and suggests that legislators from closed primary states are more likely to be disloyal to their party on party line votes controlling for the other effects in the model.

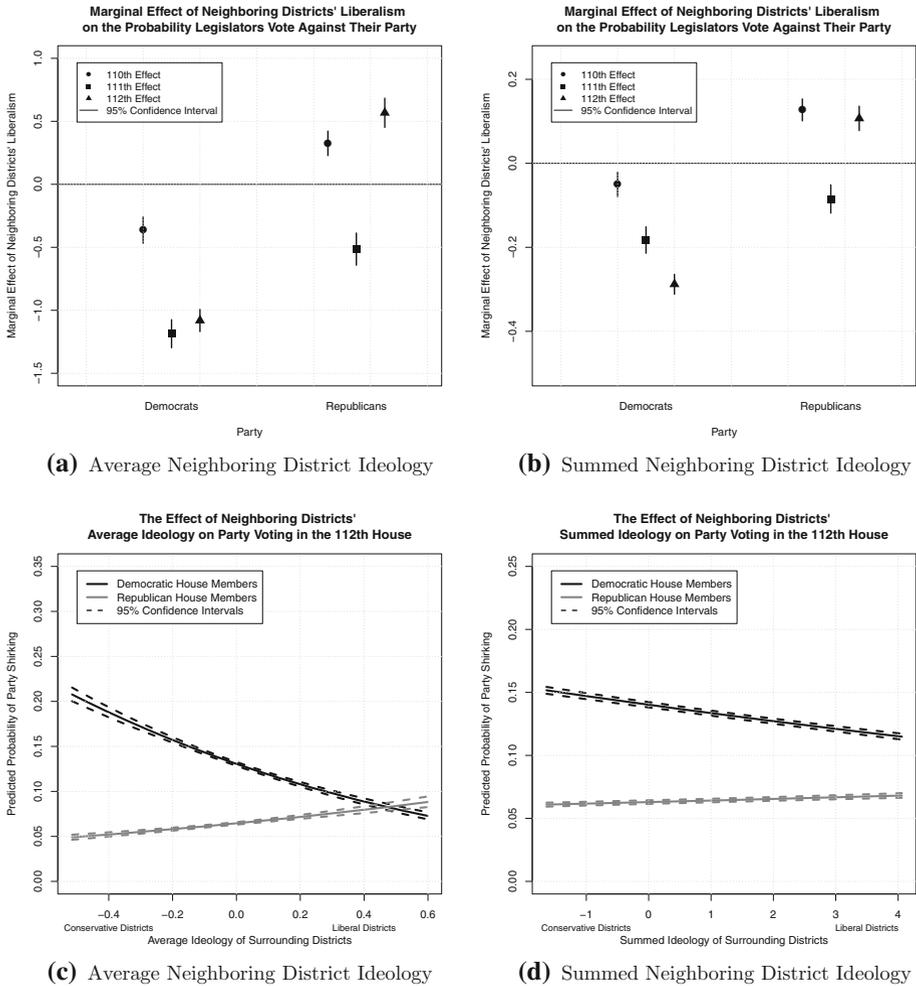


Fig. 3 The conditional effects of neighboring district ideology on the party disloyalty of Democratic and Republican House members

Because our models leverage interaction terms to allow the effects of neighboring district ideology to have different effects on Republicans and Democrats in the House, directly interpreting the magnitude of effects for neighboring district ideology can be challenging. As such, the top panels of Fig. 3 plot the marginal effects of the average and summed ideology of neighboring districts on the probability a legislator will be disloyal to his or her party during roll call voting on party line votes. As the figure shows, the effect of increasingly liberal average neighboring district ideology is a negative and significant predictor of Democratic Party disloyalty in all three sessions, and is a positive and significant predictor of Republican Party disloyalty in two of the three sessions. The 111th House session is something of an anomaly in our analysis. Our results for that session suggest that Republicans surrounded by liberal districts actually became more loyal to their party. The same is true for the marginal effect of summed neighboring district ideology on

party disloyalty among Democrats and Republicans. Thus, 10 of the 12 estimated marginal effects are statistically significant and in the direction expected by our theory.²⁴

The bottom panels of Fig. 3 plot the predicted probability of a legislator being disloyal to his or her party during the 112th session of the House as the average ideology of that legislator's neighboring districts increases from the most conservative districts to the most liberal districts for both Democratic and Republican members of the House. The closed primary dummy variable is set to 0, and the lagged party disloyalty rate and home district ideology covariates are held at their means. Under these circumstances, a Democratic legislator surrounded by highly conservative districts has a predicted probability of disloyalty of 0.21, while that same legislator surrounded by highly liberal districts has a predicted probability of disloyalty of 0.07, a statistically significant jump of 0.14. The effects are more muted for Republican legislators, but remain statistically significant. A Republican House member surrounded by highly conservative districts has a predicted probability of party disloyalty of 0.05, while that same Republican legislator surrounded by highly liberal districts has a predicted probability of disloyalty of 0.09.²⁵

To provide these figures some context, Fig. 4 plots the predicted probability of party disloyalty for Democratic and Republican House members as a function of their home district's ideology for the 112th Congress model in Fig. 1. A legislator's home district ideology should have a larger influence on that legislator's probability of disloyalty than do neighboring districts. The figure indicates that Democratic legislators from the most conservative districts have a probability of disloyalty on roll call votes of 0.45 holding all the other variables in the model at their means, while Democratic legislators from the most liberal districts have a probability of disloyalty of 0.02. Republican legislators from conservative districts have a predicted probability of disloyalty of only 0.05, while Republicans from liberal districts have a predicted probability of disloyalty of 0.15. Thus, it is comforting for proximity models of representation to observe that legislators are strongly responsive to the ideology of their home districts even as they are somewhat responsive to the ideology of their neighboring districts.

Across both averaged and summed measures, our empirical evidence consistently suggests that legislators respond to the ideology of their neighboring districts.²⁶ Republican legislators surrounded by liberal districts behave much differently than their counterparts who are surrounded by conservative districts. These results are significant even after

²⁴ We expected that the legislators' responsiveness to their neighboring districts would grow as redistricting approached, and thus, would reach its maximum in the 112th House. This pattern does not manifest in our results, and thus we are led to believe that most of the motivation for legislators' responsiveness to their neighbors comes from some combination of concerns about redistricting and migration.

²⁵ We have also subset these analyses to distinguish between southern and non-southern states, and to distinguish between states which use a redistricting commission to draw district lines, and those that do not. Our results are largely stable across these distinctions. The effects we observe are slightly weaker in southern states, but are still in the expected direction and statistically significant. Our results are nearly identical when comparing commission to non-commission states. These results can be provided upon request.

²⁶ We suggest that the primary reasons for legislators to respond to neighboring districts' ideology are redistricting and migration. This necessarily begs the question of just how much short-distance migration is actually occurring within or across Congressional Districts. While we have been assured by statisticians at the U.S. Census Bureau that district-to-district migration flows are impossible to capture using Census data, Supplemental Appendix B attempts to provide some evidence regarding short-distance migration in Congressional Districts. In summary, our results suggest that the effects of neighboring district ideology are strongest in districts with the most short-distance migration, exactly as our theory would predict.

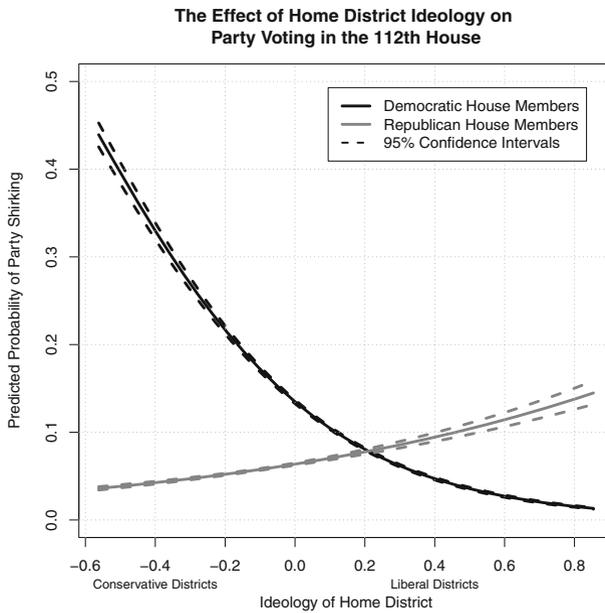


Fig. 4 The effect of a legislator's home district ideology on party disloyalty for Democratic and Republican legislators

controlling for the ideology of a legislator's own district, and that legislator's historical rate of party disloyalty.²⁷

4.1 Migration and Congressional Districts

In an ideal world, we would be able to bolster our analyses by examining the degree to which citizens actually move from one Congressional District to another. After all, legislators are only likely to care about the ideology of neighboring districts if citizens are actually coming into their district from those neighbors. Unfortunately, after a lengthy investigation, we have discovered that migration inflow and outflow data are not currently available at the Congressional District level. In addition, the American Community Survey (ACS) cannot produce Congressional District, tract, block group, or block level migration data because they do not receive enough accurate street names or residence numbers that are required for such data. This makes tracking district-to-district migration flows functionally impossible. Furthermore, the Census only began collecting migration data of any sort in 2008, and such data are not available from the Census long form. While it is possible to get a sense of the number of citizens who have moved some distance in the past year (i.e. what percentage of a district lived in a different county a year ago), the census

²⁷ It is possible that our results here are driven by legislators from primarily urban legislative districts. We test this possibility in the supplemental appendix and find that legislators from both rural and urban districts respond to the ideology of their neighboring districts.

does not ask about specific prior residence locations making it impossible to track precisely where citizens came from if they did change residences.²⁸

While we cannot track district-to-district migration flows, we do think it is important to demonstrate that a reasonable amount of short-distance migration is occurring in Congressional Districts such that legislators have some reason to be worried about incoming and outgoing constituents altering the ideological makeup of their districts. To provide some sense of the amount of short-distance migration that is occurring in districts, we utilize data from the 2008 ACS. The ACS asks respondents to indicate whether they “lived in the same house one year ago?” A no response indicates that a person has moved in the past year. Then, a series of branching questions are asked regarding the origin of the respondents’ migration. These include whether the respondent moved from within the same county and whether they moved from a different county within the same state. Since respondents’ current Congressional District can be determined (though not their prior district), the migration responses can be aggregated by Congressional District. For a given district, we take the number of respondents indicating a within-state county-to-county move in the past year and divide it by the total number of constituents in the Congressional District to obtain the proportions of a Congressional District who moved from a different county in the prior year, or the proportion of a district that are short-distance migrants.²⁹ In Table 3, we present summary statistics that describe the nature of migration for 434 Congressional Districts in all 50 U.S. states.³⁰

In Table 3, the second column, “Proportion Migrants” provides summary statistics for the total amount of citizens changing residence at all in each district. This is done simply by dividing the number of respondents who said they lived in a different residence one year ago by the total population. Across Congressional Districts, residential change is fairly common. At least 7 % of each Congressional District changed residences in the preceding year before receiving the ACS. Given that the average Congressional District size at this time is roughly 680,000 people, the Congressional District with the least residential change saw 47,000 constituents change residences in the year prior to receiving the ACS survey. The average district saw roughly 16 % of its constituents change residences.

We also produce some basic descriptive statistics that indicate the amount of migration across county lines within a state for each Congressional District. The third column in Table 3, “Proportion County-to-County Same State” shows these statistics. County-to-county migration among Congressional Districts across the country vary from 0.2 % in Nevada’s 1st Congressional District to 7.6 % in the Texas 17th district. The median and mean are not substantially different from one another, indicating few outliers. Thus, the 3.5 % of the typical Congressional District’s constituents moved from one county to another in the year before receiving the ACS. Again using the average Congressional

²⁸ We contacted Census Bureau survey statistician Kin Koerber, who is a specialist in migration statistics and agreed to be referenced for this paper on these points. Mr. Koerber confirmed on more than one occasion that district-to-district migration cannot be tracked, aggregated, or measured with current Census data. Mr. Koerber provided the following document on measuring migration using the ACS data in which the migration data team specifically requests that previous address information begin to be collected (section 1.2) moving forward: http://www.census.gov/acs/www/Downloads/methodology/content_test/P3_Residence_1_Year_Ago.pdf.

²⁹ For the rest of this section, we refer to residents who changed counties in the year prior to receiving the ACS as “short-distance migrants.”

³⁰ West Virginia’s 1st Congressional District has been excluded. For that district, there were more respondents indicating movement from a previous address than there were in the total estimated population.

Table 3 County-to-county migration by Congressional District summary statistics

Variable	Proportion migrants	Proportion county-to-county same state
Median	0.16	0.034
Mean	0.16	0.034
σ	0.04	0.014
Max.	0.27	0.076
Min.	0.07	0.002

Cell entries are derived from the American Community Survey’s 2008 3-year estimates, available at the Census Bureau’s American Fact Finder page <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

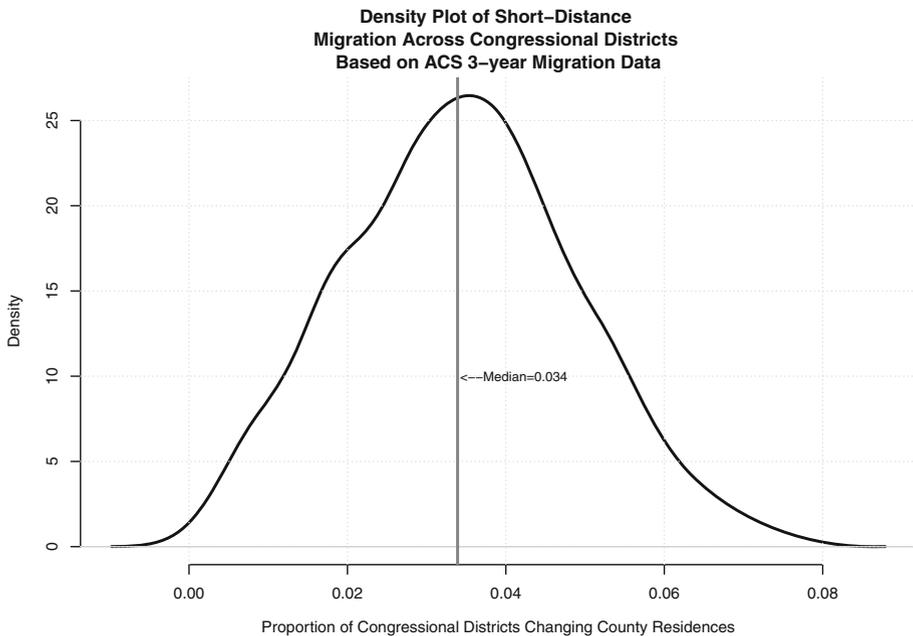


Fig. 5 Distribution of short distance migration in Congressional Districts

District population as a guide, this suggests that roughly 23,000 constituents in a Congressional District changed counties of residence in the year prior to receiving the survey.

Figure 5 plots the distribution of short-distance migration across Congressional Districts. The *x*-axis indicates the percentage of residents who moved from a different county into their current residence for each Congressional District. A great majority of Congressional Districts have between 2 and 6 % of their populations move into their current residents from other counties. Of course, some migrants may move from one county to another and remain in the same Congressional District. Others may move within the same county, but change Congressional Districts. These data also cannot provide information about those residents who leave a district. However, we simply wish to show that short-distance migration occurs at rates that are consequential for the makeup of Congressional

Districts. Because Congressional Districts are drawn orthogonal to county borders, county-to-county migration within a state should mirror Congressional District-to-Congressional District migration with a reasonable amount of accuracy.

Further investigation of the county-to-county migration data reveals that the correlation between district ideology and county-to-county migration is -0.402 . Since our district ideology estimates code conservative districts as having negative values, this implies that, as districts become more liberal (meaning district ideology is increasing) county-to-county migration declines. We can also create a measure of the ideological distance between a legislator's home district and that of his or her neighbors by taking the absolute difference between a representative's district and the average ideology of his or her neighboring districts. Larger numbers would indicate a House member's district is surrounded by ideologically opposed districts. The correlation of this distance measure and short-distance migration is only -0.051 , suggesting that "enemy territory" districts are no more or less likely to see short-distance migration than those not surrounded by "enemy" districts.

It is worth re-emphasizing that this is simply providing a picture of the short-distance migration happening across the country. These numbers *do not* imply that 3.5 % of constituents in a district came from a different district in the prior year, but they do suggest that a reasonably worrisome amount of short-distance migration is happening in the country. Congressional District lines are generally drawn orthogonally to county lines. Thus, each of these county-to-county migrants is just as likely to remain in a Congressional District as to cross Congressional District lines as a result of his or her move. Nevertheless, even if only 11,000 of the average 23,000 constituents in a Congressional District changed districts in the prior year, a legislator in a typically liberal district surrounded by conservative districts would be loathe to trade 11,000 of his or her on average liberal constituents for 11,000 of his or her neighbors' conservative constituents.

In our main analysis, we suggest that legislators worry about neighboring districts at least in part due to their concerns over migrants from neighboring districts. While our short-distance migration measures are not Congressional District inflows and outflows, they do measure the percentage of a district's population that are short-distance migrants. A simple extension of our theory would suggest that in districts made up of many short-distance migrants the effects of neighboring ideology ought to be strongest. It is in these districts that legislators have the most migration-based incentives to worry about their neighboring districts. To test this hypothesis, we extend our analysis from Table 1 and now incorporate additional interactions testing whether the effects of neighboring districts' ideology on party loyalty are greater in places with high levels of short distance migration. The results of this analysis appear in Table 4.

Beyond the inclusion of these interaction terms, there are some other differences between the results in Table 4 and those we presented earlier. In our initial analyses, we take time series data and disaggregate that data into individual Congressional sessions. While this allows us to test our model in each individual session, a more traditional approach to this data structure would be to pool the data across years, control for temporal differences in the data, and examine the general support for hypotheses across all the years of analysis simultaneously. Thus, in Table 4, we provide two multilevel models. We begin by pooling our three sessions worth data into a single dataset. We then replicate our earlier models from Table 1, but incorporate varying intercepts for Congressional sessions, individual members of Congress, and the states those members represent. In these models then, any variance across sessions, individual members, or states that is not accounted for by our covariates is appropriately modeled. From this basic multilevel model, we then

Table 4 Multilevel logistic regression model predicting the party disloyalty during roll call votes in 110th–112th U.S. House as a function of the average ideology of a House member's neighboring districts

Variable name	Model 1	Model 2
Lagged rate of disloyalty	-0.122* (0.006)	-0.188* (0.006)
Home district ideology	-0.131* (0.014)	-0.879* (0.015)
Average ideology of neighboring districts	-0.229* (0.016)	-0.208* (0.017)
Closed primary	0.001 (0.324)	-0.005 (0.015)
Home district's proportion short-distance migrants	— (—)	-0.167* (0.025)
Home district's proportion migrants × ideology of neighboring districts	— (—)	0.004 (0.016)
Republican party dummy variable	0.722* (0.034)	0.613* (0.035)
Home district ideology × Republican dummy	0.065* (0.021)	-0.001 (0.022)
Ideology of neighboring districts × Republican dummy	0.273 (0.022)	0.294* (0.023)
Home district's proportion migrants × Republican dummy	— (—)	0.548* (0.033)
Home district's proportion migrants × ideology of neighboring districts × Republican dummy	— (—)	0.052* (0.023)
Intercept	-3.204* (0.231)	-3.192* (0.270)
$\sigma_{Legislator}$	1.611	2.121
σ_{State}	0.955	1.415
$\sigma_{Session}$	0.044	0.049
AIC	24,388.6	24,078.9

Cell entries report coefficient values from multilevel logistic regression models predicting the probability of a House member voting against his or her party on party lines votes as defined by Poole and Rosenthal (1991) in the 110th through 112th Congresses. Standard errors are reported in parentheses. Continuous covariates in the model are standardized

AIC Akaike's information criterion

* $p < 0.05$

incorporate our additional interaction terms testing whether the effects of neighboring districts' ideology are conditional on short-distance migration.³¹

In examining the results from the pooled models, the coefficients in Model 1 are precisely as we would expect. The effect of neighboring district ideology is negative and significant, and the interaction term is positive and significant, mirroring our earlier results.

³¹ To help the multilevel models achieve convergence, each of our continuous covariates were standardized.

The marginal effect of neighboring district ideology for Democrats is a negative and significant, -0.229 , while the marginal effect of neighboring district ideology is a positive and significant, 0.044 . Thus, increasingly liberal neighbors reduce party disloyalty among Democrats while driving up party disloyalty among Republicans. It is also worth noting that the magnitude of these coefficients is much smaller, suggesting that the addition of our varying intercepts was an important step in controlling for potential confounding covariates. The variance in the varying intercepts for individual legislators is quite large, suggesting that there are many individual-level covariates that influence party disloyalty. Importantly however, our multilevel approach assures us that these covariates cannot create omitted variable bias in our models.

Moving from the replication model, we now turn to interpreting the results of our model incorporating short-distance migration. Because we expect the effects of neighboring districts to be different for Democratic and Republican legislators, and to be conditional on short-distance migration in districts, our model includes a three-way interaction term. Interpreting such models can be challenging. Thus, Fig. 6 plots the predicted probability of

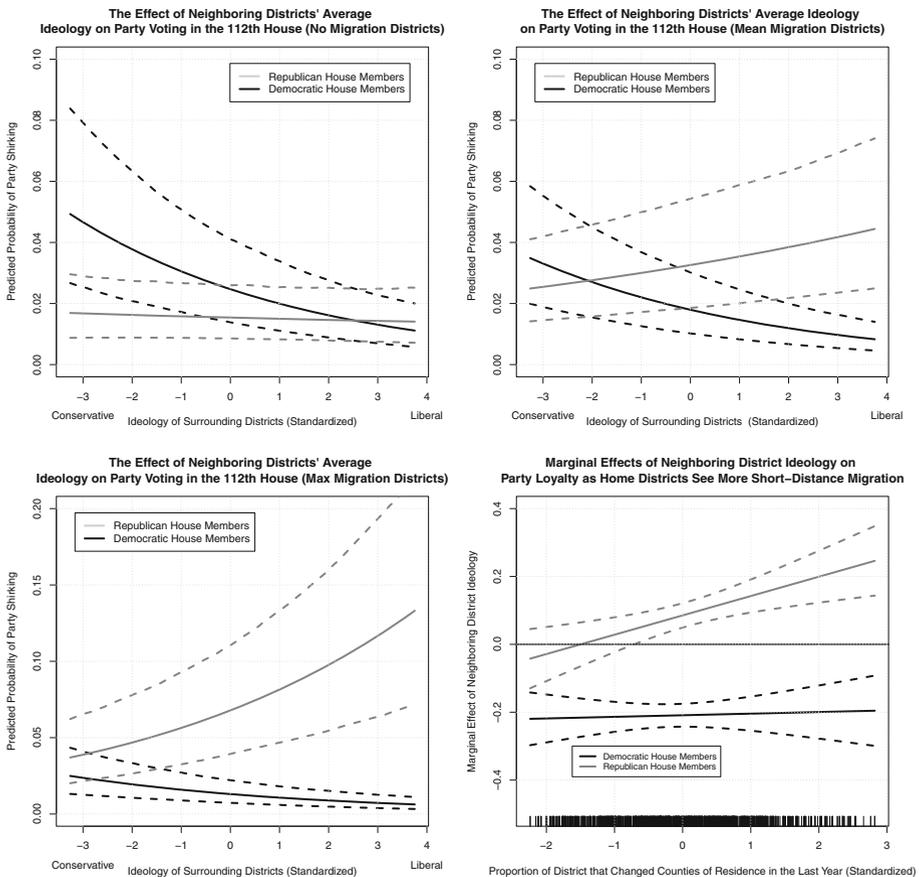


Fig. 6 The conditional effects of neighboring district ideology on party loyalty for House members from no migration, mean migration, and max migration Congressional Districts. As Congressional Districts contain more short-distance migrants, neighboring district ideology has a stronger effect on party loyalty

party shirking or party disloyalty during roll call votes for Democrats and Republicans as their neighboring districts' average ideology changes. These effects are plotted for districts with no short-distance migration (upper left), the average amount of short-distance migration (upper right), and the maximum amount of short-distance migration (lower left). The bottom right panel of Fig. 6 plots the marginal effect of neighboring district ideology for Democratic and Republican House members as short-distance migration increases.

As the figure shows, the model suggests that the effects of neighboring district ideology on party disloyalty are strongest in districts with the most short-distance migration. This squares perfectly with our theory and suggests that legislators are paying attention to neighboring districts more when their district is experiencing more short-distance migration. The conditional effect is extremely pronounced for Republican House members, for whom the marginal effect of neighboring districts moves from a slightly negative -0.042 , when short-distance migration is zero to 0.246 when short-distance migration is at its maximum. For Democrats the marginal effect of neighboring ideology is functionally constant, with a marginal effect of -0.219 , when short-distance migration is at its minimum, and -0.195 , when short-distance migration is at its maximum.

5 Conclusion

In this research, we have developed a theory and presented evidence that legislators respond to and represent the ideology of their neighboring districts in their legislative choices. Because legislators are forward-looking and concerned with the makeup of their future constituency, and migration and redistricting move constituents from their neighboring districts into their home district, legislators have strong incentives to weigh the preferences of their neighboring districts in their choices regarding loyalty to their own party. Using survey results from three iterations of the CCES and roll call voting results from the 110th, 111th, and 112th U.S. House of Representatives, empirical evidence strongly supports our claims. Legislators surrounded by ideologically opposed Congressional Districts moderate their behavior and become increasingly likely to oppose their own political party during roll calls.

Our results have strong implications for scholarship on representation. Virtually every study of legislative representation has assumed that legislators are interested in re-election and that this interest helps keep legislators tied to the wishes of their constituents. This overlooks the fundamentally important fact that legislators who are interested in re-election are not concerned about their current constituents, but are concerned about their future constituents. These future constituencies are certainly strongly tied to a legislator's current constituency, but are not the same as that current constituency. Forward-looking legislators must concern themselves with representing citizens who did not actually vote for them in the past but may vote for them in the future. Thus, one of the reasons the electoral connection does not motivate legislators to be perfectly responsive to their constituents is because those legislators wish to win re-election, and winning re-election often means satisfying new constituents.

Future research on this topic would do well to consider replicating our analysis for state legislators. Thanks to the variance both in professionalism and term limits across state legislatures, the degree to which state legislators are motivated by re-election concerns varies from one state to the next. This institutional variance would be valuable in assessing how strong re-election concerns must be before legislators begin representing the interests

of citizens who are not yet their own constituents. It would also be worthwhile to consider moving beyond party line votes to evaluate whether legislators are more likely to help accrue distributive benefits for their neighboring districts. Assisting in the provision of distributive benefits to neighboring districts can have both a positive impact on legislators' own home districts by improving regional economies and create a positive image of a legislator in the minds of potential future constituents.

Additionally, while most of our evidence (primarily found in our appendices) suggests that progressive ambition is not the primary motivation for representing one's neighbors, precisely how progressive ambition fits into the representational efforts of forward-looking legislators is worth considerably more attention than we have provided here. Paired with the results we provide, progressive ambition provides yet another reason why a legislator might look beyond her constituents in her representational efforts. Such non-constituent representation presents an important extension to how scholars view the electoral connection between citizens and House members.

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