Within and Between Parties: Agendas and Influence in the Legislature

Dissertation

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By

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Abstract

A large body of research points to evidence that the U.S. is in an era of strong party government, characterized by internally homogenous and externally heterogeneous parties. In a three article dissertation, I find that parties are not invariably strong and polarized. The first chapter finds evidence of surprising patterns of bipartisanship in state legislatures. The second chapter develops a methodology and produces a data set of scores reflecting members' influence in their party's constituent communication. The third chapter uses those scores to test whether party influence extends beyond formal legislative activities.

Article 1: Elite polarization has increased over recent decades, with some scholars questioning whether bipartisanship remains possible. However, it is not clear that this process is homogenous. Bipartisanship depends, at least in part, on the lobbying behavior of interest groups. Lobbying behavior, in turn, is influenced by the type of proposed policy. With redistributive policies, potential winners and losers align their conflict with opposing political parties making bipartisanship unlikely. With distributive policies however, rent-seeking interest groups are incentivized to lobby both parties to maximize their rents which increases the likelihood of bipartisanship. I test these predictions with a novel data set of all environmental policy bills proposed in state legislatures between 2008 and 2020 and find support for the hypothesis. Renewable energy policy, a rent-seeking policy type, has significantly higher levels of bipartisanship than climate change policy, a redistribution-seeking policy type.

Article 2: Almost all legislative members are influenced by their party's leadership and the behavior of other members of their party. The degree of influence wielded by the party has been researched extensively with regard to voting behavior, but little effort has been made to understand whether this influence extends to other important behaviors

members exhibit. Like floor votes, constituent communication plays an important role in shaping a party's brand and its electoral outcomes, yet the role of the party in what members choose to communicate about is largely unknown. This chapter develops a novel methodology to measure communication influence among elite partisans. Using the content and timing of all press releases published by House members between 2013 and 2020, I model the diffusion of communication choices through the party network. The result is a new data set of influence scores that can be used to extend the study of party influence outside of the formal legislative process. These scores create the ability to test the scope of our dominant theories of party power, and they allow for new insights into our understanding of constituent communication and political influence.

Article 3: Scholars have traditionally conceived of constituent communication as an independent exercise, relatively free of party influence. However, the current landscape of highly-competitive and nationalized parties creates a strong incentive for both party members and their leaders to communicate a unified party brand. Party influence and cue-taking are well-documented within the formal legislative process, but scholars have little understanding about the degree to which they shape the communication behaviors of House members. Using a novel data set of communication influence scores, this chapter tests which member characteristics are associated with higher influence and finds that many of our theories from the formal legislative process also apply to constituent communication. Party and committee leaders, ideological moderates, and members with high legislative effectiveness scores are all more likely to be influential in messaging. The findings suggest a potential need to reevaluate how constituent communication choices are conceived, measured, and researched in order to understand how internal politics are shaping the collective party brand.

Acknowledgments

Most importantly, I want to acknowledge the social support of friends and family. My husband, Kyle, in particular, has been magnanimous in his encouragement and patience, and he deserves every good thing life has to offer.

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Publications

Campbell, B., Warren, K., **Weiler, M.** & De Leon, G. "Eigenvector centrality defines hierarchy and predicts graduation in therapeutic community units." *PlosOne*, 16(12): e0261405. Dec 2021.

Warren, K., Campbell, B., Cranmer, S., De Leon, G., Doogan, N., **Weiler, M.** & Doherty, F. "Building the community: Endogenous network formation, homophily and prosocial sorting among therapeutic community residents." *Drug and alcohol dependence*, 207:107773. Feb 2020.

Fields of Study

Major Field: Department of Political Science

Studies in:

Political Methodology
American Politics

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1.1 Introduction

Partisan polarization in American legislatures has risen over the last four decades accompanied by a shrinking of the ideological middle (McCarty, Poole and Rosenthal, 2016; Fleisher and Bond, 2004). Scholars consistently observe high internal party homogeneity and high interparty heterogeneity with a variety of measures (Poole and Rosenthal, 2001; Stonecash, Brewer and Mariani, 2018; Layman, Carsey and Horowitz, 2006), both in federal institutions (Theriault, 2008; Lee, 2009) and across state legislatures (Hinchliffe and Lee, 2016; Lax and Phillips, 2012). The polarization among legislative parties also stretches across issues, ranging from social welfare to religion, to racial and cultural conflicts (Brewer, 2005; Layman, 2001; Layman, Carsey and Horowitz, 2006). In light of the trend toward elite polarization, the state of environmental politics in the United States presents a puzzle. No fewer than ten Republican states passed bills urging Congress to block the Environmental Protection Agency's (EPA) Obama-era Climate Action Plan while at the same time having renewable portfolio standards that require a specified percentage of their electricity to come from renewable resources (DSIRE, 2014; NCSL, 2021). Rick Perry, the former Republican governor of Texas, said that carbon emissions

are not primarily responsible for climate change (DiChristopher, 2017; Daly, 2017), yet lauded Texas' wind power capacity as the fifth largest in the world (*House Journal of the Regular Session of the Eighty-Fourth Legislature*, 2015). In just the last seven years, Nevada, Utah, Illinois, and Iowa have all passed sweeping bipartisan "green energy" bills.[1] Why, given rising elite polarization, does renewable energy garner bipartisan support while climate change remains polarized? The relevance of this question grows in light of political calls to limit the scope of federal agencies (Bowers, 2022) and the 2022 Supreme Court Decision to strip the EPA of its ability to regulate carbon emissions from power plants (*West Virginia v. EPA*, 2022). State governments continue to retain the potential to shape Americans' future on environmental policy and hundreds of other policy areas (Rabe, 2004; Krupp, 2017). Without an answer to explain these puzzling partisan responses, will we be unable to anticipate future legislation, but we will also fail to recognize the conditions under which bipartisan support emerges for seemingly-partisan issues.

The observed examples of partisan responses to environmental policy are, at least in part, the result of interest and advocacy group behavior. Interest group behavior, in turn, stems from the incentives created by different types of policy. When policies are distributive, as they are in renewable energy, interest groups are often comprised of business leaders concerned with maximizing profits, characterized by rent-seeking behavior. They, therefore, are indifferent to ideology and strategically seek to influence both liberals and conservatives to maximize rents distributed to them. In contrast, redistributive policy types, like climate change, engage in an ideological conflict. Climate change advocacy groups seek to redistribute the social cost of carbon onto carbon producers which comes at the direct cost to producers. Carbon-producing industries thus align themselves politically

[1]Nevada passed the Solar Bill of Rights (A.B. 405, 2017) (*Renewable Energy Bill of Rights*, 2017), a partnership between libertarians and environmentalists. Illinois Republican Governor Bruce Rauner signed the bipartisan Future Energy Jobs Act (S.B. 2814, 2016) (*Future Energy Jobs Act*, 2016) intended to make the state a clean energy leader. In 2020, Iowa passed a unanimous, bipartisan Value of Solar Bill (S.F. 583, 2020) (*Net Metering Transition to Value of Solar*, 2020) promoting solar energy for the purpose of diversifying Iowa's energy portfolio. Utah's Republican legislature passed the Resolution on Environmental and Economic Stewardship (H.C.R. 7, 2018) (*Concurrent Resolution on Environmental and Economic Stewardship*, 2018) commissioning a sweeping green energy study by the University of Utah (*The Utah Roadmap: Positive Solutions on Climate and Air Quality*, 2020).

on one side of the aisle, and climate advocates align themselves on the other. Conditional on political and state-specific variables, bipartisanship should therefore be more common among the renewable energy policy type and less common among the climate change policy type. I test these predictions with a novel data set of all renewable energy and climate change bills proposed in state legislatures from 2008 to 2020 and find evidence that bills are more likely to receive bipartisan sponsorship if they concern renewable energy.

1.1.1 Partisan Conflict in the Legislatures

After a declining period of partisanship in the 1950s and 1960s, scholars began to notice evidence of increasing elite partisanship (Abramowitz, 1983; Kawato, 1987; Rohde, 1991; Cox and McCubbins, 1993; Aldrich, 1995). The McGovern-Fraser reforms of 1968 dramatically shifted power away from traditional committee institutions and toward party leadership, and political scientists have since been occupied with explaining the role of parties in the legislature. Some argue that parties play a minor role next to the ambitions and preferences of the individual legislators (Mayhew, 1991; Krehbiel, 1998), while others argue that legislators are often willing to delegate power to their party leaders to address their collective action problems (Rohde, 1991; Aldrich, 1995; Cox and McCubbins, 1993). In their influential theory of parties as cartels, Cox and McCubbins (2005) argue that the majority party uses its negative agenda-setting power to prevent votes on bills that may encourage its members to defect and vote against the party policy, resulting in increasing intraparty homogeneity and interparty heterogeneity in voting patterns. Regardless of the causes, most scholars agree that elite polarization is high (Poole and Rosenthal, 1984; Fleisher and Bond, 2004; McCarty, Poole and Rosenthal, 2016) and that this pattern is reflected not only in Congress but also across state legislatures (Lee, 2016; Aldrich and Battista, 2002; Cox, Kousser and McCubbins, 2010).

So why, given the trend toward partisan conflict, do we see such paradoxically aligned and even bipartisan sponsorship within environmental policy? It may be reasonable to predict that environmental policy, too, is trending toward polarization. However,

attention should first be paid to fundamental variation in the *policy types* of climate change and renewable energy. In particular, partisan conflict over environmental policy in the last decade cannot be understood without considering the behavior and incentives of interest groups elicited by variations in these two types of policy.

1.2 U.S. Environmental Policy at the State Level

Environmental policies concern sources of energy and the impacts caused by their production. In particular, I focus on two sub-types of this policy: climate change and renewable energy. *Climate change* policies relate to addressing global climate change through the reduction of atmospheric greenhouse gases. *Renewable energy* policies relate to the production and sale of wind, solar, and hydroelectric energy. *Environmental policy* as it relates to this study will be used as an umbrella term for these two policy types. The related policy areas of extractive energy (e.g. coal, oil, natural gas), nuclear energy, and the conservation of nature and pollution are not included here.

Although the federal government and the Environmental Protection Agency set some of the nation's environmental policy, states have a great deal of autonomy. Since oil was first discovered in Pennsylvania in the late-nineteenth century, the precedent has been that whoever owns the land owns its resources (Merritt, 1988; *Exxon Corp. v. Maryland*, 1978; *American Petroleum Institute v. Cooper*, 2013). States have successfully fought to maintain a great deal of this political power both with oil and with regard to new energy technologies (Ferrey, 2003; Gerrard, 2007). The development of renewable energy depends on states providing zoning permits for thousands of acres of land, along with subsidies for development, and access to sell energy on local electrical grids (EPA, 2017). Climate change legislation is also largely decentralized: with the absence of strict federal laws, policies designed to limit greenhouse gas emissions like carbon capping (limits for how much carbon an industry is permitted to emit), cap-and-trade programs (vouchers for how much carbon a business is allowed to emit that can be sold to other companies if

not used) and carbon taxing (taxes on emissions, usually over a certain threshold) are a patchwork of individual state policies (Rabe, 2004). These dynamics are increasingly important after the weakening of the Clean Power Plan which has increased the individual freedoms afforded to state-level environmental policy decisions (*West Virginia v. EPA*, 2022; Newburger and Mangan, 2022).

1.2.1 Renewable Energy Policy

Renewable energy technology that allows energy to be generated from solar, wind, and water power has seen historic rises in capabilities in the last decade. Although hydroelectric power continues to be the oldest and largest renewable resource (DOE, 2018), advancements in wind and solar power have been rapidly increasing (DOE, 2012; Fekete et al., 2022). The cost of solar power, for example, dropped more than 70% between 2010 and 2019 (Browning, 2018), and wind power capacity in the United States tripled between 2008 and 2016 (DOE, 2012). Some of the fastest growth in renewable energy has taken place in Republican-dominated states (Browning, 2018). The biggest player in wind energy by far is Texas, followed by Iowa, Oklahoma, and Kansas. Solar power is dominated by states in the southwest and northeast with the greatest potential for future development in the west and southwest (see Figure 1.1 for state renewable production maps).

1.2.2 Climate Change Policy

Scientific evidence about the causes of climate change has mounted in the last decade, and a consensus has evolved in the scientific community that greenhouse gas emissions from human activities are a significant contributor to faster-than-average climate changes (Cook et al., 2013; Trenberth, 2018). In the United States, the largest greenhouse gas emitting industries are electricity, transportation, and agriculture (EIA, 2011). Climate change emerged as a political issue in the 1970s as activists called for

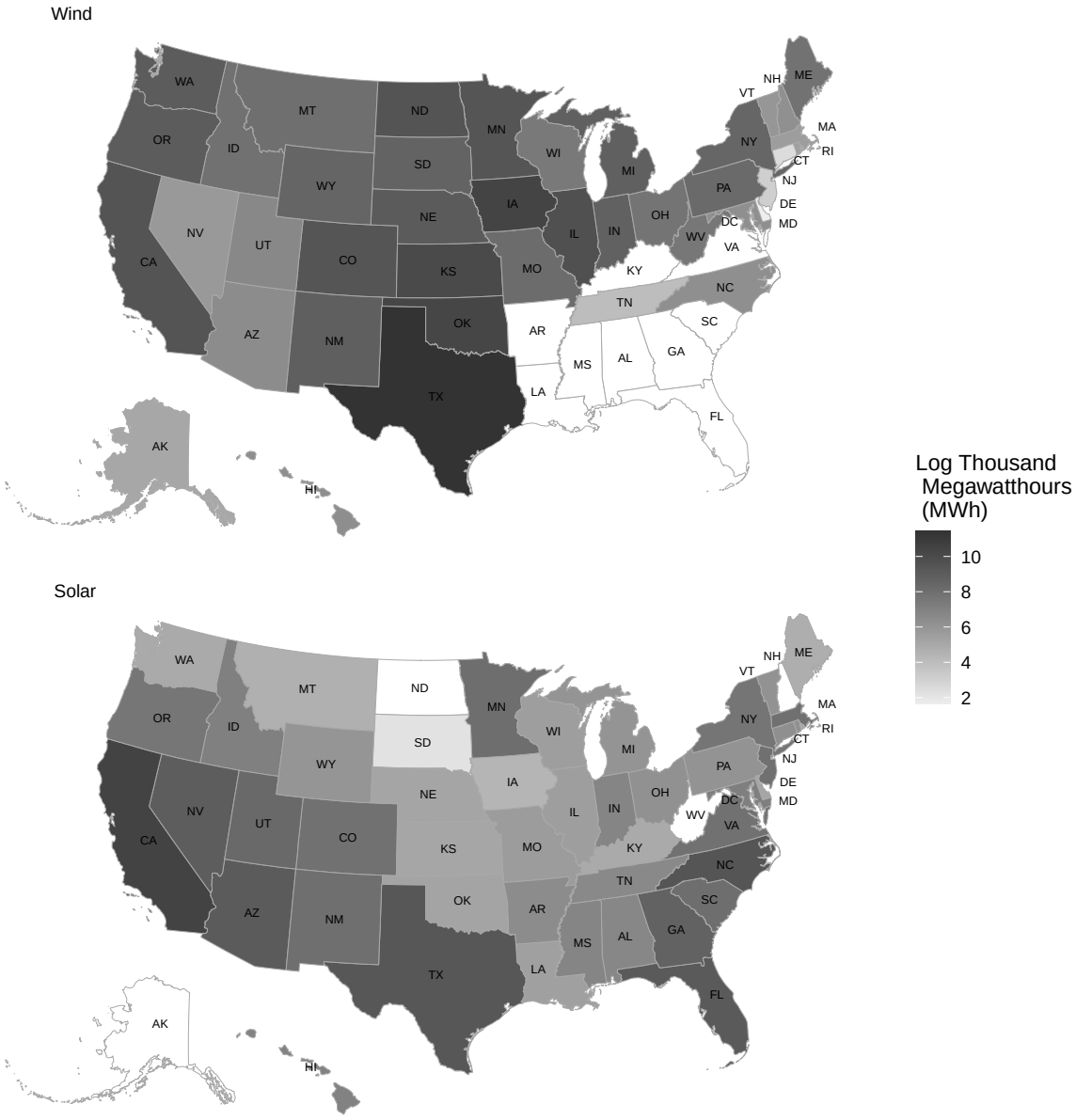


Figure 1.1: **Wind and Solar Electricity Production Map.** Wind and solar electricity production varies widely by state and are correlated with production potential more so than with the dominant political party. Darker shades indicate higher renewable energy production. Values have been logged to accommodate outlier states (Texas and California). Data are drawn from the U.S. Energy Information Administration (EIA), 2020.

more effective political action around global warming (Haibach and Schneider, 2013). The United States joined the international Paris Agreement in 2016 and again in 2021 after a temporary withdrawal under the Trump administration (Blinken, 2021). Despite scientific consensus and more-destructive-than-average weather events, climate change is a divisive political issue (Leiserowitz, 2006; Rossi, 2009; McCright and Dunlap, 2011; Mildenberger and Leiserowitz, 2017). The 2016 Democratic Party Platform, for example, referred to climate change as "an urgent threat and a defining challenge of our time" that requires "bold steps to slash carbon pollution" (Peters and Woolley, 2016*a*), while the 2016 Republican Party Platform stated that they "oppose any carbon tax" and that climate change is "far from this nation's most pressing national security issue" (Peters and Woolley, 2016*b*).

1.3 Interest Groups and Politics

Group-centered theories of politics, popular in the 1950s and 1960s (Truman, 1951; Mills, 1956; Schattschneider, 1960; Lowi, 1969), became less prevalent beginning in the 1970s as researchers shifted their attention to the role of party institutions (Rokkan, 1970; Shepsle, 1979; Thelen, 1999). The Downsian revolution, characterized by the left-right axis (Downs, 1957) and median voter theorem (Black, 1958), transformed the study of American political institutions (Mayhew, 1974). Conceiving of politics as a game between largely uniform players, campaigns, and elections has allowed us to produce an enormous body of important work, perhaps most notably the ability to track polarization over time (Poole and Rosenthal, 1985, 1997, 2001).

Despite the unquestionable value contributed by spatial models of legislative behavior, a growing body of research is calling into question the absence of organized interests in the Downsian model (Bawn et al., 2012; Hacker and Pierson, 2014; Gilens and Page, 2014; Anzia and Moe, 2019). Hacker and Pierson (2014), for example, argue that policy-seeking interest groups, not electoral connections, are the driving force behind the

policy process and suggest a return to Schattschneider-like conceptions of upper-class bias in the political system. Gilens and Page (2014) test competing theories of influence in public policy and similarly find that the preferences of organized groups and economic elites, not average citizens, are the strongest predictors of policy outcomes. Anzia and Moe (2019) build on these works and find evidence that interest groups have a significant influence on pension policy decision-making. That is not to suggest that there has been no ongoing study of American interest groups; Baumgartner et al. (2009)'s punctuated equilibrium theory, and the work of Marie Hojnacki, David Kimball, Beth Leech, and Jeffrey Berry (Hojnacki and Kimball, 1998, 1999; Baumgartner, Berry, Hojnacki, Leech and Kimball, 2009) are notable exceptions, along with the work of other scholars (Epstein and O'halloran, 1995; Caldeira and Wright, 1998; Box-Steffensmeier, Christenson and Craig, 2019). That said, for decades, interest groups have not been at the center of our theories (Hacker and Pierson, 2014; Anzia and Moe, 2019), and I argue that an intentional centering of the role played by interest and advocacy groups can help explain the patterns of asymmetrical polarization observed in environmental politics in the U.S. states.

The typical inductive logic of party theory is that politicians' primary goal is to win elections, and, to do that, they must please voters (Mayhew, 1974; Fenno, 1978). Voters' choices are made easier by the organization of political parties, and therefore parties help citizens exercise control (Schwartz, 1989; Aldrich, 1995). Bawn et al. (2012), on the other hand, argue that politicians do not need to please voters because voters have an "electoral blind spot." Extreme policies are hidden from voters by intentionally complex rules such as amendment and voting procedures, omnibus bills, and careful delegation to bureaucracy (Arnold, 1990; Bawn et al., 2012; Sinclair, 2016). In this blind spot, policy-demanding groups can influence party agendas as well as candidate races to ensure that nominees have a demonstrated commitment to the agenda (Masket, 2011; Berry and Wilcox, 2018; Herrnson, Panagopoulos and Bailey, 2019). Once a policy-demanding group, such as civil rights or Christian values, becomes part of a party, activists can take advantage of voters' difficulty understanding differences between candidate platforms to dictate the nomination

process and ensure that "any 'good Democrat' or 'good Republican' can be counted on" (Bawn et al., 2012, p. 581). This argument follows in the tradition of Rohde (1991) and Aldrich (1995) and aligns with Cox and McCubbins (1993, 2005)'s cartel theory that party leaders enforce their party's platform through majority agenda-setting tools.

Voters do not necessarily want the same policies proposed by interest and advocacy groups. Several scholars find evidence that voters prefer more centrist policies than they receive (Fiorina, Abrams and Pope, 2004; Lax and Phillips, 2012). In addition, when a candidate swings too far toward the extreme, voters are able to pick them out and punish them (Ansolabehere, Snyder Jr and Stewart III, 2001). However, as long as the candidates stay within voters' blind spot, the electorate has a difficult time understanding the complex differences between platforms in primary elections, and policy-demanding groups can ensure that nominees will support the party program (Cohen et al., 2009; Bawn et al., 2012; Page and Gilens, 2020). For their part, Bawn et al. (2012) admit that the nomination process they theorize is not easily observed or empirically measured. While I also cannot see behind the closed doors of the nomination process, this study may allow us to gain some indirect insight by exploiting variation in interest group incentives for different policy types.

1.3.1 A Group-Centered Approach to Environmental Policy

Lowi (1964, 1972) developed an influential typology of public policy based on the nature of the conflict and the types of outcomes conflicting groups seek to achieve. These policy types are distributive (tangible benefits distributed from the government to specific people/groups), redistributive (upper-class vs. lower class), regulatory (business vs. labor), and self-regulated (e.g. medical system, legal system, oil prices). Key to understanding the puzzle of state legislators' behavior on environmental politics is identifying that there are at least two primary policy types within this issue area - distributive (renewable energy) and redistributive (climate change) - and they each encourage different behaviors by the groups representing their interests.

1.3.2 Renewable Energy and Distributive Politics

Renewable energy is largely a distributive policy area with rent-seeking interest groups (Bergland, Clark and Pedersen, 2002; Kwon, 2015; Stokes, 2015). While it may be true that some groups advocate for renewable energy because they see it as a path toward sustainability, renewable energy is found to have almost negligible impacts on greenhouse gas emissions and is an inferior policy tool for this goal when compared to policies such as cap-and-trade which put an actual price on carbon emissions (Rabe, 2008; Carley, 2009, 2011; Fisher and Newell, 2008). Instead, the majority of renewable energy groups advocate for profitable business environments (Stokes, 2015). Organizations such as the Solar Energy Industries Association, the American Wind Energy Association, and the Renewable Fuels Association collectively spend over $20 million annually on lobbying and make large amounts of profits (OpenSecrets, 2023*a*). NextExtra Energy, for example, one of the largest wind energy businesses in the US, reported over $26 billion in revenue in 2022 (WSJ, 2023). Solar energy has lower and more decentralized profits, but big businesses like Apple, Verizon, and Walmart are increasingly purchasing solar systems and present large windfall opportunities for well-positioned providers (Frangoul, 2019).

Renewable energy cannot be sold directly to the consumer, however (EPA, 2017). The industry is highly reliant on state laws granting them access to distribute their energy on consumer electrical grids as well as subsidies to make them competitive with existing energy providers (prices per kilowatt-hour from renewable energy are, as of 2022, still between $.03 and $.10 higher than from fossil fuels) (Battaglia, 2022). They also need state zoning approval for wind and solar farms (DOE, 2022). For reference, California's Ivanpah solar farm, one of the largest in the country, is a $2.2 billion facility requiring 3,500 acres of land (NREL, 2014). Companies often also need to fight for eased set-back laws that regulate how far solar and wind farms need to be set back from residential zones (EPA, 2017).

Because these companies' foremost goal centers around profits, their rent-seeking interest groups should attempt to influence both Democratic and Republican policy plat-

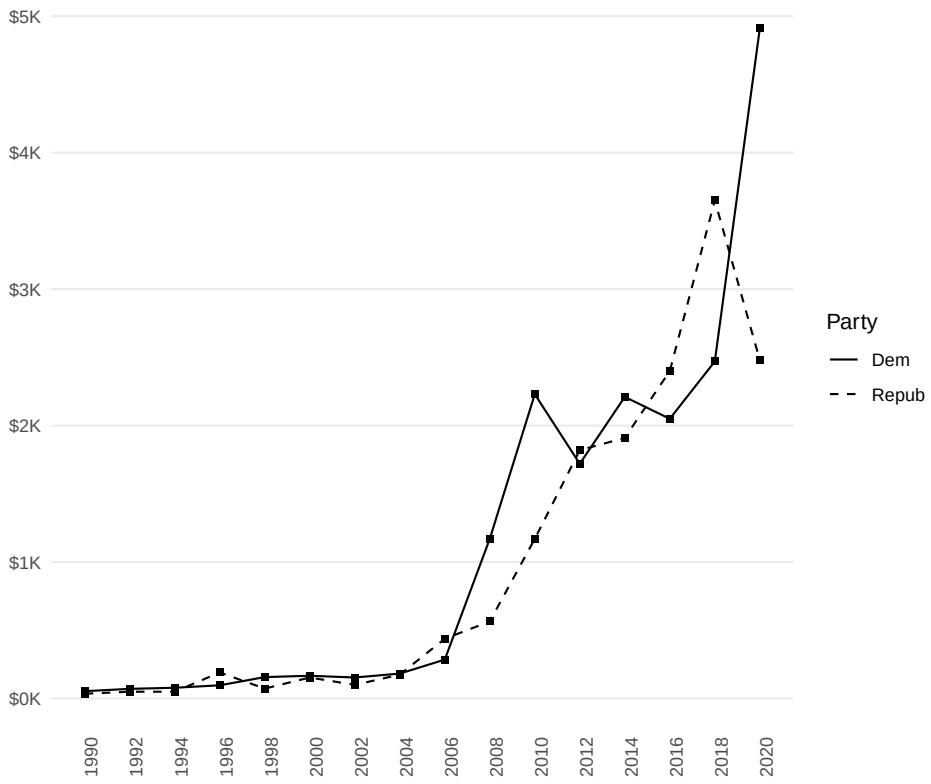


Figure 1.2: **Renewable Energy Industry Annual Campaign Contributions.** Annual campaign contributions by renewable energy groups to House campaigns do not show a clear correlation with political party. Data are drawn from OpenSecrets.org, 2020.

forms. Figure 1.2 displays renewable energy contributions to House races and shows that they target both parties' candidates relatively equally (OpenSecrets, 2023*a*). The groups should care little for political ideology and support any candidate who expresses support for a favorable business environment.[2] Both parties, therefore, should be supportive of renewable energy interests (Romsdahl, Atkinson and Schultz, 2013). These are businesses that offer jobs to states that support them, often in rural areas, in addition to boosting local tax revenues (ACP, 2011; Stefek, 2012). This power dynamic should put renewable energy lobbies in an advantaged position compared to climate change lobbies as discussed in the next section. Indeed, Figure 1.3 shows high variability in the political ideologies of states with Renewable Portfolio Standards designed to increase the proportion of renewable energy in their electricity markets (DSIRE, 2014). Because of renewable energy's rent-seeking incentives and interest groups' powerful bargaining position, the prediction is that there will be higher levels of bipartisan support for renewable energy legislation relative to climate change legislation.

1.3.3 Climate Change and Redistributive Politics

Climate change, in contrast to renewable energy, is a redistributive policy area (Rabe, 2004). Referring back to Lowi's typology, redistributive policy is defined as concerning directly-competing groups operating in a zero-sum context. The reduction of greenhouse gas emissions is not free. Effective emissions reduction involves establishing a carbon price that internalizes the cost of greenhouse gas emissions associated with a business activity by assigning a monetary value to each ton emitted, or by outright limiting the amount allowed to be produced (Carley, 2011; Ahluwalia, 2017). Under these laws, producers are forced to invest in costly technological solutions or pay a significant cost in taxes or penalties (Carley, 2009).

[2]It could be argued that the Republican party is more of a pro-business party, and thus rent-seeking interest groups like renewable energy would find more support in the Republican party than in the Democratic party (Romsdahl, Atkinson and Schultz, 2013). While I do not test this directly, I concede that it may be true. If true, however, this would bias the results against my prediction (i.e. it should decrease the level of bipartisanship) and therefore makes this a conservative study.

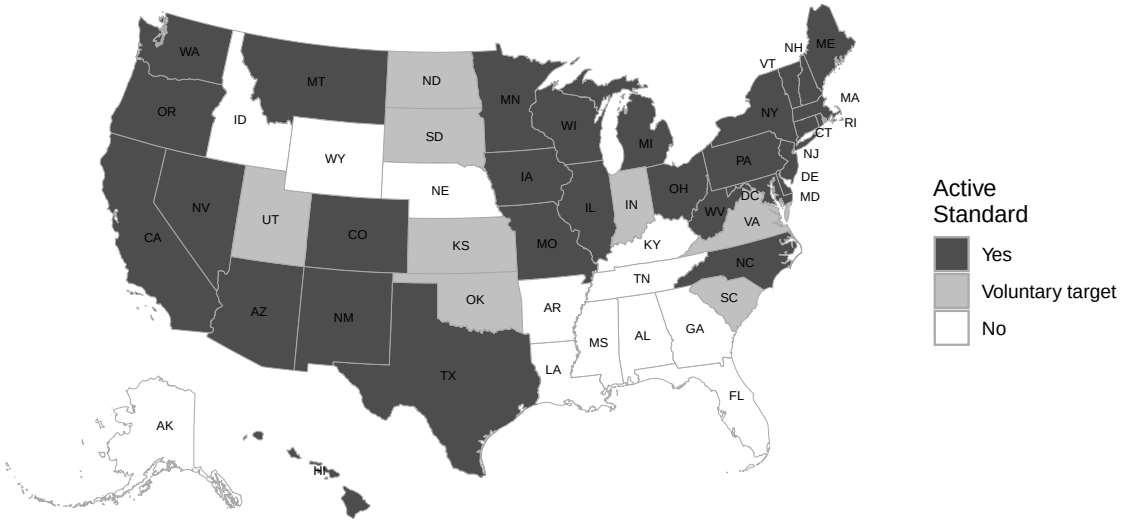


Figure 1.3: **Renewable Energy Portfolio Standards Map.** States with active laws requiring a specified percentage of electricity to come from renewable sources correlate more strongly with renewable electricity potential than with the dominant political party. Data are drawn from the Database of State Incentives for Renewables and Efficiency (DSIRE), 2020.

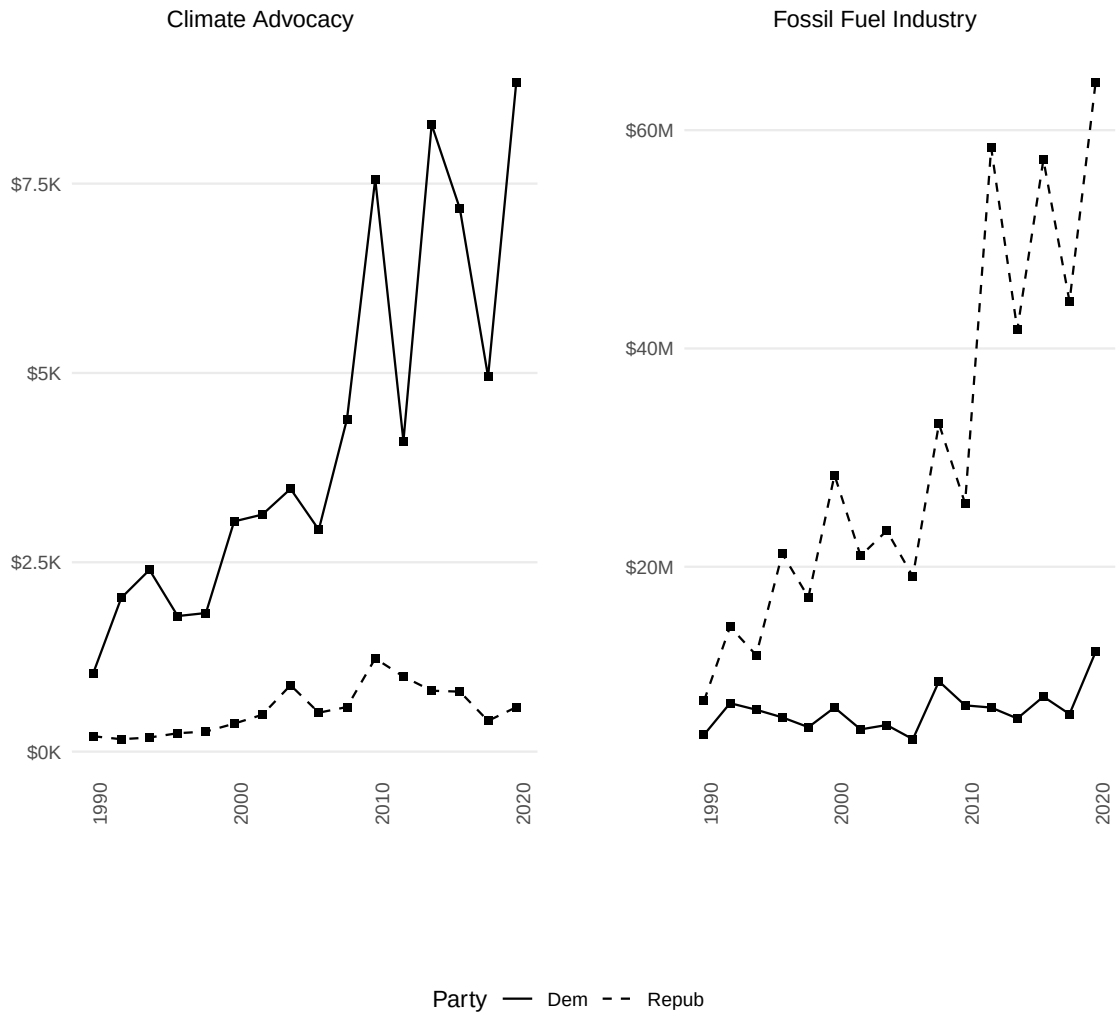


Figure 1.4: **Annual Campaign Contributions by Climate and Fossil Fuel Lobbyists.** Annual campaign contributions by lobbying groups involved in climate policy show a strong correlation with political party. While climate advocacy donations are skewed in favor of Democrats, oil and gas donations are skewed toward Republican candidates. Despite the different scales of contributions, the pattern is clear: on each side of the issue, one party receives the vast proportion. Data are drawn from OpenSecrets.org, 2020.

In the absence of carbon-pricing legislation, the cost of climate change is instead borne by society (Titus, 1992; Farber, 2008; Urry, 2015). Economists calculate the social cost of carbon as the marginal cost of the impacts caused by emitting one extra ton of greenhouse gas at any point in time (Tyagi et al., 2021). In practice, these costs can take the form of losses due to flooding from sea-level rise, heightened severity of tropical storms, increased wildfire occurrence, and water and agricultural damage due to climate changes (Rott, 2023). Climate change advocacy groups like the Citizens Climate Lobby and NextGen Climate attempt to influence legislators to enact policies that transfer the social cost of carbon onto the producers (CCL, 2023; NextGen, 2023). In this zero-sum environment, gains made by one side result in costs to the other (Farber, 2008).

Because climate change groups seek to redistribute costs off of society, those who do not want to bear those costs (e.g. fossil fuel energy producers) will organize against them (Cory, Lerner and Osgood, 2020). This creates two opposing sides with directly-competing political interests (Farber, 2008). The expectation is that these interests align their conflict along partisan lines with climate change advocates attempting to influence Democratic legislators and those in opposition attempting to influence Republicans. Figure 1.4 contrasts the contribution patterns of climate change and conservation PACS with those made by the fossil fuel industry (OpenSecrets, 2023*b*,*c*). On one side of the climate change debate are climate advocates who spend significantly more on Democratic candidates than Republicans. On the other side, the fossil fuel industry follows the opposite trend, donating to Republican candidates over Democratic candidates. This contrast reflects the theorized mechanism that opposing interest groups align themselves on alternate sides of the political aisle when attempting to influence redistributive policy. Though these figures show national contribution efforts, the top three donors in climate advocacy - the League of Conservation Voters,[3] the Sierra Club,[4] and Environment America[5] - and the

[3]League of Conservation Voters. 2023. "Conservation Voter Movement: State Affiliates." https://www.lcv.org/state-affiliates/ (March 1, 2023).

[4]Sierra Club. 2023. "Sierra Club Chapters — Sierra Club." https://www.sierraclub.org/chapters (March 1, 2023).

[5]Environment America. 2023. "About." Environment America. https://environmentamerica.org/about/ (March 1, 2023).

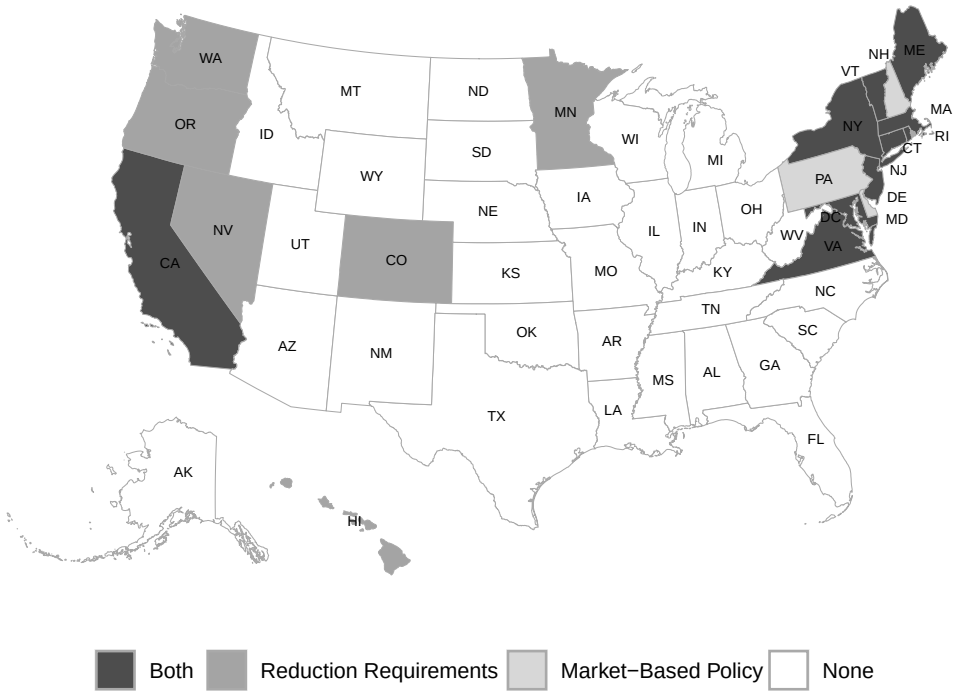


Figure 1.5: **Greenhouse Gas Reduction Policies Map.** Darker colors indicate more restrictive emissions policies. There is a clear correlation between laws to mandate the reduction of GHGs and the dominant political party in the state. Unlike renewable energy laws which are popular across states, GHG-emission laws are concentrated in states dominated by the Democratic party. Data are drawn from the National Conference of State Legislatures (NCSL), 2020.

top three donors in the fossil fuel industry - Koch Industries, Royal Dutch Shell, and Chevron Corp (InfluenceMap, 2016) - all have state branches that attempt to influence state elections. Figure 1.5 shows a map of state greenhouse gas reduction policies and displays a concentration of these policies in Democratically-controlled states (Shields, 2021). The expectation is that there will be higher levels of partisanship and lower levels of bipartisanship in climate change policy because of this partisan alignment of conflict.

1.4 Bipartisanship and Environmental Policy

To test the prediction of higher levels of bipartisanship in renewable energy policy relative to climate change policy, bill cosponsorship coalitions will be tested rather than roll-call votes. Building on Cox and McCubbins (2005)'s cartel theory of parties, majority party leaders use their negative agenda-setting powers to keep bills off the floor agenda which have the potential to divide its members. Roll-call votes are only one measure of partisan conflict, and they do not capture the entire legislative process (Roberts, 2007; Holman and Mahoney, 2018). Negative agenda-setting acts like a screen filtering out legislation not supported by the majority of the majority party (Cox and McCubbins, 2005, 2007; Harbridge, 2015; Highton and Rocca, 2005). The bill cosponsorship coalition - the coalition of legislators who sign their name to bills proposed to committee - is an alternative measure of partisanship that allows us to observe one step back in the legislative process. Imagine, for example, a Republican and a Democratic legislator who are both supportive of (or supported by) renewable energy interest groups in a state. If the Republican legislator authors a bill proposal supportive of the renewable energy industry, the Democrat should have an incentive to join as a co-sponsor to credit-claim to the industry and their constituents. The goal here is to capture legislator behavior beyond just their restricted voting behavior. Harbridge (2015) demonstrates that there are significantly higher levels of bipartisanship in the proposal stage than in the final floor vote stage in Congress. She also provides evidence that legislators commonly reference their bill cosponsorship in their briefs to constituents and campaign materials demonstrating that legislators use co-sponsorship as a way to advertise, position take, and credit claim (Mayhew, 1974; Grimmer, 2013; Harbridge, 2015). Examining partisan patterns at the proposal stage is also advantageous here because it avoids the problem of omnibus bills and allows me to examine the most up-to-date data as many of the bills from 2019-2020 are still pending in the legislature.

1.5 Data

The data for this study were gathered via web scraping from the National Conference of State Legislatures (NCSL) between February and April 2020 and are the most detailed and up-to-date data available. To construct the data, a remote driver searched for and scraped all environmental policy bills proposed in American states between January 2008 and April 2020. These data include the state, year, bill name, bill topic, lead author, cosponsors, the party affiliation of all sponsors, and an executive summary of the bill.

State party variables for the most recent years are not available in machine-readable format, so these variables were also produced by scraping PDF files available for download from the NCSL from the years 2009 to 2020. These scraped data include counts of the numbers of Democratic and Republican members of each state's House and Senate and the party affiliation of the governor. This information was used to construct categorical variables for control of the House and of the Senate (Democratic, Republican) for each state-year, and for which party had control of the legislature and control of the state (Democratic, Republican, Divided). Nebraska was excluded from the data set because its legislators do not serve under party labels. The final data set consists of all renewable energy and climate change bills proposed to committee in the U.S. states[6] between 2008 and 2020 ($n = 12,340$).

The dependent variable of interest is whether the bill received a bipartisan sponsorship coalition (1) or a partisan sponsorship coalition (0). Following Harbridge's measure, I considered a bill bipartisan if at least 20% of its cosigners belonged to the party opposing the lead author of the bill. That is, if a bill was authored by a Democrat, at least 20% of the other signatories must be Republican for the bill to be coded as bipartisan. The Minnesota Democratic-Farmer-Labor Party (DFL) and the Vermont Progressive Party (P) are both affiliated with the Democratic Party and therefore DFL and P members were considered Democrats (Cain and Joseph, 2023; VPP, 2023). Bills authored by independent

[6]Excluding Nebraska and Hawaii. As stated, Nebraska is excluded because its legislators do not serve under party labels. The data for Hawaii was not included in the analysis due to the inability of the remote driver to scrape open-source data from the state.

party members ($n = 116$) were excluded, as were any bills proposed by a bureaucratic institution rather than a partisan legislator. Based on the decision rules outlined here, 7.03% of the bills in the data set have bipartisan sponsoring coalitions.

The primary independent variable of interest is the policy type (renewable energy, climate change). Policy type comes from the bills' topics as labeled by the NCSL. At least two possible measurement errors may be introduced here. The first is accidental mislabeling of bill topics by the NCSL. The second is the possibility that the bill's title and executive summary may be misleading. For example, a bill that seems on the surface to concern "Green Energy for West Virginia" may, in practice, propose the shifting of subsidies toward coal and away from new forms of renewable energy. Case study analyses on a random sample of bills in the data set suggest that the second error type is more common. The random sample did not reveal any obvious mislabeling of topic areas by the NCSL.

An initial look at the data supports the prediction that bipartisanship should be more common in renewable energy policy than in climate change policy. Figure 1.6 displays the percentage of bills which received bipartisan sponsorship conditional on policy type. When aggregating across states, each year of the data contains a greater percentage of bipartisan renewable bills than bipartisan climate bills. This suggests that the results will not be biased by any particular set of outlier years. Similarly, Figure 1.7 aggregates the data by state across all years. Here, the pattern of renewable energy bipartisanship is weaker, but the majority of states in the data have higher levels of bipartisan sponsorship in renewable energy policy than in climate change policy which again suggests that a set of outlier states is not driving the results of this study.

1.6 Results

Table 1.1 presents the main model results. The primary relationship of interest is the effect of policy type on the likelihood of bipartisan sponsorship. As stated previously,

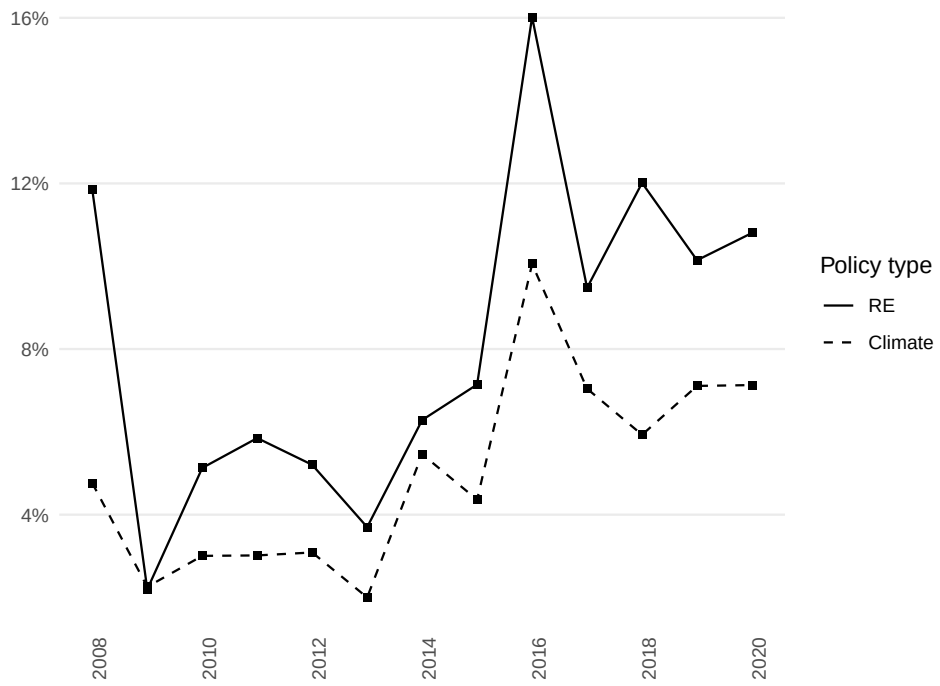


Figure 1.6: **Comparing Rate of Bipartisan Sponsorship by Policy Type.** Lines represent the percentage of bills that received bipartisan sponsorship. Across all years, the percentage of renewable energy bills which were bipartisan-sponsored is greater than that for climate change bills.

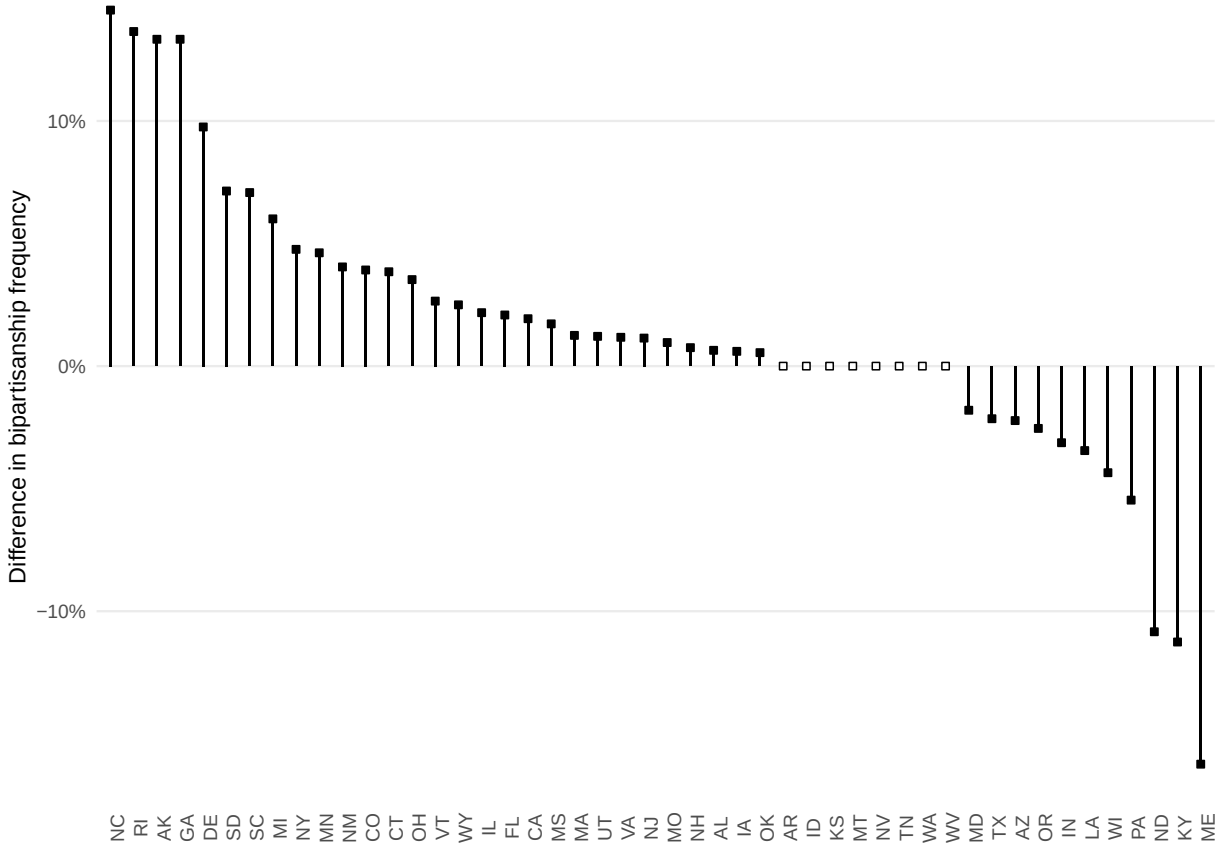


Figure 1.7: **Difference Between Rate of Renewable Energy and Climate Change Bipartisanship by State.** Bars represent the difference between renewable energy bipartisanship and climate change bipartisanship. Values are calculated as $Pr(Bill = Bipartisan|RE) - Pr(Bill = Bipartisan|Climate)$, and positive values therefore indicate more frequent bipartisanship in RE bills. Hollow points represent a difference of zero. 37 out of the 48 states in the data either have greater bipartisanship in RE or no difference when aggregated across the 12 years of data, suggesting that the predicted trend will not be driven solely by a few outlier states.

a bill was coded bipartisan (1) if at least 20% of the bill's cosponsors belong to the party opposing the party of the bill's lead author, and partisan (0) otherwise. The reference category for policy type is climate change, and the coefficients present the change in log-odds of bipartisanship with a move from a climate change bill to a renewable energy bill. The results suggest that, holding state and national variables constant, moving from a climate change bill to a renewable energy bill significantly increases the odds of bipartisanship by a factor ranging from 1.36 to 1.57.

State fixed effects are included in some models to adjust for differences in states' renewable energy potential, natural resource endowment, professionalization of the legislature, and other variables associated with policy innovation and adoption (Squire, 2007; Desmarais, Harden and Boehmke, 2015; Walker, 1969). Year fixed effects are also included in some models to adjust for differences in the frequency of legislature sessions and urgent issues that may periodically overwhelm other legislation (e.g. hurricane relief, a pandemic).

Political variables indicate the party in control of the state's House and Senate, and governorship. Control of the state as a whole and the Ranney Index for degree of competition were included in some models as scholars have found a relationship between the degree of competitiveness in states and the level of polarization (Aldrich and Battista, 2002; Crisp et al., 2004; Key, 1949). The reference category for control of the legislature is 'Divided' and coefficients represent the change in the log-odds of bipartisanship moving from divided to unified control of both houses. The reference category for governor's party is Democratic, and coefficients represent the change in the log-odds of bipartisanship when moving from a Democratic governor to a Republican or Independent one. State Control indicates whether both houses and the governorship are controlled by either the Republican or Democratic party compared to the reference category of 'Divided'. Folded Ranney Index comes from Klarner (2013) and measures the degree of two-party competition in the state in a four-year moving average (Ranney, 1976). It takes into account the proportion of seats won in the state House and Senate elections, the percentage of votes for each

Bipartisan (Was the bill sponsored by a bipartisan coalition?)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Policy type						
Renewable energy	**0.32**	**0.31**	**0.36**	**0.32**	**0.45**	**0.41**
	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)
Control of the legislature						
Dem (leg)		−0.18		**−1.00**		
		(0.10)		(0.17)		
Rep (leg)		−0.10		−0.27		
		(0.12)		(0.16)		
Governor party						
Rep (gov)		**−0.16**		−0.06		
		(0.08)		(0.10)		
Ind (gov)		0.32		0.19		
		(0.38)		(0.43)		
State Control						
Dem (state)			0.01		0.07	
			(0.08)		(0.10)	
Rep (state)			**−0.39**		−0.10	
			(0.11)		(0.18)	
Fold Ranney Index			**1.80**		**1.99**	
			(0.47)		(0.48)	
Lead author party						
Rep			**0.52**	**0.66**	**0.50**	**0.66**
			(0.08)	(0.08)	(0.11)	(0.08)
Rep : Dem State					0.10	
					(0.17)	
Rep : Rep State					−0.35	
					(0.23)	
President						
Trump			**0.58**	**0.63**		
			(0.07)	(0.08)		
State fixed effects	**No**	**No**	**No**	**Yes**	**No**	**Yes**
Year fixed effects	**No**	**No**	**No**	**No**	**Yes**	**Yes**
AIC	6264.30	6072.84	5954.58	5282.25	5827.74	5368.72
Num. obs.	12345	12045	12045	12045	12045	12340

Table 1.1: **Explaining Bipartisan Sponsorship in the States.** Presents the main model results. The dependent variable is whether a bill is sponsored by a bipartisan coalition (1) or partisan (0). Coefficients are bold at the 0.05 significance level.

party in the gubernatorial election, and the percentage of the time each party controlled both the governorship and state legislature. Scores range from 0.5 to 1, and higher scores indicate greater competition. The lead author party variables indicate the proposed bill's lead author's affiliation and an interaction effect with the party in control of the state.

Although most effects for partisanship and competitiveness fail to reach statistical significance, they generally suggest that increasing competitiveness is associated with a higher likelihood of bipartisanship. This conforms with other research which finds that intraparty coalitions are more common when legislators represent competitive districts because they face greater electoral risk than legislators who represent safe districts (Harbridge, 2009, 2015). In competitive districts, legislators may need to appeal to a broader range of constituents to win reelection, and they may benefit by establishing a reputation for being independent (Crisp et al., 2004; Harbridge, 2009; Flynn and Harbridge, 2016). Controlling for the degree of competition, and, by proxy, constituent preferences, bipartisanship is still significantly more likely to occur in renewable energy than in climate change. This is consistent with the theory presented here that other incentives around policy type exert an independent influence on the likelihood of bipartisanship.

Finally, an indicator variable for president was included in some models to adjust for the political influence of the president (Neustadt, 1960; Davidson, Kovenock and O'Leary, 1966; Lee, 2008) and is coded as Trump (1) and Obama (0). Holding constant partisan competition variables, bipartisanship in renewable energy legislation was significantly more likely under the Trump administration than under the Obama administration. Research has found that when an issue becomes a presidential initiative, opposition party members are less likely to support it (Lee, 2008). During his administration, Obama had made renewable energy a dominant initiative (House, 2011) which may have decreased Republican incentives for bipartisanship. When Trump took office in 2016 and decisively rescinded the role of the presidency in environmental issues (Krupp, 2017), it may have allowed for greater bipartisanship at the state level. This effect may also help explain the association between lead author's party and the log-odds of renewable energy

bipartisanship. When conditions are held constant with a Democratic governor and a divided legislature, renewable energy bills are significantly more likely to receive bipartisan sponsorship if the lead author is a Republican. As the state's executive, the governor may tend to heighten partisan disagreement similarly to a president, and, under a Democratic governor, Republicans may be less willing to cosponsor a bill with a Democratic lead author (Gross, 1983; Lee, 2008).

1.7 Discussion

The results of this study are consistent with the prediction that policy type exercises an independent role in patterns of partisan conflict, even within a single issue area. After adjusting for state- and year-level variables, bipartisan bill cosponsorship is still significantly more likely in renewable energy policy than in climate change policy.

I have theorized that renewable energy is dominated by rent-seeking interest groups that attempt to exert influence on both political parties, whereas climate change is divided between advocates who want carbon producers to pay and carbon producers who do not want to pay. However, the results presented here are only correlational, not causal. There may be alternate mechanisms that explain the results of this study. For example, bipartisanship may be higher in renewable energy, not because of interest group alignment, but only because of ideological agreement on the issue. Political psychology scholars find evidence that conservatives tend to value individual and market freedom while liberals value equality and social justice (Schwartz, 1992; Gastil et al., 2011; Meyer, 2010; Domhoff, 2003) which may suggest an alignment of values on renewable energy. Similarly, despite findings that policy outcomes are often not congruent with constituent preferences (Lax and Phillips, 2012), the results presented here could be caused by bipartisan support for renewable energy among constituents.

To disentangle whether the mechanism is preferences and not interest groups may be difficult. I have argued that interest and advocacy group coalitions shape party

platforms, and a growing body of research suggests that voters' opinions are shaped to a higher degree by their partisan identification than by a consistent individual ideology (see, for example, Barber and Pope (2019)). However, future research may attempt to establish a causal link by identifying state cases where bipartisan public support for renewable energy is high but interest group involvement is low. Other future directions of research may include the role of the media in environmental policy outcomes as well as the role of citizen demonstrations. In particular, protests calling for greater action on climate change have become increasingly common among student populations (Doyne, 2019; Nadeem, 2021). It may be valuable to study whether student protests have an effect on environmental policy outcomes and whether this effect is different than demonstrations by voting-age citizens.

The primary research challenge to further study of these policy proposals would be in assessing the significance and intended impact of the proposals. As noted previously, the would-be impact of a bill is not always clear and may even be intentionally misleading. A future measurement strategy may utilize media publications by interest and advocacy groups with known preferences and analyze their language in reporting about the proposed bill to measure its sentiment. Ohio House Bill 6 (2019), for example, actually intended to dramatically *reduce* Ohio's support for renewable energy and shift subsidies toward older coal and nuclear production sites. However, the bill's official summary is: "Facilitates and continues the development, production, and use of electricity from nuclear, coal, and renewable energy resources in this state, modifies the existing mandates for renewable energy and energy efficiency savings," and its title is "Renewable Energy Resources." From this information, it is impossible to assess the true direction of impact of an intended bill. In contrast, the American Wind Energy Association, almost immediately after the bill's proposal, issued a public statement to Ohio Governor Mike DeWine urging him to oppose the bill. Although resource-intensive, this research direction could make room for future questions about how variation in the intended impact and expected significance of policy proposals interact to influence bipartisanship.

1.8 Conclusion

This study has demonstrated observational evidence that is consistent with the theory that elite polarization is not only dependent on electoral competition and party institutions, but that it is dependent on the type of policy proposed, even within a single issue area. That policy type is a strong predictor of bipartisan sponsorship even after controlling for partisan variables demonstrates the importance of considering more nuanced measures of partisan conflict. In particular, the theory presented here suggests that attention should be paid to variation in the goals and incentives of organized groups brought about by different types of policies. I contrast policy types within the environmental arena, but one could imagine similar mechanisms applying to other areas of rent-seeking policy (e.g. agricultural subsidies, tariffs) or redistribution-seeking policy (e.g. affirmative action, minimum wage). Finally, observers of environmental politics may take the results of this study as evidence that the future of state environmental policy rests with renewable energy, but what is the normative implication of this finding considering that, of the two policy types studied, carbon pricing is the only one shown to actively reduce greenhouse gas emissions? The evidence suggesting that bipartisan coalitions are more easily formed in distributive policy areas than in redistributive ones should perhaps reiterate enduring questions about whose preferences in best represented in state democracies.

Chapter 2: Measuring Influence in Constituent Communication

2.1 Introduction

Since the institutional reforms of the 1970s shifted power away from the long-standing committee structure of the House, political scientists have been concerned with uncovering centers of influence within American political parties. While some scholars argue that party influence plays a minor role next to the ambitions and preferences of the individual legislators (Mayhew, 1991; Krehbiel, 1993), others argue that legislators are often willing to delegate power to their party leaders in order to address their collective action problems (Rohde, 1991; Aldrich, 1995; Cox and McCubbins, 1993). Other work focuses on the role of ideology and whether moderate members (Krehbiel, 1998) or extreme members (Homan and Lantis, 2019; Blum, 2020) wield influence, while still others focus on the influence of senior or specialized members (Matthews and Stimson, 1975; Box-Steffensmeier, Ryan and Sokhey, 2015).

The scholarly debate over the centers of legislative influence, however, has largely failed to extend to congressional behaviors outside of the formal legislative process. Constituent communication has long been considered an individual behavior crafted to each member's home style, not one subjected to party influence (Mayhew, 1974; Fenno, 1978). However, constituents receive both individual representation from their legislator and collective representation from their member's party as a whole (Grimmer, 2013).

In an era of competitive, nationalized party politics (Abramowitz and Webster, 2016; Hopkins, 2018), the collective message is just as critical, if not more so, to electoral results than a single member's messaging (Grimmer, 2013). Because of the importance of a party's collective message to electoral results (Lee, 2016), party leaders, factions, and individual members all use their speech as a form of influence in the party (Green, 2015; Blum, 2020; Clarke, 2020). Significant attention is devoted to influencing the electoral brand through communication with constituents (Evans and Oleszek, 2001; Sellers, 2009; Grimmer, 2013; Lee, 2016). Despite this importance both to members and to parties as a whole, and despite a large body of work examining elite peer influence in voting behavior, little research has been conducted on the role of copartisan influence in constituent communication behaviors.

Studying influence in constituent communication is a challenge for political scientists, in part because communication does not lend itself to data structures that can be easily used to test traditional hypotheses. Lack of easy-to-use data results in unanswered questions about centers of influence within copartisans' communication behaviors. This chapter takes advantage of scholarly and computing advances in network science and text analysis to conceive of member communication as a network through which topics of communication may diffuse through a party. Its primary contribution is the development of a novel methodology and resultant data set of influence scores. The development of these data have consequences for our understanding of parties. They allow political scientists to test new theories of influence in communication, and they allow us to refine the scope of our current theories of party power. Furthermore, aggregate party brands shape how voters perceive parties (Grimmer, 2013; Lee, 2016; Clarke, 2020), and therefore the legislators who exercise influence over their copartisans' messaging, may consequently play a role in shaping their party's electoral outcomes.

2.2 Measuring Influence in Communication

Legislative scholars use a number of methods and data sources to define and measure influence. There are rich cue-taking and party influence literatures, for example, which study copartisan influence (Kingdon, 1973; Matthews and Stimson, 1975; Box-Steffensmeier, Arnold and Zorn, 1997; Masket, 2008; Minozzi and Volden, 2013; Box-Steffensmeier, Ryan and Sokhey, 2015; Minozzi and Caldeira, 2021). Indisputably, the most common sources of data for testing influence within a party are derived from roll-call votes (Rosenthal, 2017). Studies employing roll-call votes include both foundational cue-taking studies (Kingdon, 1973; Matthews and Stimson, 1975) as well as modern cue-taking research (Masket, 2008; Box-Steffensmeier, Ryan and Sokhey, 2015) and sophisticated spatial models of influence (Poole and Rosenthal, 1997; Snyder and Groseclose, 2000; Lebo, McGlynn and Koger, 2007; Minozzi and Volden, 2013; Hershberger, Minozzi and Volden, 2018). Similarly, researchers have studied influence using the timing of floor votes (Box-Steffensmeier, Arnold and Zorn, 1997), bill passage (Box-Steffensmeier, Christenson and Craig, 2019), and bill cosponsorship (Zelizer, 2019). Evidence of party leader influence over the legislative agenda is commonly measured as the frequency of floor votes that propose to move policy toward the majority of party members' preferences (Cox and McCubbins, 2005; Curry and Lee, 2020).

While advances made by congressional scholars have been significant, clear limitations exist in the literature. Studies of party influence have focused almost exclusively on (a) the formal legislative process and (b) within that domain, predominately on roll-call votes. Communication with constituents is a key behavior of legislators (Mayhew, 1974; Fenno, 1978), and communication significantly influences how constituents view and assess their representatives' performance (Grimmer, 2013). Every member of Congress invests substantial energy and resources into their communication (Grimmer, 2013; Curry and Lee, 2020), and they attempt to win policy debates and shape public opinion through their communications (Evans and Oleszek, 2001; Sellers, 2009; Schaffner and Sellers, 2010).

Despite the importance both for legislators and for the public, we have yet to develop sources of data that allow for testing theories of influence in constituent communication.

Rectifying this data gap is especially urgent because voting behavior in the most recent Congresses now contains less information than in past decades. Due to negative agenda-setting, message votes, and the prevalence of omnibus bills, several scholars have argued that the "real action" is no longer in voting (Harbridge, 2015; Lee, 2016, 2018). Decisions around the party agenda are frequently made behind closed doors, bypassing formal processes that may have in the past produced data for political scientists (Sinclair, 2016). Parties have become highly centralized, and negative agenda-setting preempts many of the internal divisions that might have been observed in the past.

There is a quickly-growing literature using quantitative methods for the study of communication (Wilkerson and Casas, 2017), but they are primarily interested in explaining trends in text data (Morris, 2001; Grimmer, 2010; Shogan and Glassman, 2016), the effect of individual characteristics on speech (Kalaf-Hughes, 2020), or the effect of speech on non-speech behaviors (Grimmer, Westwood and Messing, 2014). Some congressional research does study the influence of text data on each other. Wilkerson, Smith and Stramp (2015), for example, develop a text reuse methodology for identifying the spread of policy proposals which were rejected but pieces of which ended up in passed legislation. Similarly, Jansa, Hansen and Gray (2019) use cosine similarity to measure language copying in bills. Although important, these studies do not produce member-level data that can be extended to research on internal party dynamics or the role of party influence on messaging. The rest of this chapter develops a methodology to measure legislators by the likelihood that their communication influences future communication by their copartisans.

2.3 A Network Model of Influence

Although it is common for political science research to assume away any interdependence between actors (Cranmer, Desmarais and Menninga, 2012; Cranmer, Desmarais and Morgan, 2020), congressional party members are inherently interdependent. Members depend on social networks for a range of legislative behaviors, including collaboration, policy coordination, coalition building, and information diffusion (Caldeira, Clark and Patterson, 1993; Caldeira and Patterson, 1988; Fowler, 2006*a*; Kirkland, 2011; Minozzi and Caldeira, 2021). Influence, in particular, is a relational concept and implies non-independence among members. Social network analysis (SNA) addresses this problem by treating the relationships between actors as valuable data to be evaluated alongside actors' individual characteristics.

For much of the twentieth century, research in social network analysis was concentrated in sociology, most notably Mark Granovetter's "The Strength of Weak Ties" (1973). However, political scientists have long been interested in social ties between political actors, and several classic works use SNA to study relationships in Congress (Routt, 1938; Patterson, 1959; Caldeira, Clark and Patterson, 1993), as well as to study American public opinion (Berelson, Lazarsfeld and McPhee, 1954; Putnam, Leonardi and Nanetti, 1992).

As a very brief summary, network data are made up of nodes (actors) and ties or edges (relationships). Edges can be undirected or directed, and they can be valued or unvalued. Member A donating \$10,000 to Member B's campaign is an example of a valued, directed tie. Member A and Member B serving on the same committee is an example of an unvalued, undirected tie. Ties between members have been measured using, among others, caucus co-membership (Victor and Ringe, 2009), self-reported connections (Berardo and Scholz, 2010; Larson and Lewis, 2020), and Twitter follows (King, Orlando and Sparks, 2016). Bill cosponsorship data, in particular, have been embraced as a tool to study relationships among legislators (Burkett, 1997; Fowler, 2006*a*,*b*; Gross, 2010; Tam Cho and Fowler, 2010; Kirkland, 2011; Fong, 2020). Modeling relationships using

nodes and ties allows researchers to analyze the structure of the overall network as well as the positions of actors within it.

2.3.1 Diffusion Networks

In contrast to static network models, diffusion networks are a type of temporal network. They seek to examine the flow of an innovation, such as a communication topic, through ties between actors (Gomez-Rodriguez, Leskovec and Krause, 2012). A 2013 study found nearly 800 articles on the diffusion of American public policy alone (Graham, Shipan and Volden, 2013). As is typical in public policy studies, the adoption of an "innovation" is defined here only as a communication topic that is new to a party member in a given Congress. It does not mean that the topic is completely new or that other members have not already published about it. Diffusion networks study only the speed and patterns of adoptions, not their invention (Walker, 1969).

This article does not attempt to prove causality of mechanisms that may lead to communication topic diffusion. However, there are many overlapping reasons a topic may diffuse through a party. Party members seek to minimize costs and maximize benefits when making communication decisions (Cook, 2010). Members of Congress want to be reelected (Mayhew, 1974), and they want to use their communication to promote their reelection (Grimmer, 2010). Costs associated with publishing a topic include time and staff resources as well as political risk both in terms of negative public opinion and drawing the ire of party leaders (Cook, 2010). Potential benefits include positive public opinion, increased name recognition, and political favor from party leaders (Lee, 2016; Butler and Powell, 2014; Green, 2015). Members have limited time, information, and resources to devote to making communication decisions (Cook, 2010). Taking cues from their peers helps to overcome these constraints (Kingdon, 1973; Matthews and Stimson, 1975; Masket, 2008; Box-Steffensmeier, Ryan and Sokhey, 2015). A member's decision to publish on a topic is made easier if many of their copartisans have already published on it because it can be assumed to be less politically risky, and they do not have to exert a lot of extra

energy (Box-Steffensmeier, Arnold and Zorn, 1997). Alternatively, if a member has an ambition to increase their esteem in the party, they may choose to be at the vanguard as one of the first to publish on a topic during a Congress, with the hope that their peers will cue-take their topics from them (Matthews and Stimson, 1975; Caldeira, Clark and Patterson, 1993). Theories about mechanisms and which members are more likely to be influential in the spread of communication topics will be explored further in Chapter 3; however, both chapters make the simplifying assumption that, within a political party in a Congress, the diffusion of topics occurs.

2.3.2 Network Inference

The central network problem to studying influence in constituent communication is that ties between actors are assumed, but they are not directly observed. Party members rarely co-author press releases, and co-appearance at speeches is not a common enough behavior to fully capture the entirety of relationships between members. This project therefore relies on network inference to uncover the most likely latent diffusion network.

The `NetInf` algorithm, developed by Gomez-Rodriguez, Leskovec and Krause (2012) and introduced to political science by Desmarais, Harden and Boehmke (2015), is a method for inferring dynamic ties between actors based on observable data of repeated choice patterns. The algorithm identifies the most likely tree pattern by which a topic, c, cascades through a population. The only evidence we observe about the cascade is that member, i, published topic, c, and time, t, within a given Congress.

In order to estimate the true, latent network structure, G^*, `NetInf` requires the formulation of three joint probabilities; the probability of a single diffusion tie, the probability that multiple diffusion ties compose a specific tree pattern, and the probability that a tree pattern occurs in the network. In order to construct the joint probabilities, we start by defining $P_c(i, j)$ as the probability that communication topic, c spread from member, i, to member, j. We can then define $P(c|T)$ as the likelihood that all of those dyadic tie probabilities compose a given tree pattern, T. Finally, we can define $P(c|G)$

as the probability that a cascade occurs in the network, G. The model then uses these probabilities to estimate the maximum likelihood network, $\hat{G}$.

`NetInf` takes into account repeated choices - in this case, the timing of topic publication - to infer the most likely paths by which those topics cascade through a party. As a very simplified example, let's assume the Speaker of the House always publishes first, regardless of the topic. The party Whip always publishes second, and Chairman always publishes third. The model would likely infer the diffusion tree, $Speaker \rightarrow Whip \rightarrow Chairman$. Of course, sequential adoption of a communication topic, even if repeated across multiple topics, may occur by random chance. The algorithm uses three criteria for determining the probability that Member A is a source for Member B. The first is the number of times A adopts a topic before B. The second is the wait time between A's adoption and B's adoption. Time intervals are assumed to be exponentially distributed, so the algorithm prefers shorter intervals over longer intervals. Finally, precision of prediction is used as a criterion for inferring a tie between two actors, modeled as the probability that an adoption by A predicts an adoption by B. Consider a hypothetical case in which every topic published by the Whip has already been published by the Speaker. We might assume that the Speaker is a source for the Whip. However, what if the Speaker publishes a great deal of topics, and less than half of them are eventually adopted by the Whip? In this case, it would be a false positive due to the sheer volume of early publications by the Speaker, and the `NetInf` algorithm seeks to penalize this.

2.4 Estimating Influence Scores

Structuring communication data as a network graph allows us to draw conclusions about actors' position within that network (Cranmer and Desmarais, 2011; Cranmer, Desmarais and Morgan, 2020). One of the fundamental benefits of network structures is that they allow for the identification of the "most important" or "most influential" actors within a population (French Jr, 1956; Wasserman and Faust, 1994). Eigenvector centrality,

one of the popular measures of influence in a network (Bonacich, 1972; Fowler, 2006*a*; Makse, 2017; Box-Steffensmeier, Christenson and Craig, 2019), is based on the principle that connections to high-scoring nodes should contribute more to the score of the node in question than connections to low-scoring nodes. It is calculated by finding the eigenvector of the adjacency matrix of the network, resulting in a vector whose values are the scores for each node. The higher the score of a node, the more influential the actor is considered to be.

Eigenvector centrality, however, does not take into account the direction of the edges in the graph. In the case of communication diffusion, the direction of the ties indicates a flow of influence or information, and the importance of an actor depends on the direction of the edges connecting it. That is to say, a member with many outgoing diffusion ties is more influential than a member with many incoming diffusion ties, even if both members have a similar number of total connections.

Instead, I use an adjusted form of eigenvector centrality, PageRank, to measure the relative influence of members within their party's communication network. PageRank takes into account the direction of edges in a graph and was originally developed by Google to rank web pages in its search engine results (Brin and Page, 1998, 2012). Like eigenvector centrality, PageRank considers not just how many connections an actor has, but also who they are connected to. In Google's case, it is calculated with *incoming* ties by considering the probability of following a link from one page to another.

In contrast to Google, in topic diffusion, the most influential actors are those with a lot *outgoing* ties to other influential members. Therefore, I modify PageRank to calculate a node's influence based on its outgoing ties rather than incoming ties. $Member_i$'s PageRank influence in their party's communication network is thus defined as:

$$PR_i = \frac{1-d}{N} + \sum_{j \in B_i} d \frac{PR_j}{L_j}$$

where PR_i is the PageRank of the source node, PR_j is the PageRank of the destination

node, L_j is the destination node's number of outgoing links, and d is a damping parameter.

The formula can be read as, for each copartisan that $Member_i$ has an outgoing link with ($j \in B$), take that member's PageRank (PR_j) and divide it by their number of outgoing links (L_j). Then, to account for the probability that an idea could "die out" or be forgotten before it reaches a new node in the network, multiply by a damping factor, d. A damping factor of 0.85 is used, conforming with the majority of PageRank applications. Adding this resistance to the spread of a topic through the network helps the PageRank metric to more accurately reflect the true importance of a member. Then, sum this quantity over every member that $Member_i$ has a tie with. Finally, we add a small quantity to normalize the scores and to ensure that even a member with no influence at all still has a score in the form,

$$\frac{1-d}{N} = \frac{1-0.85}{N} = \frac{0.15}{N}$$

where d is the damping factor and N is the number of nodes in the network.

2.5 Data

The communication data used to estimate influence scores consist of all press releases published by House members during the 113th through 116th Congresses (2013-2020). This period covers the second term of the Obama administration and the entire single-term Trump administration. The data come from the ProPublica Congress data store and were converted from a nested to a flat-file format so that each observation consists of a member ID, the date of publication, the title of the press release, and the body of the document. The final data set consists of 395,770 press releases published by 630 unique members.

Press releases were chosen over alternate sources of constituent communication data for theoretical and methodological reasons. Press releases are one of the oldest ongoing forms of communication by members to their constituents (Grimmer, 2010). They

are written for a broad audience that consumes local media (Goodman et al., 2015) and are used to demonstrate a legislator's priorities and accomplishments to constituents (Grimmer, 2010; Lee, 2016). Press releases are published regularly by all House offices, with an average of 1.6 per member per week and 64 per day by the party as a whole during the 113th-116th Congresses. Press releases are used by news outlets, in particular local media with limited budgets, to report on the activities of representatives (Grimmer, 2010). Studies have found that more than half of local media's coverage of representatives comes from press releases, sometimes even copying the text of press releases verbatim (Grimmer, 2010; Bennett, 2016). They are therefore an important mechanism by which legislators communicate to their constituents and are representational evidence for the information that constituents receive (Grimmer, 2010).

Social media posts and one-minute floor speeches were also considered as sources of data, but they were ultimately not chosen for this iteration of the project. One-minute speeches have been used by researchers to study issue attention and interparty dynamics (Shogan and Glassman, 2016; Maltzman and Sigelman, 1996; Morris, 2001; Kalaf-Hughes, 2020). They were not chosen for this project primarily because of their unequal use by party members. More junior and more extreme members tend to give one-minute speeches disproportionately more frequently than moderate and senior members (Shogan and Glassman, 2016; Maltzman and Sigelman, 1996; Morris, 2001). Social media, and especially Twitter, has gained popularity over the last decade both as a communication tool for politicians and as a source of data for political scientists (Barberá, 2015; Barberá et al., 2015). Twitter is a powerful tool to assess real-time reactions, but tweets are idiosyncratic and short, often referencing other conversations, making it arduous to identify statement topics. Furthermore, social media have been used for a relatively short period of time which limits their applicability in longitudinal research.

The scope of this project is limited to inferring connections between members based on repeated sequences of press release topic publication. Estimated ties between actors are not assumed to be an indication that Member B directly read Member A's press release

and made the explicit decision to imitate the topic. The diffusion of a topic through a party is spread through a variety of methods including communication strategy meetings, journalists and media, and informal conversations among office staff (Cook, 2010). The publication of a press release topic is assumed only to be one piece of observable evidence of this process.

Future analysis may consider collecting all of these ties and inferring multiplex networks representing the different modes of transmission. I make only the assumption that press releases are one form of observable evidence of the true, multi-relational nature of information diffusion through a party network. Evidence has shown that the topics expressed in press releases are highly correlated with topics expressed in other forms of communication (Grimmer, 2010), suggesting that press releases can be reasonably expected to represent a member's constituent communication behavior.

2.6 Unsupervised Topic Clustering

In order to prepare the data for network inference, the topic being communicated to constituents must be determined. Unsupervised topic models seek to uncover the structure of large data sets that are split into documents. They assume that there exists a latent topic distribution, and they seek to uncover that distribution based on the text, and sometimes the structure, of the observed documents (Wilkerson and Casas, 2017). The most common method for optimizing text is creating document-term matrices in which documents are represented by rows, and columns represent the relative frequencies of terms in each document

I use Structural Topic Models (STMs) to identify the topics of the press releases. STMs are extensions of the popular Latent Dirichlet Allocation model (LDA). Unlike LDA which treats all words in a document equally, regardless of the structure of the document, STM allows researchers to incorporate metadata into its predictions (Roberts, Stewart and Airoldi, 2016). STM takes into account the structure and the length of documents,

and it allows metadata to be incorporated as priors which can improve the interpretability of results and make the topics identified by the model more meaningful (Roberts, Stewart and Tingley, 2019; Roberts, Stewart and Airoldi, 2016).

Topic models were estimated for each party separately which allows parties to discuss differing topics, if relevant. This conforms to the theoretical question at hand as this project seeks to study intraparty dynamics with regard to influence. In all models, *Congress* was included as a prevalence variable to instruct STM to allow the prevalence of topics to vary over time. This is an advantage as it allows time-dependent topics, such as the COVID-19 pandemic, to be identified as a topic despite only appearing in the corpus during the 116th Congress.

To prepare the data for modeling, documents were first filtered to include only English-language documents.[1] Standard text pre-processing steps were then taken including stemming, removing stop words, and removing extremely frequent and infrequent words. Members' names and states were also removed because they do not contribute to the document's topic and they appear frequently in the footer of press releases.

Despite being unsupervised, STMs, like many other unsupervised models, require that the researcher choose the k parameter, or the number of topics. The number of topics can potentially have significant effects on the results of the model (Wilkerson and Casas, 2017). If too few topics are requested, discrete topics may be grouped together. If too many topics are requested, multiple clusters may refer to the same topic, or there may be an excess of nonsensical clusters (Grimmer and Stewart, 2013; Wilkerson and Casas, 2017).

Unlike a supervised topic model, in which it is relatively straightforward to calculate accuracy by predicting on a held-out set of labeled data, there is no gold standard for validating the appropriate number of topics for a given corpus (Grimmer and Stewart, 2013). As opposed to more traditional statistical methods, where validation is typically done by demonstrating several different models and showing that the results are consistent

[1]The vast majority of non-English documents are duplicate press releases translated into Spanish.

(e.g. including different covariates), the focus with topic models is typically on validating a single best model (Wilkerson and Casas, 2017). Common methods include randomly sampling documents and demonstrating that the label fits the content of the document (Wilkerson and Casas, 2017), or demonstrating that topics produced are similar to those identified by human coders (Quinn et al., 2010).

Models ranging from 20 to 75 topic clusters were tested using a gradient descent-like procedure, starting with 10-cluster increments and eventually testing 1-cluster increments. The models were evaluated both manually and with quantitative diagnostics. Details of the selection process appear in Appendix B, along with examples of other model specifications. The final models consist of 30 topics per party. The models were then used to label press releases with one topic per document, which is a reasonable simplifying assumption because press releases are written to draw attention to one particular action by the legislator similar to a short news story (Grimmer, 2010).

2.7 Topic Modeling Results

Tables 2.1 and 2.2 show the 30-cluster topic modeling results for the Republican and Democratic parties, respectively. `FREX` stems are the stemmed words that are both frequent and exclusive to the topic. They are used to distinguish and identify topics based on their content. The topic labels were given manually based on the `FREX` stems. The validity of the manual labels was checked by reading a random sample of press releases from each topic. Topics in gray represent those that may not be considered politically relevant to intraparty dynamics and therefore may have different patterns of influence. Influence scores were calculated by including all 30 topics. As discussed further in the following section, networks were also inferred using only politically relevant topics, and there was very high correlation between those PageRank scores and those calculated on full networks.

Topics were modeled separately for each party to conform with research questions

FREX stems	Topic
water; project; infrastructur; fund; transport; state; million; region; lake; airport	Infrastructure
state; iran; unit; presid; u.; terrorist; israel; attack; terror; nuclear	Iran nuclear
trade; agricultur; farmer; farm; u.; produc; food; agreement; state; market	Agriculture
feder; act; requir; govern; agenc; h.r; state; use; process; regul	Govt agency
militari; defens; nation; forc; air; secur; author; includ; fund; base	Defense
veteran; care; servic; affair; health; mental; provid; benefit; receiv; medic	Veterans' affairs
land; nation; forest; manag; park; state; conserv; public; area; natur	Public lands
secur; border; immigr; illeg; homeland; nation; countri; u.; american; state	Immigration
communiti; fund; rural; grant; program; opioid; disast; help; drug; assist	Project funding
busi; small; loan; financi; econom; compani; program; communiti; job; manufactur	Small business
law; enforc; polic; offic; safeti; justic; crimin; communiti; state; act	Law and order
academi; school; u.; high; nomin; servic; state; militari; unit; student	Education
energi; research; technolog; develop; nation; innov; new; product; american; gas	Energy
presid; obama; rule; state; court; administr; constitut; law; execut; power	Executive power
educ; school; student; program; colleg; univers; communiti; opportun; help; workforc	Higher edu.
children; traffick; victim; abort; human; life; protect; women; act; child	Human trafficking
hous; vote; pass; congress; fund; senat; govern; presid; budget; legisl	Legislation pass
covid; health; coronavirus; state; pandem; provid; care; test; fund; need	COVID-19
health; care; insur; obamacar; patient; american; medic; plan; cost; medicar	Healthcare
tax; job; american; famili; reform; economi; cut; work; worker; rate	Taxes
investig; impeach; american; democrat; report; elect; general; presid; ir; trump	Trump
right; china; icon; freedom; human; religi; govern; chines; u.; peopl	China
congression; competit; art; school; high; student; district; year; winner; capitol	Edu. excellence
offic; district; meet; constitu; staff; congressman; visit; event; town; inform	District business
counti; offic; citi; street; pm; st; hour; p.m; 00pm; room	Other
r; legisl; bipartisan; act; said; d; introduc; senat; support; work	Legislation intro
congressman; follow; statement; today; releas; f; t; e; issu; r	Other
said; peopl; get; go; can; one; just; want; like; make	Other
honor; famili; nation; day; american; year; serv; live; war; world	Military honor
hous; committe; member; chairman; hear; subcommitte; work; serv; congress; click	Govt operations

Table 2.1: **Republican Press Release Topics.** Republican press releases clustered into 30 topics. FREX stems are the top stems in each topic cluster that are both frequent and exclusive and are best able to distinguish the topic. Topics in gray represent those that may not be considered politically relevant.

FREX stems	Topic
violenc; gun; victim; sexual; law; prevent; assault; crime; survivor; domest	Violence
presid; trump; administr; investig; statement; elect; american; white; polit; constitut	Trump
educ; student; school; program; colleg; children; child; univers; support; loan	Education
letter; depart; report; request; secretari; concern; administr; agenc; feder; urg	Govt agency
state; u.; unit; secur; war; foreign; iran; nuclear; world; intern	Iran nuclear
vote; right; court; elect; state; rule; census; voter; decis; servic	Voters' rights
safeti; epa; air; airport; health; water; protect; pfas; faa; use	Environment
energi; water; climat; nation; protect; land; clean; environment; chang; natur	Climate
research; nation; technolog; develop; scienc; opioid; diseas; innov; treatment; drug	Drug research
busi; small; food; program; agricultur; rural; farmer; farm; loan; bank	Agriculture
covid; coronavirus; pandem; health; test; provid; can; state; need; care	COVID-19
fund; program; million; grant; feder; provid; billion; will; depart; emerg	Project funding
tax; american; republican; famili; cut; budget; will; year; govern; million	Taxes
health; care; access; afford; medic; patient; provid; servic; coverag; insur	Healthcare
worker; job; work; employ; employe; pay; labor; wage; feder; workforc	Minimum wage
act; legisl; h.r; introduc; protect; pass; bipartisan; law; requir; american	Legislation pass
immigr; border; polic; enforc; children; famili; law; justic; secur; u.	Immigration
inform; consum; compani; data; internet; communic; use; onlin; secur; collect	Consumers
infrastructur; transport; invest; job; project; trade; will; new; u.; econom	Infrastructure
veteran; militari; servic; defens; nation; serv; forc; affair; guard; arm	Defense
american; women; nation; right; honor; equal; year; day; histori; black	Civil rights
will; park; citi; center; street; open; visit; resid; meet; locat	Local politics
peopl; speaker; go; say; want; just; know; think; us; now	Other
offic; constitu; district; staff; contact; assist; chief; angel; los; dc	Other
district; congression; school; high; art; u.; year; hall; academi; will	Edu. excellence
d; r; e; f; u.; t; jr; l; rep; member	Other
work; congressman; will; continu; need; congresswoman; issu; today; congress; can	Other
hous; committe; member; congress; democrat; chairman; vote; subcommitte; repres; hear	Govt operations
communiti; counti; local; servic; citi; hous; will; help; said; develop	District business
said; senat; state; deleg; governor; u.; new; year; sen; news	State politics

Table 2.2: **Democratic Press Release Topics.** Democratic press releases clustered into 30 topics. FREX stems are the top stems in each topic cluster that are both frequent and exclusive and are best able to distinguish the topic. Topics in gray represent those that may not be considered politically relevant.

around intraparty dynamics, but, unsurprisingly, they discuss many similar topics. Figure 2.1 shows these commonalities as well as topics where the parties diverge in their issue attention in constituent communication. Topics including Taxes, Trump, Iran, and Healthcare were popular communication topics for both parties. In contrast, only the Republicans published enough about China and Small Business for those topics to constitute a cluster in a 30-topic model, and Democrats were the only ones who published enough on Civil Rights and Climate for those topics to be included. The figure is split vertically, with Democratic topic shares on the left and Republican topic shares on the right. The bars represent the proportion of attention each party paid to each issue, on average.

2.8 Influence Network and Score Results

Eight networks were inferred in total - one for each Congress and one for each party. Networks were estimated at the Congress level to conform with established legislative score data, such as DW-NOMINATE (Poole and Rosenthal, 1997) and Legislative Effectiveness (Volden and Wiseman, 2014). Networks were estimated at the party level to focus on intraparty dynamics. While party members naturally have external sources of cues (Box-Steffensmeier, Christenson and Craig, 2019), including the opposition (Hughes, 2018), those ideas and information spread through copartisans as well. The `NetInf` algorithm does include a small, non-zero probability that a member's topic adoption was induced only by an exogenous event.

After labeling all press releases published by House members between 2013 and 2020 with their highest-probability topic, the data was transformed into cascades representing the sequential order of topic adoption within each party in each Congress. Then, based on the repeated patterns across all 30 topic cascades, communication diffusion networks were estimated based on the maximum likelihood graph through which ideas and information surrounding constituent communication spread during that Congress. Finally, each

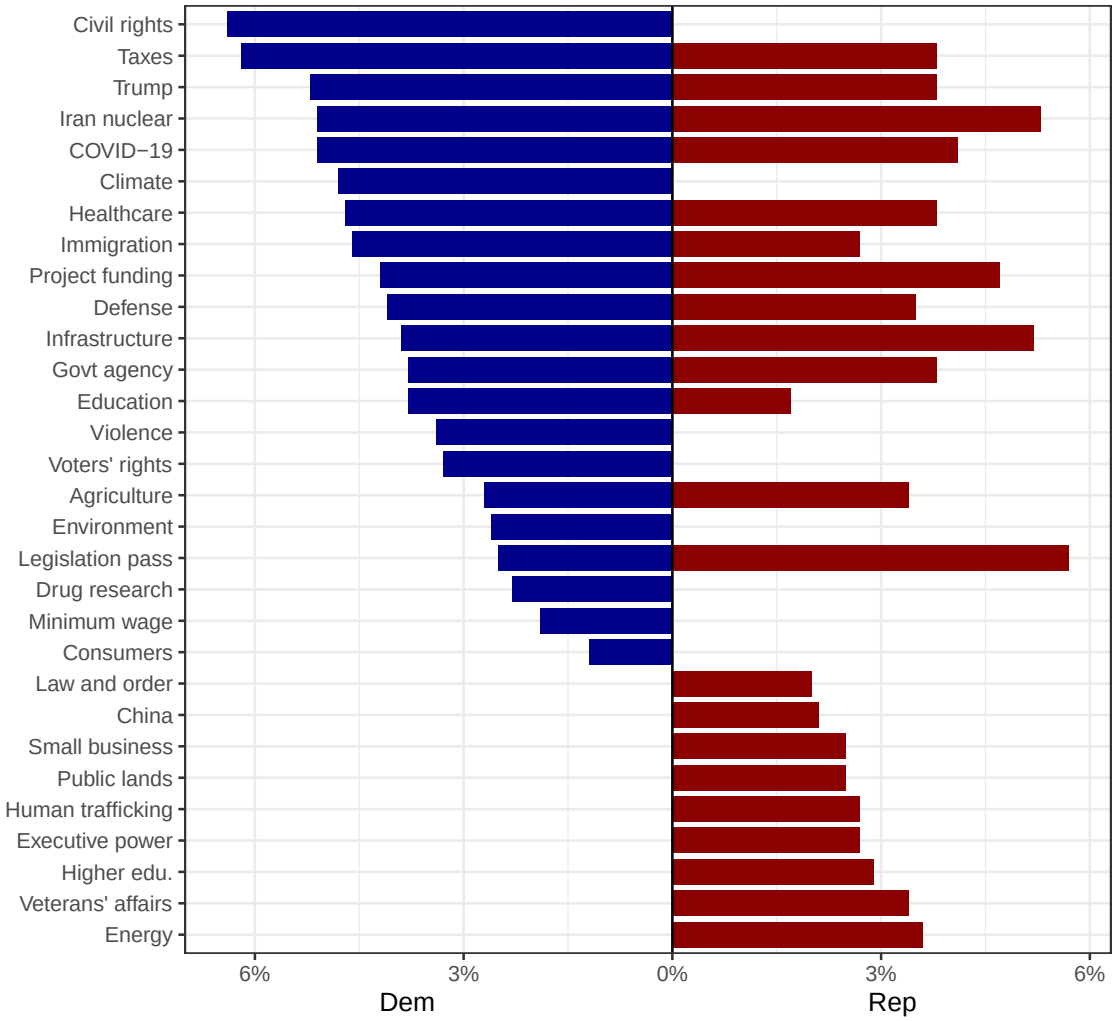


Figure 2.1: **Democrats and Republicans Diverge in Communication Topic Focus.** Displays the divergence and commonality in the topics Republicans and Democrats publish about most frequently. The x-axis shows the percentage of press releases party members dedicate to each topic, on average. Some topics, such as Civil Rights and Climate, were frequent topics for Democrats but were not discussed by Republicans frequently enough to make up one of their 30 topics. Similarly, issues like Small Business and Human Trafficking were popular among Republicans and not Democrats.

member's relative influence score was calculated according to their position in their party's network. Details of the network inference process appear in Appendix B.

Figure 2.2 displays the distribution of the final influence scores. Influence is measured as a modified version of Google's PageRank which itself is a modification of eigenvector centrality, a measure of importance or influence within a network. Unlike eigenvector centrality, PageRank explicitly takes into account the directionality of ties, and the resulting scores can be interpreted as a member's influence based on their outgoing diffusion ties. PageRank is a measure of relative influence, with all scores in a network summing to 1. As a result, the score distribution is right-skewed, suggesting that a minority of party members are more influential than the majority of their copartisans, within a given Congress. This chapter produces influence scores in their raw form; for hypothesis testing in the following chapter, the scores will be transformed to meet normality assumptions and to increase legibility. Table 2.3 shows a sample of the resulting influence score data set. It displays the most- and least-influential members in each Congress, relative to other members of their party. Although it is only a sample, we can start to get a sense of consistency. Some members repeatedly rank in the top or bottom six members of their party, while others appear only once. We can also see that communication influence may be correlated with other forms of power, with both Speaker Nancy Pelosi and Speaker Paul Ryan appearing in the top ranks, but is not necessarily so. Other members, such as Randy Weber (R-TX) and Pramila Jayapal (D-WA), ranked in the top six of their party as freshmen. These dynamics will be explored further in the following chapter.

While each diffusion network is too large to be visualized in its entirety, Figure 2.3 presents two illustrating portions. The figures visualize the ego networks of the highest and lowest-scoring members in the data set. Ego networks focus on one member of Congress and their connections, or alters. The first graph shows the most influential member in the data, Bruce Westerman (R-AR) during the 114th Congress. We can see that he has a large number of outgoing ties, and that he influences several copartisans who are themselves influential. In contrast, the least influential member, Colin Allred (D-TX) in the 116th

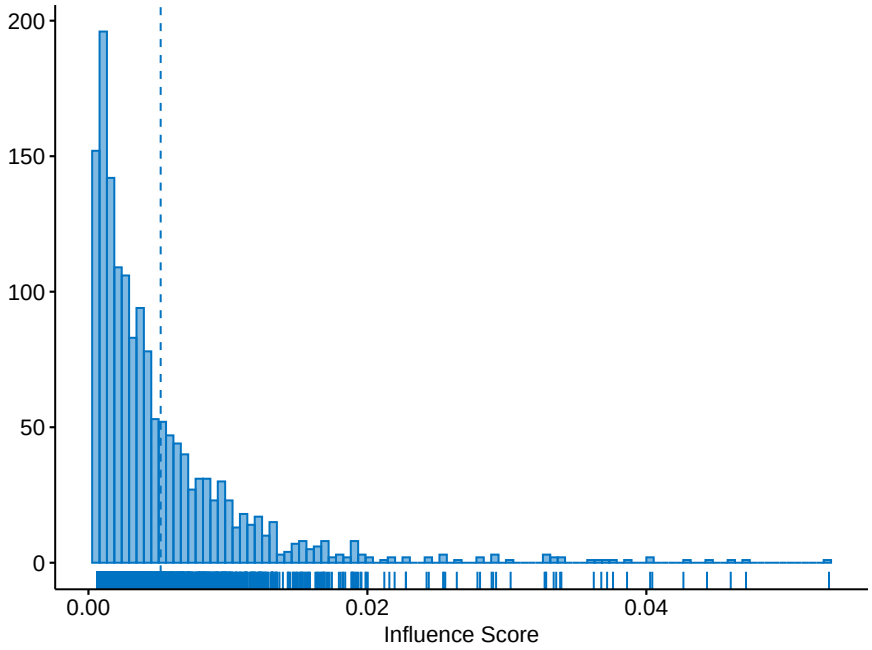


Figure 2.2: **Raw Distribution of PageRank Influence Scores.** Displays the distribution of influence scores, calculated as *outgoing PageRank*, across the entire data set. PageRank scores are limited between 0 and 1 and must sum to 1. Therefore, all scores are significantly below 1 and are distributed with a right skew. This suggests that a minority of party members are more influential than the majority of their copartisans in a given Congress.

Democrats

113th Congress		114th Congress		115th Congress		116th Congress	
Chellie Pingree	0.044	Eleanor Norton	0.037	Ted Lieu	0.0403	Richard Neal	0.047
Maxine Waters	0.037	Steve Cohen	0.034	Carolyn Maloney	0.0386	John Larson	0.034
Tulsi Gabbard	0.036	Ann Kuster	0.030	Steve Cohen	0.0256	Steve Cohen	0.029
John Larson	0.029	Nancy Pelosi	0.028	Pramila Jayapal	0.0216	Marcy Kaptur	0.019
Eric Swalwell	0.023	David Cicilline	0.024	Daniel Kildee	0.0171	Rosa DeLauro	0.019
Peter Welch	0.021	Alcee Hastings	0.023	Henry Cuellar	0.0169	Jackie Speier	0.019
...		...		...		...	
David Scott	0.001	David Scott	0.001	Terri Sewell	0.0008	Katie Porter	0.001
Albio Sires	0.001	Bennie Thompson	0.001	Niki Tsongas	0.0008	Cedric Richmond	0.001
John Tierney	0.001	Mark Takano	0.001	Paul Tonko	0.0008	Mike Thompson	0.001
Niki Tsongas	0.001	Norma Torres	0.001	Filemon Vela	0.0008	Mark Takano	0.001
Peter Visclosky	0.001	Filemon Vela	0.001	Timothy Walz	0.0008	Peter Visclosky	0.001
Debbie Schultz	0.001	Timothy Walz	0.001	John Yarmuth	0.0008	Debbie Schultz	0.001

Republicans

113th Congress		114th Congress		115th Congress		116th Congress	
Lynn Jenkins	0.038	Bruce Westerman	0.053	Paul Ryan	0.043	Mike Johnson	0.046
Randy Weber	0.033	Randy Hultgren	0.040	Lee Zeldin	0.029	David Schweikert	0.034
Tim Walberg	0.033	Bruce Poliquin	0.033	Barbara Comstock	0.020	Rodney Davis	0.033
Charles Dent	0.025	Barbara Comstock	0.024	Bob Goodlatte	0.020	Vern Buchanan	0.028
Michael McCaul	0.020	Daniel Donovan	0.020	Mike Coffman	0.019	Susan Brooks	0.026
Steven Palazzo	0.017	Tom Reed	0.019	Kristi Noem	0.019	Greg Walden	0.025
...		...		...		...	
Austin Scott	0.001	Ann Wagner	0.001	Barry Loudermilk	0.001	Tom Rice	0.001
Patrick Tiberi	0.001	Randy Weber	0.001	Thomas Massie	0.001	John Ratcliffe	0.001
Joe Wilson	0.001	Andy Barr	0.001	Tom Rice	0.001	David Rouzer	0.001
Ann Wagner	0.001	David Trott	0.001	Michael Simpson	0.001	John Rose	0.001
Bill Young	0.001	Robert Wittman	0.001	Patrick Tiberi	0.001	Michael Simpson	0.001
Kevin Yoder	0.001	Rob Woodall	0.001	Roger Williams	0.001	Mac Thornberry	0.001

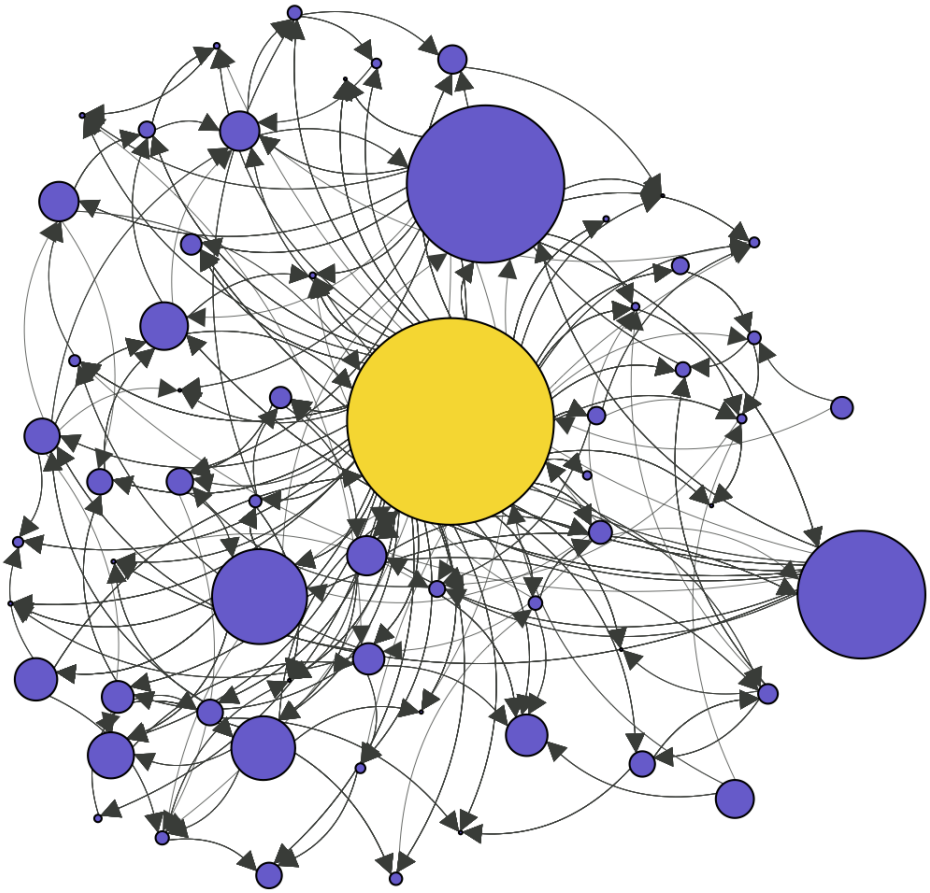
Table 2.3: **Most and Least Influential Members of Congress.** Sample of constituent communication influence score data set. Shows the highest and lowest-scoring House members in each Congress. This sample of influence scores gives insight into the most and least influential members as well as the consistency across years. Some members repeatedly appear at the top or bottom of the ranked list, while others may be less consistent, relative to the other members of their party. All PageRank scores within a party and Congress sum to 1, and so all raw scores are below 1 and rounded to the third decimal place.

Congress, has a very small ego network and all of his ties point in toward him suggesting that he largely receives cues rather than being influential in the diffusion network.

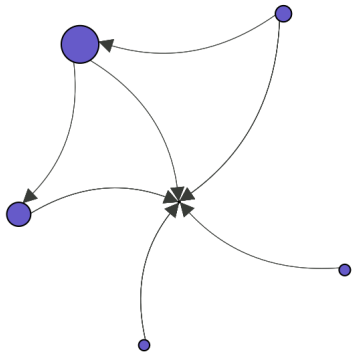
Validity of diffusion assumption

In addition to the theoretical validity described earlier in the chapter, it is necessary to check validity quantitatively. Unfortunately, because the true structure of the underlying network is unobserved, there are no simple quantitative tests available, such as calculating accuracy. However, we can test that things look "right." For example, we can examine the cumulative distribution of copartisans' topic adoption. Repeated studies in a variety of disciplines find that diffusion patterns typically follow an s-shaped cumulative normal curve (Gray, 1973). S-curves are identified by a slow increase in innovation adoption among early adopters, picking up speed as the majority adopts, and finally slowing down again until it is just the laggards who are still adopting. Figure 2.4 shows an illustrative example of the cumulative distribution of a topic, Immigration, during the 115th Congress in the months following President Trump's January 2017 executive order barring entry for citizens of several Muslim-majority countries. While not a perfect s-shape, we can see that the curves for both parties resemble the s-curve commonly theorized by diffusion researchers. Figure 2.5 displays the cumulative distribution of topic adoption across multiple topics for the randomly-selected 113th Congress. Again, while not perfect s-shapes, the distributions all resemble what we would expect if topics diffused through the party, rather than a steep, almost vertical climb to a sum of 1 as we might expect if constituent communication behavior was administrated by party leaders alone.

Another way to test validity is to compare the resulting influence scores to an expected ground truth. Because influence in constituent communication is an under-developed research area, we do not have clear theories for which members we expect to be the most influential. However, as noted previously, both Speakers Nancy Pelosi and Paul Ryan appear as one of their party's most-influential members during their tenures. Speaker John Boehner does not appear in the top-6 during either the 113th and 114th



(a) Most Influential Member



(b) Least Influential Member

Figure 2.3: **Most and Least Influential Ego Networks.** Figure shows the ego networks for the most and least influential House members in the data set. Vertex size corresponds to members' PageRank within the Congress, and ego is highlighted in gold. We can see that the most influential member, Bruce Westerman (R-AR) in the 114th Congress, has a large number of out-ties, and several of the members that he influences are themselves influential members. In contrast, the least influential member, Colin Allred (D-TX) in the 116th Congress, has a very small network, and all ties point in toward him.

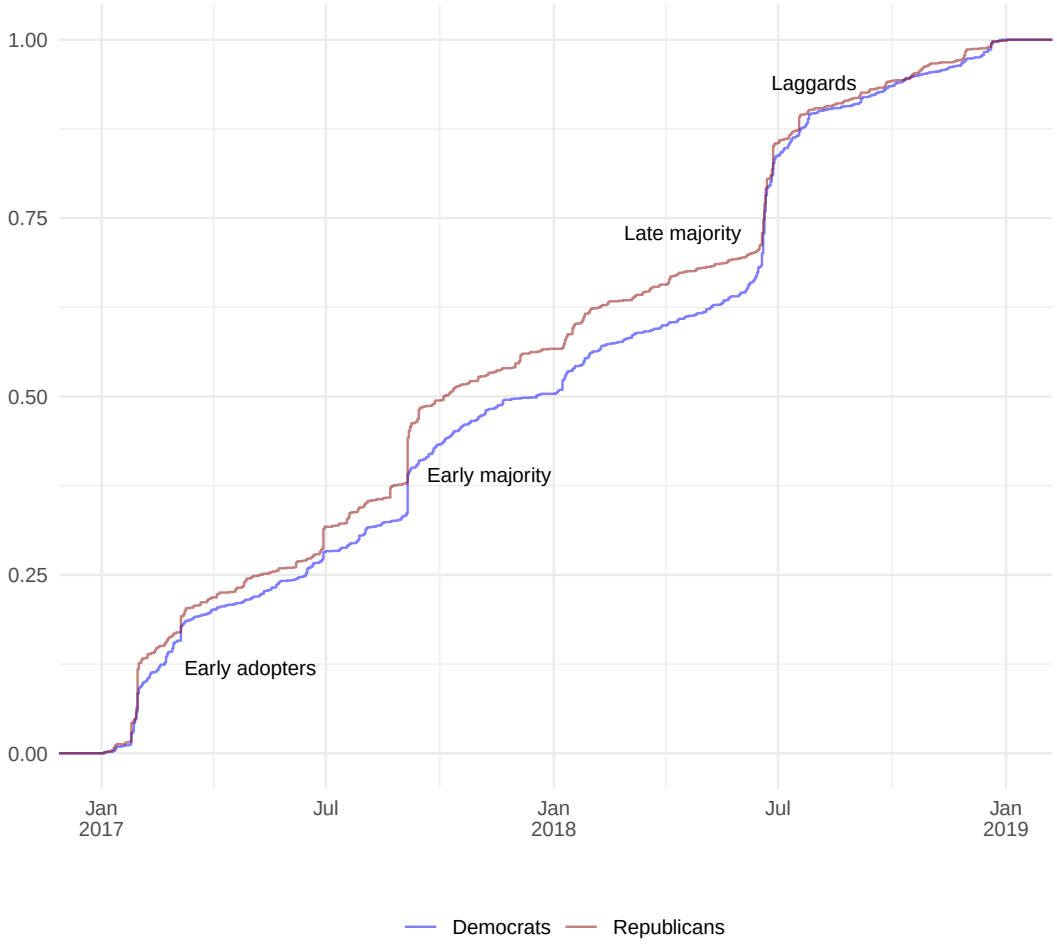
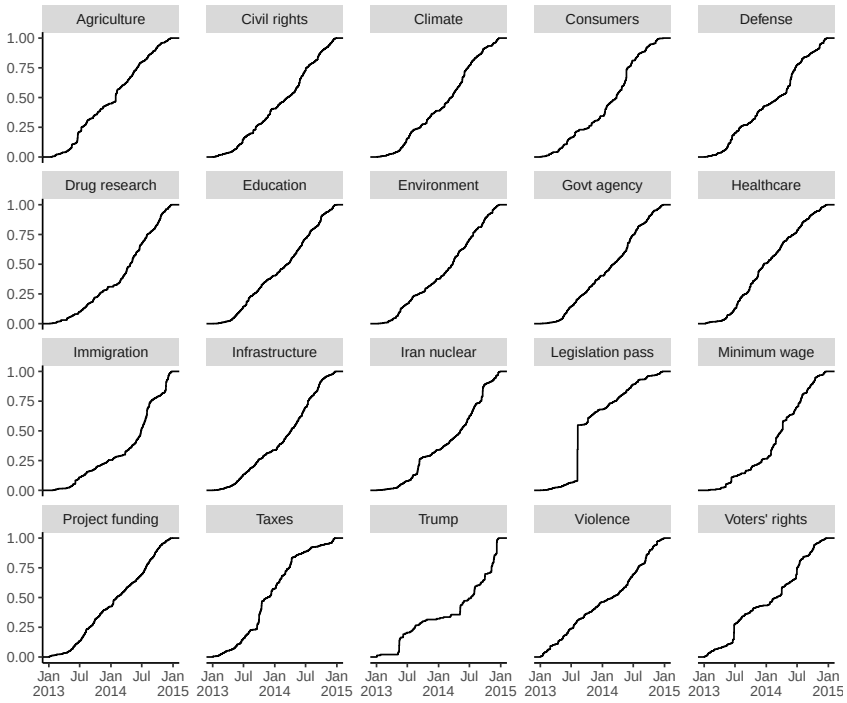
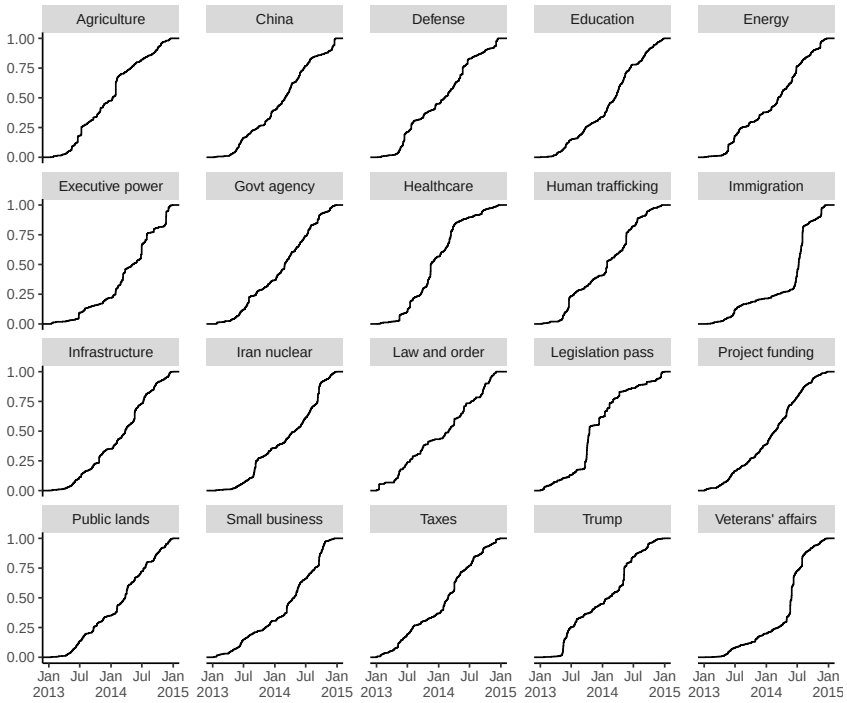


Figure 2.4: **Diffusion S-curves in Immigration Press Releases.** Plots the cumulative distribution in an illustrative example of the diffusion of a topic, Immigration, through the press releases of party members during the 115th Congress. On January 27, 2017, President Trump signed an executive order banning entry for citizens of several Muslim-majority countries which prompted court battles and a national discussion about immigration. The figures above plot the cumulative distribution of members' first publication on the topic. The cumulative distributions resemble the s-curve commonly theorized by diffusion researchers and provide evidence that topic diffusion is likely to occur through a party's constituent communication.



(a) Democrats



(b) Republicans

Figure 2.5: **Cumulative Distributions of All Topics During the 113th Congress.** Illustrates that the s-curve cumulative distribution theorized by diffusion researchers is reflected in the adoption rates of all topics within each party. Figures plot the cumulative distribution of multiple topics during the 113th Congress and suggest that, across topics, members decide to publish over time, rather than all at once as would be expected if press releases were centrally dictated by party leaders.

Congresses. During his tenure, Boehner faced an internal challenge led by Tea Party Caucus members which resulted in his resignation from the Speakership mid-way through the 114th Congress. Accordingly, it is theoretically consistent that other members of his party were relatively more influential in their copartisans' messaging choices. Randy Weber (R-TX) jumped from one of the most influential members in his freshman year in the 113th Congress to one of the least influential in the 114th Congress. Though surprising, this may correlate with his invitation to join the House Freedom Caucus, which, at the time, successfully enforced centralized decision-making procedures.

Because this study only calculates influence scores for four Congresses, and because turnover in the House is relatively high, it is difficult to systematically test correlation of a member's scores year over year. However, of 208 members who served in all four Congresses and were above their party's median influence score in the 113th Congress, 87% of them went on to be above the median in at least one successive Congress, and 27% were above the median in all four Congresses in the data set. This suggests that, while there is variation in terms of influence depending on the Congress and its composition, about a quarter of party members are consistently influential in their party's constituent communication network.

Finally, I tested the stability of the networks to ensure that actor positions are not dependent on idiosyncrasies of the topic clusters. Eight additional networks were inferred using only those topics which were manually identified as politically-salient. This alternate specification left out topics such as Military Honor, Educational Excellence, Local Politics, and the two catch-all nonsensical topics containing stems like, "p.m., 00pm, d, r, u, rep". Figure 2.6 plots the correlation in the resulting influence scores between the scores resulting from full, 30-topic networks and those from the politically-salient topic networks. The scores are highly correlated ($\rho = 0.773$), suggesting that the resulting scores are robust to changes in model specification.

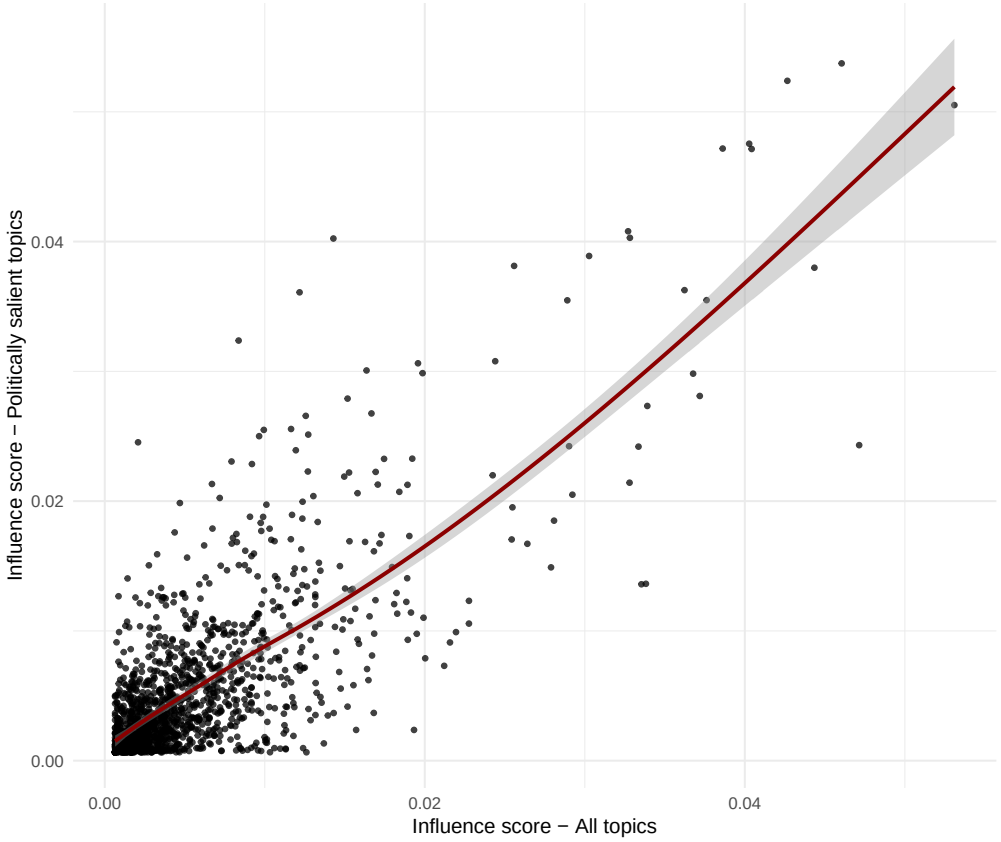


Figure 2.6: **Influence Scores Robust to Network Specification.** Plots the correlation between influence scores calculated using all 30 topics and influence scores calculated using only 21 politically-salient topics. The figure shows that the two sets of influence scores are highly correlated ($\rho = 0.77$), suggesting that the network and resulting scores are robust to changes in the specification of the model. Influence scores are calculated as outgoing *PageRank*, and all scores in a network must sum to 1. Scores are therefore right-skewed and well below 1. When scores are log-transformed, correlation remains relatively high ($\rho = 0.66$). Raw scores are presented in this chapter; the following chapter uses a transformed version for hypothesis testing.

2.9 Discussion

This chapter represents one of the first attempts to systematically measure interdependent peer influence in legislators' constituent communication. The data set developed here allows us to extend our study of influence beyond roll-call votes and to study party influence in constituent communication, addressing a key limitation in our knowledge of party politics. The methodology developed in this chapter is generalizable to other sources of communication and can be extended to analogous research areas involving the diffusion of other forms of political speech.

This chapter has demonstrated that influence scores are robust to changes in the topic cascades specified. It has also shown that influence scores pass an initial intuitive assessment of which members appear among the top-ranked of their party. The primary limitation of this project is the difficulty of validation. As this is one of the first incursions into empirically studying influence in constituent communication, there is a dearth of existing findings to compare the results to. This study is important precisely because we do not know whether communication influence follows similar patterns to roll-call influence; however, this fact also limits our ability to check consistency with other measures.

Political scientists have found that copartisans look to each other to make communication decisions as well as voting decisions. However, there remains a possibility that there is no cue-taking in constituent communication at all, with any repeated behaviors occurring by random chance. It is also possible that there is influence in communication but that press releases do not offer observable evidence of it. Future work should replicate influence sores using alternative communication data such as Twitter posts, one-minute speeches, or newsletters to test the degree to which scores are consistent across data sources.

As with all constituent communication, the choice to not publish on a topic is itself a choice. The network does not capture the diffusion of non-publication, despite the fact that non-publication could be influenced by cues from a copartisan. Though it should be

explored further, the expectation is that those who publish frequently are more influential than those who publish infrequently. In this study, influential decisions to refrain from publication are assumed to be randomly distributed, on average.

Unlike roll-call vote data which offer clear, mutually-exclusive choices, natural language is complicated, and operationalizing it requires some reduction of dimensionality. It is possible that the overarching topic is not where the "real" influence takes place. Chapter 1 finds that policy sub-topics garner divergent partisan behavior. Within a given Congress, it is possible that the topic of Agriculture, for example, refers both to trade protectionism as well as to food safety regulations, and the two sub-topics have different diffusion patterns.

Future work should examine other sources of communication data and consider developing multiplex networks that include multiple data sources in the inference. It might also explore nuances in influence below the topic level by taking press releases from each topic individually and calculating secondary sub-topic clusters and networks. The methodology outlined in this chapter can also be extended to study the diffusion of short phrases or other text features. Finally, future work should consider expanding the scope of these initial networks, adding in the publication of communications by other branches of government, interest groups, and the media. Chapter 3 begins the analysis by exploring contradictions in constituent communication research and testing the degree to which our current theories of party influence can be extended to elite communication.

2.10 Conclusion

In this article, I develop a methodology for measuring influence in constituent communication among elite party members. By extending the concept of influence beyond the formal legislative process and into the realm of communication, I provide a more comprehensive method of understanding how party members exert influence within their respective parties. This approach, which combines topic modeling and network inference,

estimates influence scores for each party member based on their repeated patterns of communication with constituents.

Studying influence in terms of constituent communication is valuable because it allows us to assess the role that individual members play in shaping their copartisans' messaging that ultimately becomes part of the party's collective brand. Modern voting behavior captures less information than it did in previous decades, with omnibus bills, negative agenda-setting, and message votes obscuring the relationship between individual preferences and the party organization. Understanding how individual members contribute to the party's messaging can help us to better understand the party's overall agenda and priorities. Overall, this data set represents an important step forward in the study of political influence and power dynamics within Congress. It provides a valuable tool for researchers, and it allows for more nuanced testing of our understanding of party politics.

Chapter 3: Influence and the Diffusion of Ideas in Constituent Communication

3.1 Introduction

Communication with constituents is a key behavior of legislators (Mayhew, 1974; Lee, 2016). Because potential voters rarely have the time, interest, or resources to closely monitor and interpret members' activities, they rely on elite communication to form their perceptions (Grimmer, 2010, 2013; Lee, 2016). As a result, members of Congress devote substantial time and resources to issuing press releases and giving speeches, and many representatives have staff or full offices dedicated to messaging (Cook, 2010; Malecha and Reagan, 2012). Constituent communication has historically been conceived as an individual activity, with each member cultivating their own *home style* to meet their unique election needs (Mayhew, 1974; Fenno, 1978). While copartisans cue-take from each in other legislative areas (Kingdon, 1973; Matthews and Stimson, 1975; Masket, 2008; Box-Steffensmeier, Ryan and Sokhey, 2015), most scholars tend to think of constituent communication as an independent behavior (Grimmer, 2010; Grimmer, Westwood and Messing, 2014).

Despite this research tradition, however, evidence suggests there are incentives for party leaders to exert influence over their members' messaging (Evans and Oleszek,

2001; Sellers, 2009; Green, 2015). In an era of highly competitive and nationalized parties (Abramowitz and Webster, 2016; Hopkins, 2018), constituent communication is important to the whole party's ability to win or maintain majority control (Lee, 2016). Members are constantly campaigning, not just for their own personal election, but also for the party collectively (Weissberg, 1978; Grimmer, 2013; Lee, 2016). Voters associate statements made by individual members with the party more broadly (Weissberg, 1978; Grimmer, 2013), and unified party messaging has become a top priority for party leaders (Sellers, 2009; Butler and Powell, 2014; Lee, 2016). Contemporary studies of influence within congressional parties almost uniformly point to party and committee leaders as wielding influence over the legislative agenda (Box-Steffensmeier, Ryan and Sokhey, 2015; Minozzi and Volden, 2013). This evidence suggests that party leaders should at least attempt to be influential over the constituent communication of their members.

Beyond the dichotomy between home style communication and party leader influence, conspicuous examples in the modern Congress seem to negate both the theory of top-down party control and the home style theory of independent actions. In 2016, for example, climate change was barely mentioned as an issue in either presidential campaign (Milman, 2016). With the introduction of the 2019 Green New Deal (GND) Resolution however, a small group of Democratic members may have compelled a national conversation on the issue (Lowery, 2022). The freshman House member, Alexandria Ocasio-Cortez (D-NY), in particular, was an active and visible promoter of the resolution (Cordero, 2019). The GND proposal would have called for the government to create a plan for achieving net-zero carbon emissions by 2050 and for the United States to take a leading role in global efforts. Despite the fact that the proposal was only a resolution and would have been non-binding, the 2020 presidential debates included a formal section on climate change with specific references to the Green New Deal (Lybrand, 2020). Speaking to a crowd in New York after Hurricane Ida in 2022, President Biden then echoed key elements of Edward Markey (D-MA) and Ocasio-Cortez's Green New Deal without crediting them, saying his administration would deal with climate change by committing to "net

[zero] emissions by 2050," "move the rest of the world," and "modernize our physical infrastructure" (House, 2021). Either directly or indirectly, a freshman representative's constituent communication may have influenced the party message. This example calls into question both the expectation that constituent communication is an independent exercise (Mayhew, 1974; Fenno, 1978) and the expectation of top-down party influence (Rohde, 1991; Cox and McCubbins, 1993, 2005, 2007).

We have, at the same time, 1) a long tradition of research suggesting the constituent communication is the domain of the individual, 2) a conclusive body of evidence that copartisans cue-take from one another, and 3) a growing body of research about influential party leaders and the importance of unified party messaging. For low-information voters, aggregate party communication serves as a valuable heuristic to make sense of the complex political environment and to make choices about which candidates best match their preferences (Grynaviski, 2010; Druckman, 2001*b*; Snyder and Ting, 2002; Arceneaux, 2006). Party members that have influence over this heuristic therefore have influence over constituents' voting behavior. As political scientists, however, we have contradictory theories about who these influential members are, and we have not been able to test them systematically, in part due to a lack of appropriate data. This chapter makes use of a novel data set of constituent communication influence scores to begin to resolve these competing hypotheses.

3.2 Constituent Communication: The Individual vs. the Collective

Communication is a crucial legislative behavior (Mayhew, 1974). It provides information to constituents, and it influences election results (Grimmer, 2013; Lee, 2016). In the absence of constituents' interest or resources to follow and interpret the Congressional Record, election decisions are heavily influenced by communication (Druckman, 2001*a*; Grynaviski, 2010). Media, especially local media, rely on members' communications to

report on activities in Congress (Grimmer and Stewart, 2013). While each member is responsible to their own constituency for reelection, they are also part of the collective party (Weissberg, 1978). This dichotomy creates contradictory theories of influence in communication decision-making.

3.2.1 The Individual

Constituent communication has long been considered the domain of the individual legislator. Mayhew (1974)'s seminal work theorized that members' communication falls under the categories of credit-claiming, advertising, and position-taking, all for the purpose of individual reelection. The party plays little role in these behaviors. Fenno (1978) studied legislators and concluded that each had a "home style" focused on their unique constituencies rather than on the party's as a whole.

Public statements are one of the few tools that legislators have outside of the formal institution to shape their political brand (Goodman et al., 2015; Grimmer, Westwood and Messing, 2014). Speech becomes an especially important tool when members do not have control of the floor agenda, either because they are in the out-party (Goodman et al., 2015) or because they are a sub-group within their party (DiSalvo, 2009; Dewan and Squintani, 2016; Homan and Lantis, 2019; Blum, 2020; Clarke, 2020). While party leaders may attempt to coordinate public statements, each member has a credible claim to speak on behalf of their agenda priorities (Green, 2015). Several studies of legislative behavior explore variation in public statements between parties, between organized sub-party groups, and between ideologically extreme or moderate members (Grimmer, 2010; Goodman et al., 2015; Grimmer, Westwood and Messing, 2014; Clarke, 2020). These research directions and findings suggest that individual preferences are the primary factor in constituent communication choices.

3.2.2 The Collective

Despite the established body of literature focused on individual communication behaviors, legislators are also members of a party and of Congress as a whole. Constituents, too, are represented both by their member and by the aggregate party, in what Robert Weissberg terms "collective representation," or the aggregated actions and interactions of all members (Weissberg, 1978; Grimmer, 2013). Communication by party members feeds into a party "brand," or what the party's product is and how it differs from alternatives (Clarke, 2020). Because constituents receive collective representation in Congress - both their individual member and the collective party - it matters to voters what a party does in aggregate (Grimmer, 2013).

Intense competition for the majority is changing the role of the party in constituent communication (Lee, 2016). Increases in competition heighten the importance of winning elections (Poole and Rosenthal, 2001; Theriault, 2008; Lee, 2009; Fong, 2020), and a clear party message signals to voters what differentiates their party from the opposition (Lee, 2016; Clarke, 2020). In some cases, a clear party brand is more important than the actual legislation passed (Lee, 2018). Blaming the opposition has also become a common communication tactic, joining Mayhew's three categories and overtaking credit-claiming (Grimmer, Westwood and Messing, 2014; Lee, 2016; Roberts, Stewart and Airoldi, 2016; Curry and Lee, 2020). This inherently party-centered communication tactic is seen in legislators' communications as well as in frequent message bills put on the floor specifically to point out partisan conflict (Lee, 2016; Curry and Lee, 2020). As communication has moved from a peripheral to a central feature of congressional behavior (Malecha and Reagan, 2012), a large share of party resources is now dedicated to efforts to drive partisan messages in the news media (Evans and Oleszek, 2001; Sellers, 2009; Green, 2015; Lee, 2016). Leaders encourage their members to be "on message" when giving speeches on the floor (Harris, 2005). Both parties have organizations dedicated to creating and disseminating "message of the day" information which encourage unity and highlight areas of pride or outrage that members might like to communicate to their constituents

(Green, 2015).

Leaders are responsible for coordinating their unique members and setting the legislative agenda to balance their reelection needs (Battista, 2011; Cox and McCubbins, 2005). This prevents the preferences of extremists from ruining the reelection changes of more moderate members (Grimmer, 2013). The same balancing act takes place in constituent communication (Casas and Wilkerson, 2017). Ideologically extreme party members tend to speak more critically of the opposition, and they are more likely to engage in policy debate (Grimmer, 2013). Because ideologically extreme members are the ones participating in and shaping the public debate, constituents receive information that is biased toward these extreme members (Grimmer, 2013; Goodman et al., 2015). This extremist-biased communication has the potential to hurt the reelection chances of moderates within the party. The collective brand is important enough to parties that majority leaders use their control over procedural rules to prevent votes on bills that would divide their members, thereby protecting their unified brand (Cox and McCubbins, 2005; Lee, 2016). Since the informational and electoral value of a party's brand increases with its homogeneity (Kiewiet and McCubbins, 1991), it is logical that party leaders may attempt to coordinate it.

3.3 Influence and the Diffusion of Ideas

Political parties are inherently interdependent. Ideas, information, and resources spread between members and through the party. Political scientists have long known that copartisans influence each other. A large body of literature finds evidence that members take cues from one another when making voting decisions (Kingdon, 1973; Matthews and Stimson, 1975; Sullivan et al., 1993; Masket, 2008; Box-Steffensmeier, Ryan and Sokhey, 2015) and when choosing which bills to cosponsor (Zelizer, 2019). Members have limited time and resources and are expected to understand and make decisions on a wide range of issues. Taking cues from copartisans helps them to overcome those constraints.

Because the same resource and time constraints exist in constituent communication decisions, copartisan cue-taking is expected to exist in this realm as well. Formulating politically-advantageous communication topics requires time and resources, both of which are limited for members and their staff (Goldschmidt, 2017). Paying attention to communication topics published by copartisans and taking cues from them reduces those costs. Research has found that published statements are often edited at the last minute based on new information received from other party members (Cook, 2010). The benefits of constituent communication are maximized when statements are picked up by local media and disseminated to a wide audience of constituents (Grimmer, 2010; Green, 2015; Lee, 2016). Members therefore have an incentive to emulate press release topics that successfully receive media reporting.

In addition to conserving time and resources, party members can reduce political risk by cue-taking from co-partisans. Publishing a press release commits legislators to their expressed position, and the more legislators who commit to a position, the less likely the move is to be politically risky (Box-Steffensmeier, Arnold and Zorn, 1997). Parties spend a lot of resources developing the party message (Goodman et al., 2015; Green, 2015; Lee, 2016), and leadership puts pressure on members to assist with party messaging efforts (Butler and Powell, 2014). Being "on message" with the party can result in political favor by party leaders who can use their resources to aid individual reelection goals. Alternatively, communication that contradicts the party line risks alienation from party resources but may result in individual benefits (Burke, Kirkland and Slapin, 2020). Members want esteem within their party (Caldeira, Clark and Patterson, 1993; Matthews and Stimson, 1975), and creating and disseminating a dissident message could help them achieve that esteem.

Constituent communication choices are subject to relatively few institutional constraints, and members have the freedom to decide when and on which topics they will publish (Cook, 2010). In contrast to roll-call voting, in which all members reveal their vote within a short period of time, communication outcomes are revealed continuously.

To model influence in constituent communication, the party is conceptualized as a social network through which information and ideas diffuse. Political scientists have always been interested in social ties between political actors, and several classic works use social network analysis to study relationships in Congress (Routt, 1938; Patterson, 1959; Caldeira, Clark and Patterson, 1993). Conceptualizing a political party as a social network allows for the study of the relationships between members alongside their individual characteristics. Using a novel set of influence scores drawn from communication topic diffusion networks, this chapter aims to answer the question of who is the most influential within these networks. Existing literature presents a puzzle, with evidence concurrently suggesting that communication choices are not subject to copartisan influence (Mayhew, 1974; Fenno, 1978), and that party leaders exert influence over their members' speech (Evans and Oleszek, 2001; Sellers, 2009; Harris, 2005; Butler and Powell, 2014; Cox and McCubbins, 2007). Other research has found that extremists tend to wield influence, especially in communication (Grimmer, 2013; Green, 2015; Blum, 2020). The rest of this section outlines these theories and sets up hypotheses.

3.4 Theories and Hypotheses

Strong party theories (Rohde, 1991; Cox and McCubbins, 1993, 2005) suggest that party leaders are the most likely to be important or influential in a communication diffusion network. While party leaders may not have the tools to compel their members to communicate, we know that they serve as cue-givers in other legislative activities (Box-Steffensmeier, Ryan and Sokhey, 2015). They also have the ability to distribute rewards or punishments (Snyder and Groseclose, 2000) which should increase the likelihood that they are influential in the communication behaviors of their copartisans. As one of the primary responsibilities of party leaders is to promote cohesiveness among their members, they have an incentive to be influential (Harris, 2005). In order to influence their party and promote a unified party brand, party leaders have regular meetings to

decide on the party message, and they oversee specialized messaging groups such as the Democratic Message Board and the Republican Theme Team whose job it is to encourage member participation in communication-oriented activities (Green, 2015; Lee, 2016).

Party leader hypothesis: Party leaders should be more influential in their party's constituent communication than rank-and-file members.

The role of seniority in constituent communication influence presents two contradictory hypotheses. On one hand, junior members spend more time than senior members communicating with constituents and building a brand (Dodd, 1977; Fenno, 1978; Hibbing, 1991). Senior members, in comparison, already have an established relationship with constituents and therefore may have more time to devote to other activities (Alford and Hibbing, 1981; Gelman and King, 1990; Cox and Katz, 1996). On the other hand, senior members have more experience, expertise, and staff resources, which should encourage copartisans to look to them for cues (Box-Steffensmeier, Ryan and Sokhey, 2015).

Brand-building hypothesis: Junior members should be more influential than senior members in their party's constituent communication.

Seniority hypothesis: Senior members should be more influential than junior members in their party's constituent communication.

The roles of ideology and extremism also present contradictory hypotheses. Traditionally, moderates are theorized to be the most influential due to their pivotal position near the chamber median (Krehbiel, 1998). If the most moderate members are most at risk for defecting, copartisans may take cues from them so as not to alienate them from the party aggregate.

Ideological moderates hypothesis: Ideologically moderate members should be more influential in the party's communication than ideologically extreme members.

However, other research suggests that extremists may exert excise influence over their party. Because moderates are better positioned to make policy in majoritarian voting decisions, extremists have an incentive to try to wield influence through speech (Shepsle, 1979; DeGregorio, 2010). They therefore tend to be the most vocal members of their party (Maltzman and Sigelman, 1996; Grimmer, 2013). Other research has found that ideologically-extreme factions use communication to try and bring the aggregate party brand closer to their preferences (DiSalvo, 2009; Dewan and Squintani, 2016; Homan and Lantis, 2019; Blum, 2020; Clarke, 2020). Moderate members may also fear a primary challenge from a more ideologically-extreme candidate and therefore choose to emulate the communication topics of extremists in their party in order to co-opt their message and dissuade a challenger.

> *Influential extremists hypothesis:* Ideologically extreme members should be more influential in their party's constituent communication than ideological moderates.

In interviews, party members cite that they take voting cues from members perceived to be knowledgeable about the topic (Kingdon, 1973; Matthews and Stimson, 1975). Committee leaders, in particular, are likely to be perceived as experts (Box-Steffensmeier, Arnold and Zorn, 1997). With constituent communication rather than roll-call votes, successful messages are considered those that are picked up by the media. Therefore, in addition to committee leaders, there may be other members who are perceived by their colleagues as experts in the realm of communication. Those may include members who are productive and effective at advancing legislation (Volden and Wiseman, 2014) as they have a demonstrated ability to persuade their copartisans. Perceived experts may also include faction members as they represent ideological sub-groups in the party and tend to communicate frequently and distinctively compared with their average copartisan (Clarke, 2020; Blum, 2020).

> *Committee leadership hypothesis:* Committee leaders should be among the

most influential in their party's constituent communication.

Finally, if the results are null, and no characteristics significantly predict a party member's influence score, that may be evidence of individualism in constituent communication. In the Mayhew and Fenno tradition, members are single-minded seekers of reelection and are concerned primarily with the constituencies within their district. They therefore may not take cues from copartisans that represent different districts.

3.5 Data and Methodology

One reason political scientists have not outlined clear theories of party influence in constituent communication may be a lack of data appropriate to test hypotheses. This chapter takes advantage of a novel data set of communication influence scores developed in Chapter 2. The data set consists of individual-level influence scores for House members in the 113th-116th Congresses, estimated from networks of press release publications. The full estimation process is detailed in Chapter 2, but the basic methodology is a 2-stage unsupervised estimation pipeline. First, press releases are labeled by their most-likely topic using Structural Topic Models (STM). The data-generating process for these topics is estimated separately by party, and topics are allowed to fluctuate in their prevalence conditional on Congress. This allows the measure to be theoretically consistent with the question of intraparty dynamics and takes into account variation in how topics are discussed over time. Second, a diffusion network is inferred for each party-Congress pair based on repeated patterns of publication sequence among party members. The resultant network is then analyzed to produce influence scores calculated as a modified version of PageRank, for each member-party-Congress. Chapter 2 details why modified PageRank is an appropriate measure of influence in a directed network.

Press releases are one of the many forms of constituent communication used by members. In addition to publishing press releases, legislators publish on social media, send e-newsletters, make television appearances, and give speeches. Press releases, however,

are one of the oldest ongoing forms of communication (Grimmer, 2010). They are issued regularly by all House offices with an average of 1.6 per member in a week and 64 per week for each party as a whole in the 113th-116th Congresses. The topics communicated in press releases are significantly correlated with other forms of speech (Grimmer, 2010) while overcoming issues in other forms of speech including length, uniformity, and idiosyncrasy.

The 113th-116th Congresses (2013-2020) cover two sessions during the Obama administration's second term and the two sessions of the Trump administration. Independent variables for this chapter's analysis come from the ProPublica Congress data store. They include party leadership status, committee leadership status, faction membership, majority party status, ideological extremism (folded DW-NOMINATE), seniority, legislative effectiveness (LES), winning vote percentage in the most recent election, number of bills cosponsored, percentage of party unity votes, race or ethnicity, and gender. Continuous variables were centered and scaled and were log-transformed where appropriate. Descriptive statistics of all data appear in Appendix C.

For this initial analysis, the hypothesized association between member characteristics and their communication influence scores is tested using linear models. Multiple types of models are estimated. Some models include fixed effects for individual members, Congress, or the party. In this analysis, the purpose of fixed effects is not causal inference. The purpose is instead to account for correlation unrelated to other predictors and to compare alternate model specifications. Unobserved variance included in these effects may be the result of, for example, a member's proclivity to discuss constituent communication with colleagues, the contemporary state of technology in each Congress, or the organizational structure of the party.

Other models include random effects to account for time-invariant individual heterogeneity that may explain variation in effects. This includes members' backgrounds, such as a past career in publicity or a fear of public speaking stemming from childhood. Party random effects are not included, as the party's structure, composition, and even conception of itself is time-variant. Congress random effects are not included because this

initial data set only contains four Congresses.

3.6 Results

Figures 3.1 through 3.6 plot coefficient estimates and confidence intervals for the main hypothesized effects across all model specifications. Table 3.1 presents the results of a selection of full models including both parties. Table 3.2 breaks out the relationships by majority party status because it is a significant predictor in every model, and legislative scholars consistently find differing effects conditional on majority party status (Matthews and Stimson, 1975; Volden, Wiseman and Wittmer, 2013; Box-Steffensmeier, Christenson and Craig, 2019).

The dependent variable in all models is a party member's influence score within a party and Congress. Influence is measured as PageRank centrality in a party network. Raw PageRank is constrained between 0 and 1 and all scores in a network sum to 1. The distribution is therefore heavily right-skewed. Scores were first log-transformed to meet the normality assumptions of linear models and were then scaled and centered. Scores are then multiplied by 10 to increase coefficient legibility. Final influence scores in all models are centered on 0 and range from -14 to 34.

The primary independent variables included in all models are party leader, committee leader, faction member, seniority, legislative effectiveness, and extremism. Additional controls included in some models are the member's winning vote percentage in their most-recent election, the number of cosponsored bills, percentage of floor votes with party, race or ethnicity, and gender. The volume of press releases published by the member in each Congress is included in some models separately from controls to account for the inferential difference in explaining influence when holding press release production constant, and explaining influence including productivity.

Figure 3.1 plots the coefficient estimates of the relationship between party leadership and communication influence, across models. On average, party leadership is significantly

associated with a positive effect on influence. This suggests that party members take cues from leaders, not just in voting behavior, but also in communication behavior. The association between influence and party leadership becomes insignificant when controlling for individual fixed or random effects or when controlling for the number of press releases published. This suggests that party leaders may publish at high volumes and are influential because of it, but holding publications constant, that effect goes away. When adding a fixed effect for the individual and comparing members to themselves, the effect of leadership on influence is also insignificant. Although 79% of party leaders changed leadership status in the four observed Congresses, that change in leadership status did not make them more influential. This may suggest that many party leaders are already influential regardless of their official leadership position. However, when looking at the effect of leadership on influence. holding constant only those variables theorized to be important, party leadership has a significantly positive relationship with communication influence.

Figure 3.2 plots the coefficient estimates for the relationship between seniority and influence across multiple models. Regardless of model specification, seniority has a significantly negative association with constituent communication influence. This suggests that junior members are more influential within their party in the realm of communication than are senior members. Junior members have less name recognition in their districts and therefore have a strong incentive to communicate their accomplishments and issue positions to constituents in order to build their reputation. Even when controlling for the number of press releases each member publishes in a given Congress, seniority is still significantly negatively associated with influence, suggesting that the additional experience and staff resources that come with increased seniority do not overwhelm the influence of junior members. Because senior members tend to have more influence over the legislative agenda, junior members, in particular, may rely on constituent communication as a tool to influence their party's brand.

Figure 3.3 tests the conflicting theories of influence between ideological extremists

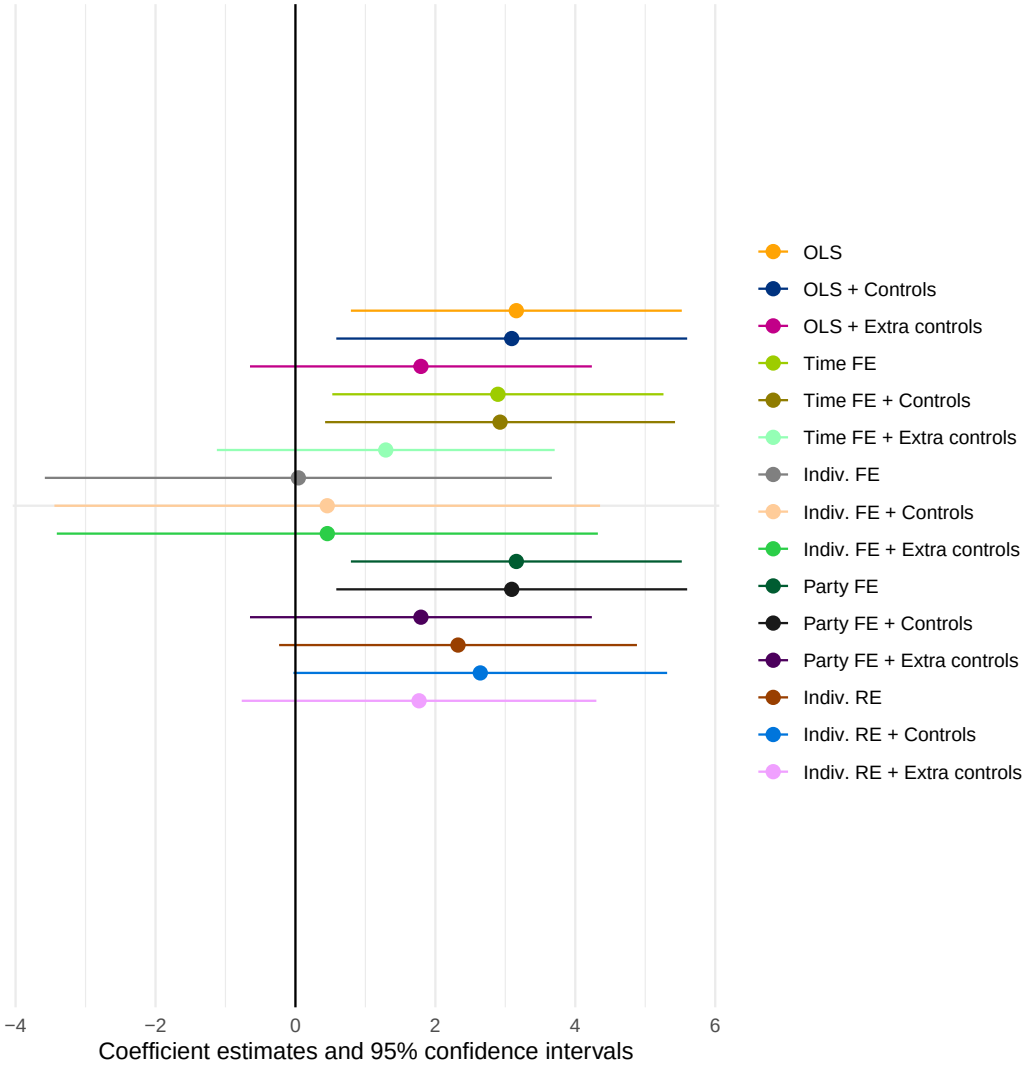


Figure 3.1: **Party Leadership Association With Influence.** Plots the coefficient estimates for the association between party leadership and influence. Influence scores are log-transformed, scaled, and centered. 'Extra controls' indicates that the model includes the number of press releases published by a member in a given Congress. The plot suggests that, in simple models, party leadership has a significantly positive association with communication influence. However, when controlling for individual fixed or random effects, and when controlling for the volume of press releases published, the effect becomes insignificant. This may suggest that party leaders already had high influence in their party's communication regardless of leadership status, or that leaders' influence is due to their high frequency of publication.

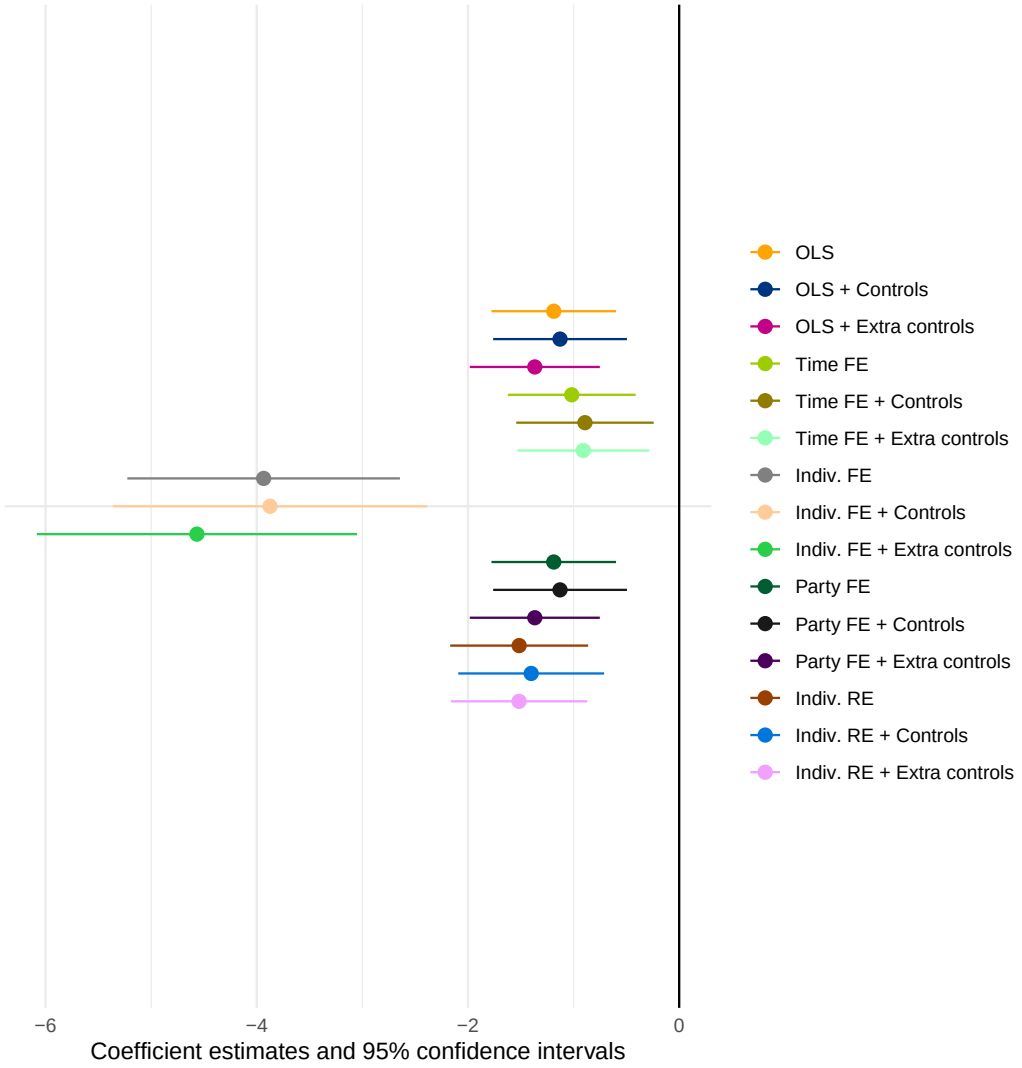


Figure 3.2: **Association Between Seniority and Influence.** Plots coefficient estimates across all models for the relationship between seniority and influence, conditional on included covariates. Both seniority and influence are log-transformed, scaled, and centered. 'Extra controls' indicates that the model includes the number of press releases published by a member in a given Congress. Regardless of model specification, there is a significant negative correlation between seniority and influence, holding covariates constant. This suggests that less-senior members are more influential in their party, even when controlling for their constituent communication productivity.

and moderates. It plots the estimated relationship between ideological extremism (folded DW-NOMINATE) and influence in constituent communication and finds that, on average, extremism has a significantly negative relationship with influence. This suggests a failure to reject the null hypothesis associated with the "influential extremists hypothesis." Because ideologically extreme members are in the minority of their party, they are often unable to influence their party legislatively. As a result, their sources of influence are limited to obstructing legislation or using communication to shape the party's aggregate brand. Despite these findings in other research, the results here suggest that extremists, conditional on party, are less influential than their more moderate copartisans. Members of Congress are more likely to take cues from ideologically-similar members (Fowler, 2006*b*; Fong, 2020), and, by definition, ideologically-extreme members have fewer homophilous colleagues. These results suggest that, on average, moderate members are more likely to be influential among their copartisans.

Figures 3.4 through 3.6 test hypotheses associated with expertise. Extensive research on legislative cue-taking has concluded that members look toward colleagues they consider to have expertise or experience. Figure 3.4 explores the relationship between committee leadership and communication influence and finds that, while failing to reach significance in most model specifications, committee leadership generally has a positive association with influence. Committee leadership has a significantly positive relationship with influence only when controlling for the number of press releases published. This fact may suggest that committee leaders do not publish high volumes of press releases, but, when they do, their communication choices are influential.

Figure 3.5 tests the effects associated with a member's Legislative Effectiveness Score (LES). High-LES scores indicate "a proven ability to advance a member's agenda items through the legislative process and into law" (Volden and Wiseman, 2014). Because these members are likely to be seen as competent by their colleagues in terms of legislative choices, I have hypothesized that they are also seen as competent in terms of constituent communication choices. The results of this analysis suggest evidence in favor of this

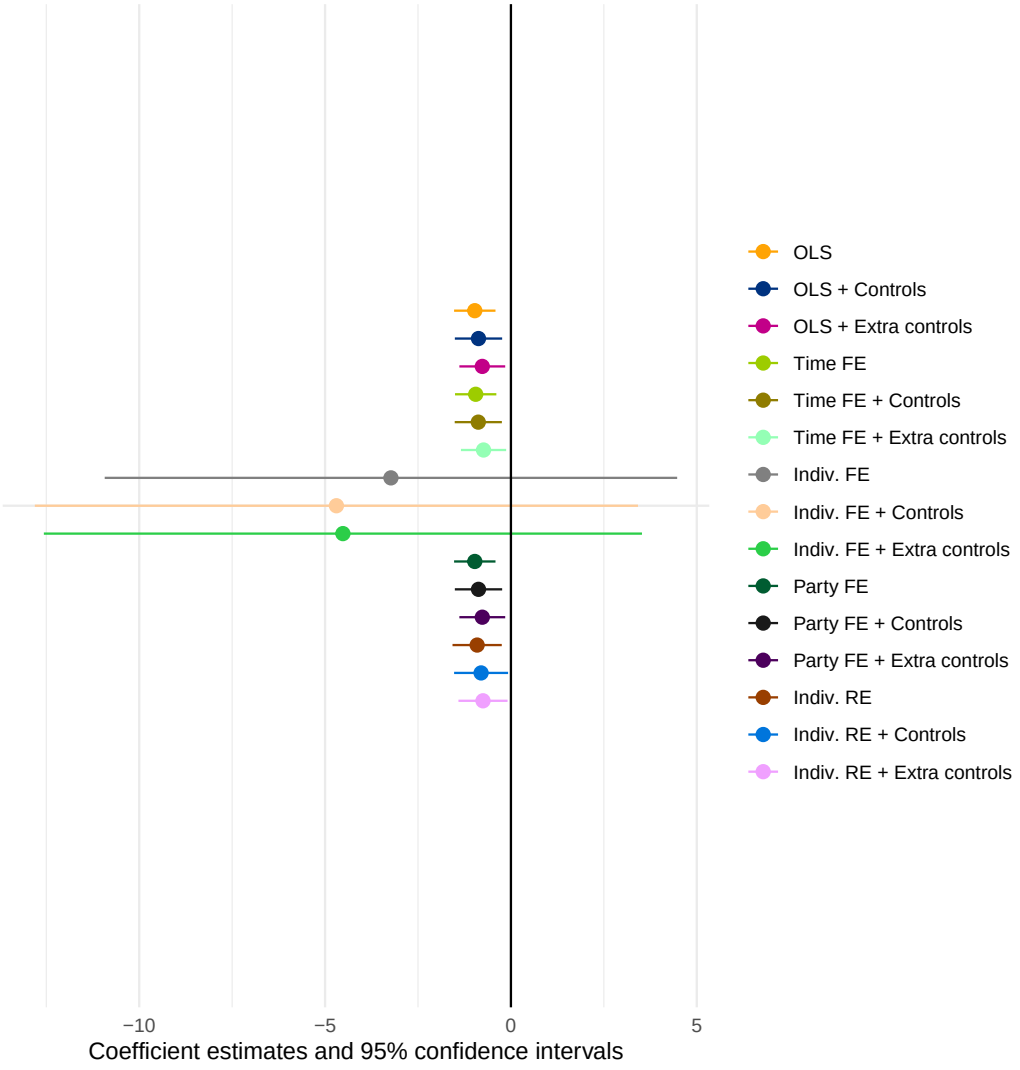


Figure 3.3: **Association between Extremism and Influence.** Plots the estimated effects of ideological extremism on influence. Influence scores are log-transformed before being centered and scaled. Extremism is measured as folded DW-NOMINATE which was then centered and scaled. Therefore, higher values for Extremism indicate a party member who is more conservative or liberal than the majority of House Republicans or Democrats, respectively. Across almost all model specifications, ideological extremism has a significantly negative association with constituent communication influence. Although extreme members tend to use constituent communication to voice their preferences more than moderate members, moderate members are more likely to influence the communication topics of their colleagues.

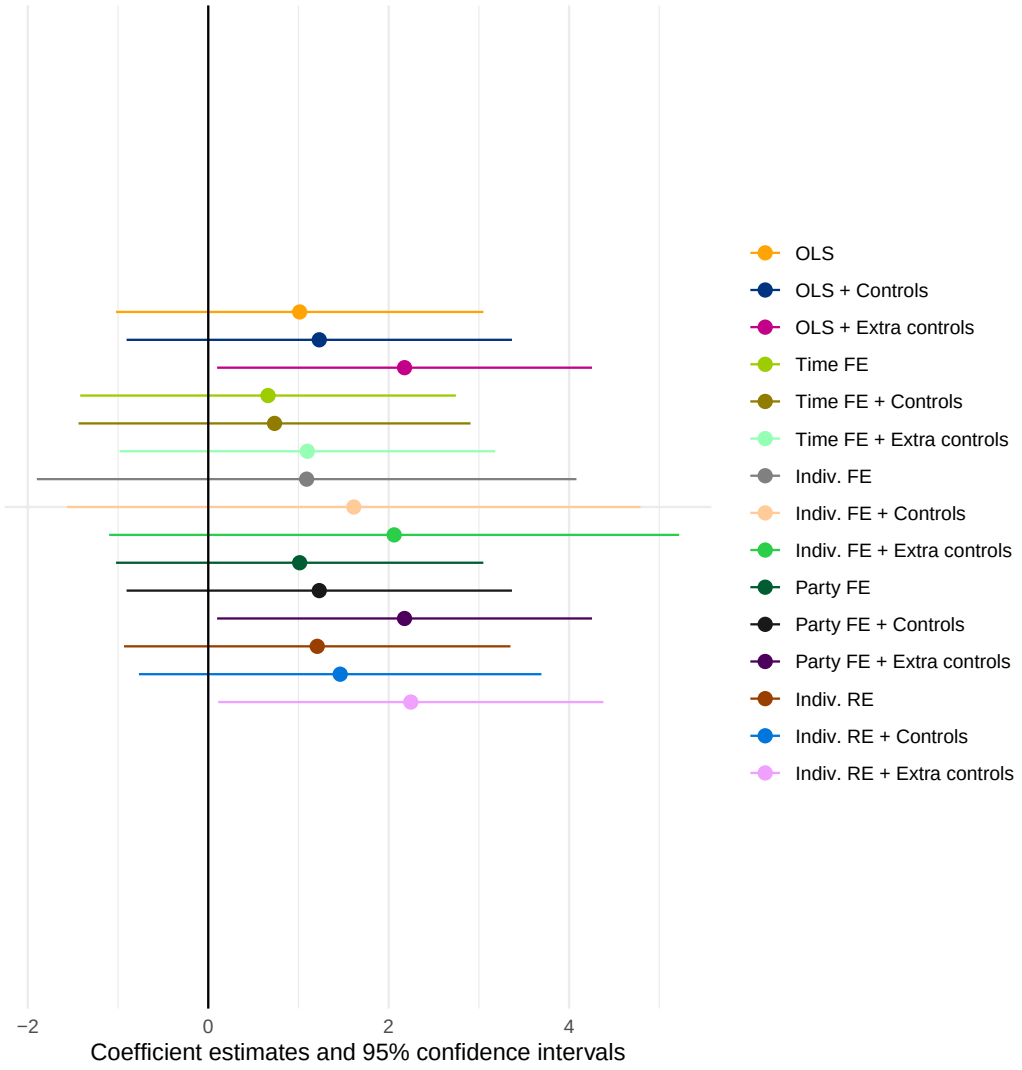


Figure 3.4: **Committee Leadership Association With Influence.** Plots the relationship between committee leadership and influence across model specifications. Committee leadership is measured as 0/1, and influence is measured as log-transformed PageRank, centered and scaled. 'Extra controls' indicates the number of press releases published was included in the model. Though the committee leadership effects generally fail to reach statistical significance, the relationship appears to be slightly positive. Committee leadership has a significantly positive association with influence when controlling for the number of press releases published, which may indicate that committee leaders do not publish at high volumes, but, when they do, their communication choices are influential.

hypothesis. Across more than half of the models, an increase in a member's LES is significantly associated with an increase in their communication influence. This evidence suggests that effective lawmakers are also effective communicators. In models that control for the number of press releases published by each member, LES fails to reach statistical significance. Like LES, which is based on a member's ability to sponsor legislation that advances through the stages of legislation, communication influence scores are based on a member's ability to publish press releases on topics that diffuse through their copartisan network. Because the effect of LES on communication influence becomes insignificant when controlling for publication volume, high-LES members are likely to be productive communicators.

The last test of the hypothesized relationship between influence and perceived expertise is the effect of faction membership, visualized in Figure 3.6. Following Clarke (2020), I consider a Congressional Membership Organization a faction if they are organized around an ideology that diverges from their average copartisan. Faction membership indicates membership in one of the following ideological factions (Clarke, 2020); the Congressional Progressive Caucus, the Populist Caucus, the New Democrat Coalition, the Blue Dog Coalition, the Republican Main Street Partnership, the Republican Study Committee, the House Liberty Caucus, or the Tea Party Caucus. This list excludes other membership organizations such as ad hoc caucuses and identity caucuses. Rhetorically, faction members express distinct positions on salient issues, and they tend to be visible communicators (DiSalvo, 2009; Clarke, 2020; Blum, 2020). However, because they are definitionally-distinct from their average party member, the perception of that expertise may be limited. Figure 3.6 confirms this. On average, faction membership has a statistically insignificant and slightly negative effect on communication influence, which may result from their preferences not being shared by the majority of their copartisans.

Table 3.1 presents the full regression results of four models. The table includes the simple OLS model with only the primary dependent variables, the individual fixed effects model excluding total press releases as a covariate, the party fixed effects model

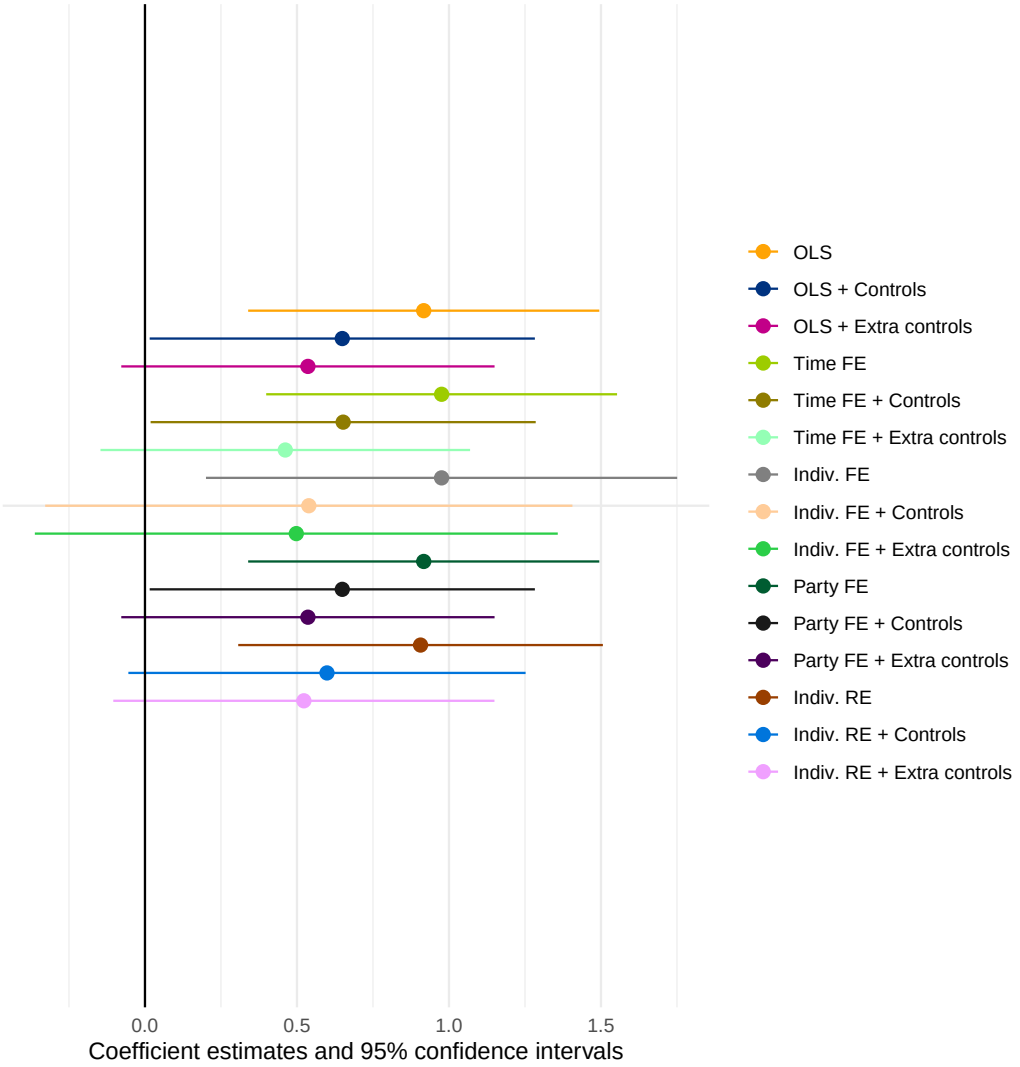


Figure 3.5: **Association Between Legislative Effectiveness and Influence.** Plots the association between Legislative Effectiveness Score (LES) and communication influence. Both legislative effectiveness and the dependent communication influence score are log-transformed before being scaled and centered. High-LES members are productive legislators, able to advance legislation through the legislative process, and it appears that they are also productive communicators able to issue press releases that diffuse through their copartisan network. In most model specifications, there is a significantly positive relationship between LES and influence. Models in which LES fails to reach significance are generally those that control for volume of press releases, indicated by 'Extra controls,' suggesting that high-LES members are also productive publishers of press releases.

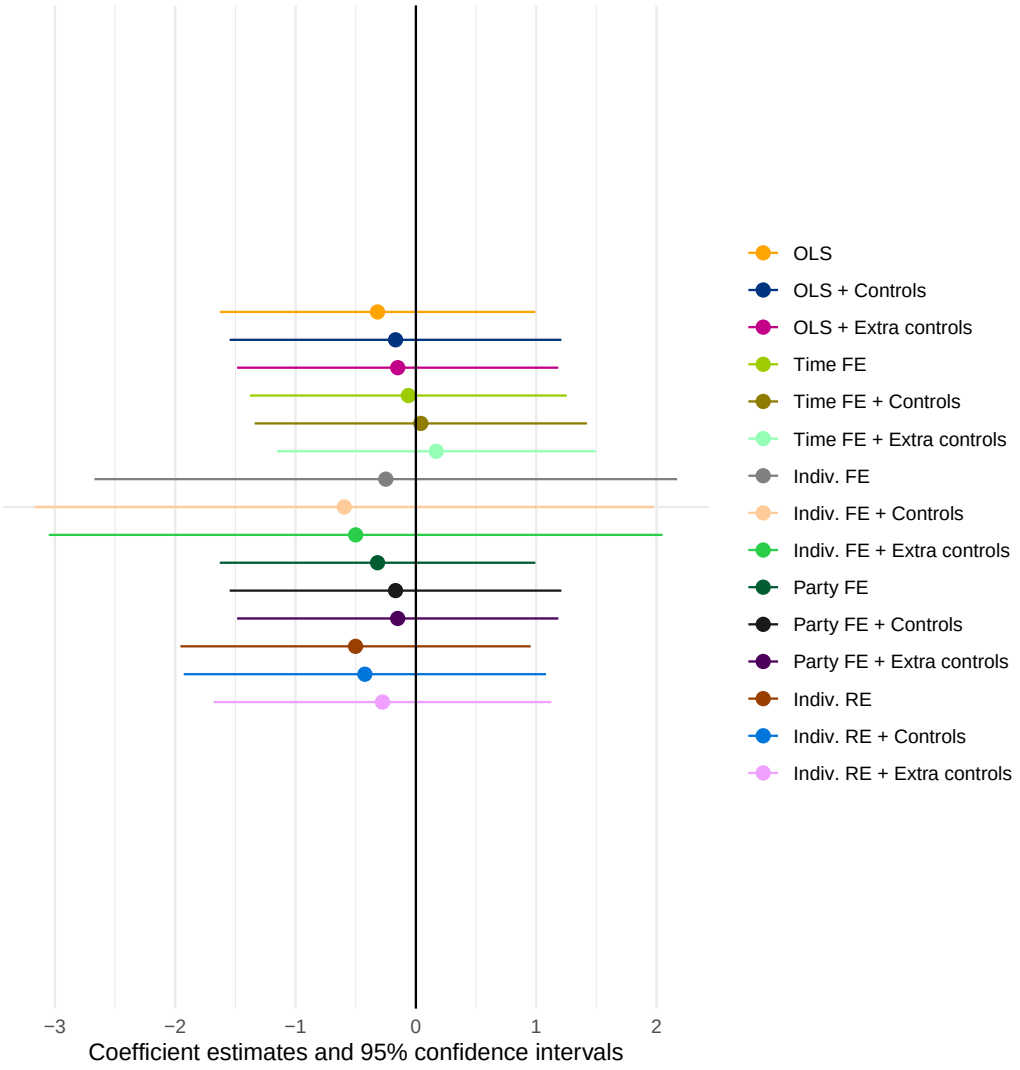


Figure 3.6: **Faction Membership Association With Influence.** Plots of the coefficient estimates across multiple model specifications of the relationship between faction membership and communication influence. Faction membership is measured as 0/1, indicating membership in an ideological sub-party organization. Influence is log-transformed PageRank which has been centered and scaled. The results suggest that, although faction members communicate frequently and distinctively, the position is associated with an insignificant relationship with influence. Because sub-party factions are, by definition, ideologically distinct from their party's average, communication choices by members have a limited diffusion scope.

also excluding press release total, and the OLS model with all controls including press release total. The models were chosen for presentation based on their ability to represent variation in effects conditional on model specification. The full regression results of all 15 models can be found in Appendix C.

The dependent variable is member influence score in a given Congress, measured as PageRank which has been log-transformed, centered, scaled, and multiplied by 10 to improve legibility. Total press releases are included in some models as an extra control. There is a theoretical difference between whether a party member is influential *because* they publish a lot and whether a member is influential holding publication volume constant, and so models are specified with and without this extra control.

We can see that the selected models largely reflect the results of the individual coefficient plots. Party leadership is generally associated with being more influential, and members who become party leaders are probably already influential and publishing at high volumes. Committee leaders might exhibit the opposite effect. The results of the presented models suggest that committee leaders do not publish at high volumes, but that, when holding press release volume constant, they are influential communicators. Faction membership has an insignificant and negative association with influence in their party's communication, most likely because faction members use their communication to create distinction from other party members. Regardless of model specification, seniority is significantly and negatively associated with communication influence. As senior members build an incumbent reputation in their districts, they have less of a need to advertise, whereas junior members need to communicate with constituents and build a reputational brand. High-LES members appear to be both effective lawmakers as well as effective influencers in the realm of their copartisans' communication. Extremism is negatively associated with influence in the party. Finally, holding other variables constant at their means, a move from minority to majority party status has a significantly negative relationship with influence. This could be because members in the majority party tend to focus on legislative accomplishments, whereas minority party members are largely kept

out of the formal legislative process and therefore turn their focus to communicating and regaining the majority.

	Model 1	Model 2	Model 3	Model 4
Member characteristics				
Party leadership	**3.16**	0.45	**3.09**	1.79
	(1.21)	(1.99)	(1.28)	(1.25)
Committee leadership	1.01	1.61	1.23	**2.18**
	(1.04)	(1.62)	(1.09)	(1.06)
Faction member	−0.32	−0.59	−0.17	−0.15
	(0.67)	(1.31)	(0.70)	(0.68)
log(Seniority)	**−1.19**	**−3.87**	**−1.13**	**−1.37**
	(0.30)	(0.76)	(0.32)	(0.31)
log(LES)	**0.92**	0.54	**0.65**	0.54
	(0.29)	(0.44)	(0.32)	(0.31)
Extremism	**−0.97**	−4.69	**−0.87**	**−0.77**
	(0.28)	(4.13)	(0.32)	(0.31)
Majority party	**−2.72**	**−2.54**	**−2.85**	**−3.40**
	(0.68)	(0.95)	(0.73)	(0.71)
Republican	0.51			**1.92**
	(0.67)			(0.91)
Controls				
Win vote pct.		−0.42	0.09	0.02
		(0.65)	(0.33)	(0.32)
Black			**−3.02**	**−2.22**
			(1.03)	(1.00)
Latino			**−3.12**	**−2.54**
			(1.10)	(1.07)
Asian/PI			0.05	0.14
			(1.79)	(1.73)
Native Am.			2.15	1.50
			(3.53)	(3.42)
Female			**2.63**	**2.03**
			(0.75)	(0.73)
log(Bills cosponsored)		**1.20**	**0.75**	**0.82**
		(0.52)	(0.37)	(0.36)
log(Votes w/ party pct.)		−0.67	3.49	3.67
		(6.94)	(3.17)	(3.07)
Extra Control				
Total press releases				**2.49**
				(0.26)
Fixed effects	*No*	*Indiv.*	*Party*	*No*
R^2	0.04	0.05	0.06	0.12
Num. obs.	1428	1337	1337	1337

Table 3.1: **Accounting for Member Influence.** Presents a selection of model specifications accounting for members' communication influence. Coefficient estimates are bold at the 0.05 significance level.

Table 3.2 breaks out regression results by majority and minority party status. Republicans held the House majority for three out of the four Congressional terms in the data. Republican majorities in the House include, 1) divided government with a Democratic Senate and President, 2) unified bicameral government with a Democratic President, and 3) unified government. The Democratic Party gained control of the House majority during the 116th Congress with a Republican Senate and President. For each majority status, the table presents the results of OLS models with and without control variables. We can see that the estimated effects directions do not change when fitting the models separately. We do see that party leadership does not reach statistical significance when in the minority party. This may suggest that members tend to take stronger cues from leadership when they have the agenda-setting power, or that majority party leaders have more tools to encourage their members to follow their lead. Committee leadership appears only to have a significant relationship with influence when in the minority party. This could be because, without the power of the Speakership, committee leaders are perceived to be the most influential. It could also be a feature of the Democratic minority in particular as they represent 75% of the minority observations, and future work should explore this.

	Majority Party		Minority Party	
	Model 1	Model 2	Model 1	Model 2
Party leadership	**3.66**	1.01	2.43	1.15
	(1.72)	(1.87)	(1.71)	(1.60)
Committee leadership	0.51	0.92	1.36	**3.35**
	(1.36)	(1.48)	(1.61)	(1.51)
Faction member	0.11	0.70	−0.43	−0.67
	(1.02)	(1.04)	(0.89)	(0.85)
log(Seniority)	**−1.88**	**−1.91**	−0.46	−0.59
	(0.40)	(0.44)	(0.46)	(0.44)
log(LES)	**1.26**	**1.18**	0.76	−0.10
	(0.43)	(0.46)	(0.41)	(0.41)
Extremism	**−0.94**	−0.46	**−1.01**	**−1.04**
	(0.34)	(0.37)	(0.45)	(0.44)
Controls	No	Yes	No	Yes
Num. obs.	775	723	653	614
Num. Democrats	169	160	493	456
Num. Republicans	602	559	158	156
R^2	0.05	0.11	0.02	0.23

Table 3.2: **Accounting for Member Influence Conditional on Majority Party Status.** Presents OLS results, with and without controls, modeled separately conditional on majority or minority party status. Republicans held the House majority in 0.75 of the Congressional terms in the data set.

3.7 Discussion

This chapter represents an introductory test of theories of influence in copartisan political communication. It makes use of a novel data set of influence scores drawn from press releases and the repeated publication choices made by legislators. It finds that many of our theories of who has influence in a party extend outside of the legislative arena. Party leaders, committee leaders, and legislatively effective members are all influential in constituent communication. It also extends constituent communication research findings that junior and ideologically extreme members use speech at higher frequencies than copartisans. The findings of this chapter suggest that junior members' use of speech has influence in their party, whereas extreme members' and faction members' frequent use of

speech does not associate them with higher communication influence.

The results presented in this chapter are observational. My objective is not to make accurate out-of-sample predictions, and I do not attempt to make causal claims. The focus of this chapter is on correlations between the influence scores in the data set and the variables we might expect to explain some of their variation based on our existing knowledge. Future work may consider validating the initial scores presented here, and then moving on to sophisticated applications including predictive models.

One set of limitations of this analysis comes from the data. The data include only four terms of Congress, which limits the generalizability of the results. Replicating the methodology for past and future Congresses would allow future researchers to build predictive models of influence, produce more accurate certainty estimates around effects, and study longitudinal trends. In addition, diffusion networks were built in 2-year Congress increments, and so an actor's position in the network is reset every term. This was done for theoretical reasons and to be consistent with other legislative scores, but it precludes my scores from picking up on short bursts of influence or influence that occurs over longer periods of time.

Future directions involving data collection and construction include additional covariates and additional network actors. For the linear models, there may be missing covariates. Perhaps budgets and office staff are the biggest predictors of influence, or perhaps it matters whether members represent urban or rural districts, or which state they are from. Although I have included models with fixed and random effects to try to account for these latent variables, it would be valuable for future work to know whether any of these factors are statistically important. Secondly, in accordance with the discussion in Chapter 2, future research should infer networks and influence with additional actors in order to test the relative influence of the executive branch, interest groups, and the media.

This analysis and the data used in it are based on the assumption that there exists some degree of topic diffusion in party members' communication choices. While the network inference algorithm used to produce the data takes into account the possibility

that there can be sequence without diffusion, it is theoretically possible that there is no diffusion at all, and that all repeated sequences occurred by random chance. Although political science literature consistently finds evidence of cue-taking among copartisans, it is impossible to compute traditional accuracy statistics for the inferred network without knowing a ground truth. Validating the diffusion assumption would benefit from future qualitative research of House members such as interviews.

The results presented in this chapter lay the groundwork for future directions of research. Researchers may consider community detection in the communication diffusion networks. Some members may be influential within a sub-group of colleagues but not the entire party. This may be the case for caucuses, for example. It may also be the case that party members' speech is influential based not on what they say, but how they say it. Future work may consider regressing influence on members' average sentiment in their press releases. Legislative scholars should also be attentive to outcomes associated with communication influence scores. Do freshmen legislators who are relatively influential fare better in their reelection results than freshmen who are not? Do influential communicators go on to more ambitious political careers?

Finally, one of the reasons constituent communication is important is because it contributes to the party heuristics that low-information voters rely on to make choices. The influence scores studied here, however, represent how important members are among their partisan colleagues, not in constituents' minds. I do not test any correlations between what voters think the party heuristic is and who is influential. For example, some scholars have found that extremists communicate more frequently and are more critical of the opposition party. These messages may resonate more in the mind of constituents than they do among elite colleagues. Being influential in the choices of copartisans therefore does not imply influence in the mind of constituents.

3.8 Conclusion

This study extends political science theories of legislative cue-taking and influence outside of the formal legislative process. The evidence presented here suggests that many of our theories of influence do in fact extend to the realm of constituent communication. It may also suggest that the tradition of studying constituent communication as an independent behavior needs to be reevaluated. Almost no other legislative behaviors exist in individual vacuums, and the results presented here suggest that communication may be similar. The research focus on modeling communication independently may be the result of a lack of data, or it may be the result of changes in historical trends. Constituents have always received collective representation from their representative and the Congress as a whole, but in recent decades, parties are especially nationalized, homogenous, and competitive. Combined with technological changes that have made communication instantaneous and inexpensive, legislators may be more influenced by their copartisans than they have been in the past.

This study aims to be an opening for further analysis of political messaging as a network phenomenon. By treating communication choices as interdependent, scholars can test the scopes of existing theories of influence, avoid potentially incomplete inferences, and open new theoretical and empirical understandings of communication and legislative cue-taking. Party politics of influence in constituent communication can also provide insights into the internal functioning of political parties and the patterns shaping aggregate party brands, which are important to our understanding of both political institutions and political behavior.

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Appendix A: Renewable Bipartisanship? Environmental Politics in State Legislatures

The appendix contains the following information:

1. Summary statistics of the bipartisanship variable;
2. Summary statistics of the independent variables.

A.1 Summary Statistics of the Bipartisanship Variable

The dependent variable is whether a bill received a bipartisan sponsorship coalition (1) or a partisan sponsorship coalition (0). Following Harbridge (2015), a bill was considered bipartisan if at least 20% of its signatories belonged to the party opposing the lead author of the bill. Bills authored by independent party members ($n = 116$) were excluded as were any bills proposed by a bureaucratic institution rather than a partisan legislator.

Table A.1 shows the distribution of the dependent variable across states, aggregated across all years, 2008-2020. It displays the raw number of bills in each category, the

percent of bills within each category that were bipartisan, and the difference in the number (or percent bipartisan) of renewable energy bills minus climate change bills. Nebraska and Hawaii are excluded from the data set. Nebraska is excluded because its legislators do not serve under party labels, and Hawaii was not included due to the inability of the remote driver to scrape open source data from the state.

There is considerable variation across states. The majority of states, however, have higher levels of bipartisan-sponsored renewable energy bills than bipartisan climate change bills, as well as higher raw totals of renewable energy bills. Only California and Kentucky have proposed more climate change bills than renewable energy bills. Kentucky has very little renewable energy capacity potential due to its geography and topography (Lopez et al., 2012); California is the national leader in climate change legislation (Vasilogambros, 2022).

Table A.1: Bipartisan Sponsorship Aggregated by State

	Number of bills				% bipartisan sponsored			
State	RE	Climate	Diff.[a]	Total	RE	Climate	Diff.[b]	Total
AK	30	22	**8**	52	13.3	0.0	**13.3**	7.7
AL	23	27	**-4**	50	4.3	3.7	**0.6**	4.0
AR	24	8	**16**	32	0.0	0.0	**0.0**	0.0
AZ	118	45	**73**	163	0.0	2.2	**-2.2**	0.6
CA	489	651	**-162**	1140	7.8	5.8	**2.0**	6.7
CO	85	45	**40**	130	10.6	6.7	**3.9**	9.2
CT	113	40	**73**	153	8.8	5.0	**3.8**	7.8
DE	41	12	**29**	53	9.8	0.0	**9.8**	7.5
FL	151	47	**104**	198	10.6	8.5	**2.1**	10.1

Table A.1: Bipartisan Sponsorship Aggregated by State *(continued)*

	Number of bills				% bipartisan sponsored			
State	RE	Climate	Diff.[a]	Total	RE	Climate	Diff.[b]	Total
GA	75	28	**47**	103	13.3	0.0	**13.3**	9.7
IA	166	26	**140**	192	0.6	0.0	**0.6**	0.5
ID	3	2	**1**	5	0.0	0.0	**0.0**	0.0
IL	278	115	**163**	393	29.1	27.0	**2.1**	28.5
IN	74	32	**42**	106	0.0	3.1	**-3.1**	0.9
KY	21	33	**-12**	54	19.0	30.3	**-11.3**	25.9
LA	76	21	**55**	97	1.3	4.8	**-3.5**	2.1
MA	617	189	**428**	806	1.8	0.5	**1.3**	1.5
MD	273	71	**202**	344	8.1	9.9	**-1.8**	8.4
ME	334	92	**242**	426	6.6	22.8	**-16.2**	10.1
MI	170	71	**99**	241	8.8	2.8	**6.0**	7.1
MN	618	188	**430**	806	7.3	2.7	**4.6**	6.2
MO	104	47	**57**	151	1.0	0.0	**1.0**	0.7
MS	58	26	**32**	84	1.7	0.0	**1.7**	1.2
MT	98	47	**51**	145	0.0	0.0	**0.0**	0.0
NC	168	35	**133**	203	20.2	5.7	**14.5**	17.7
ND	29	14	**15**	43	3.4	14.3	**-10.9**	7.0
NH	188	101	**87**	289	3.7	3.0	**0.7**	3.5
NJ	910	243	**667**	1153	13.1	11.9	**1.2**	12.8
NM	173	35	**138**	208	4.0	0.0	**4.0**	3.4
NV	48	3	**45**	51	0.0	0.0	**0.0**	0.0
NY	903	362	**541**	1265	5.3	0.6	**4.7**	4.0

Table A.1: Bipartisan Sponsorship Aggregated by State *(continued)*

	Number of bills				% bipartisan sponsored			
State	RE	Climate	Diff.[a]	Total	RE	Climate	Diff.[b]	Total
OH	43	29	**14**	72	7.0	3.4	**3.6**	5.6
OK	182	25	**157**	207	0.5	0.0	**0.5**	0.5
OR	132	79	**53**	211	3.8	6.3	**-2.5**	4.7
PA	149	41	**108**	190	33.6	39.0	**-5.4**	34.7
RI	254	109	**145**	363	14.6	0.9	**13.7**	10.5
SC	113	22	**91**	135	7.1	0.0	**7.1**	5.9
SD	42	6	**36**	48	7.1	0.0	**7.1**	6.2
TN	61	26	**35**	87	0.0	0.0	**0.0**	0.0
TX	169	102	**67**	271	1.8	3.9	**-2.1**	2.6
UT	61	27	**34**	88	4.9	3.7	**1.2**	4.5
VA	312	126	**186**	438	6.7	5.6	**1.1**	6.4
VT	171	101	**70**	272	7.6	5.0	**2.6**	6.6
WA	306	236	**70**	542	0.0	0.0	**0.0**	0.0
WI	68	23	**45**	91	0.0	4.3	**-4.3**	1.1
WV	107	32	**75**	139	0.0	0.0	**0.0**	0.0
WY	40	8	**32**	48	2.5	0.0	**2.5**	2.1
KS	NA	2	**NA**	2	NA	0.0	**NA**	0.0

[a] Difference between the number of RE bills and number of Climate bills

[b] Difference between % of bipartisan RE bills and % of bipartisan Climate bills

Table A.2 shows the distribution of the dependent variable by year, aggregated across all states. In every year, 2008-2020, more renewable energy bills are proposed than are climate change bills. In every year except for 2009, the proportion of renewable

energy bills that are bipartisan is greater than the proportion of climate bills that are bipartisan. In 2009, both policy types experienced relatively low levels of bipartisan sponsorship. Climate bills had a slightly higher rate of bipartisan sponsorship, with 2.3% being bipartisan, compared to 2.2% of renewable energy bills.

Table A.2: Bipartisan Sponsorship Aggregated by Year

	Number of bills				% bipartisan sponsored			
Year	RE	Climate	Diff.[a]	Total	RE	Climate	Diff.[b]	Total
2008	211	84	**127**	295	11.8	4.8	**7.0**	9.8
2009	956	266	**690**	1222	2.2	2.3	**-0.1**	2.2
2010	819	233	**586**	1052	5.1	3.0	**2.1**	4.7
2011	718	199	**519**	917	5.8	3.0	**2.8**	5.2
2012	711	162	**549**	873	5.2	3.1	**2.1**	4.8
2013	703	150	**553**	853	3.7	2.0	**1.7**	3.4
2014	716	293	**423**	1009	6.3	5.5	**0.8**	6.0
2015	616	321	**295**	937	7.1	4.4	**2.7**	6.2
2016	643	368	**275**	1011	16.0	10.1	**5.9**	13.8
2017	517	284	**233**	801	9.5	7.0	**2.5**	8.6
2018	641	371	**270**	1012	12.0	5.9	**6.1**	9.8
2019	621	422	**199**	1043	10.1	7.1	**3.0**	8.9
2020	796	519	**277**	1315	10.8	7.1	**3.7**	9.4

[a] Difference between the number of RE bills and number of Climate bills

[b] Difference between % of bipartisan RE bills and % of bipartisan Climate bills

A.2 Summary Statistics of the Independent Variables

Table A.3 displays summary statistics for the political independent variables for each state-year. The folded Ranney Index measures the degree of two-party competition in the state in a four-year moving average (Ranney, 1976). It takes into account the proportion of seats won in the state House and Senate elections, the percentage of votes for each party in the gubernatorial election, and the percentage of the time each party controlled both the governorship and state legislature. Scores range from 0.5 to 1, with 1 indicating equal competition between the two parties and 0.5 indicating complete control by one party.

Table A.4 reflects the final bill status at time of last data collection on August 17, 2020, and whether or not the bill received a vote on the floor. These variables are not directly included in the analysis but are valuable for understanding the nature of proposed legislation in the states. Every year, roughly 40% of bills are left pending at the end of the session and never resumed. Final bill status is collected by the National Conference of State Legislatures (NCSL) and relies on states keeping their legislative records up to date. Republican, Democratic, and total cosponsors are used to construct the dependent variable. If the lead author of a bill is a Democrat, and at least 20% of the total cosponsors are Republican, the bill was coded as bipartisan.

Political Variable	N = 563
Legislative Control	
Divided	62 (12%)
Democratic	190 (36%)
Republican	274 (52%)
Governor Party	
Independent	7 (1.3%)
Democratic	226 (43%)
Republican	293 (56%)
State Control	
Divided	190 (36%)
Democratic	127 (24%)
Republican	209 (40%)
President	
Obama	391 (69%)
Trump	172 (31%)
Fold Ranney Index	
Mean (SD)	0.87 (0.09)
Range	0.66, 0.99

Table A.3: **Independent Political Variables Summary Statistics.** Displays summary statistics for the independent political variables. Percentages show the proportion of observations that fall into each variable level across all unique state-year combinations.

Bill Details	**Climate**, N = 3,672	**RE**, N = 8,668
Bill Final Status		
Adopted	206 (5.6%)	100 (1.2%)
Enacted	480 (13%)	1,175 (14%)
Failed	1,320 (36%)	3,245 (37%)
Pending	1,573 (43%)	4,005 (46%)
To Governor	19 (0.5%)	49 (0.6%)
Vetoed	74 (2.0%)	94 (1.1%)
Received Floor Vote	1,717 (47%)	3,760 (43%)
Republican Cosponsors		
Mean (SD)	1 (4)	1 (2)
Range	0, 70	0, 44
Democratic Cosponsors		
Mean (SD)	3 (6)	2 (4)
Range	0, 82	0, 56
Total Cosponsors		
Mean (SD)	4 (7)	2 (5)
Range	1, 87	1, 87

Table A.4: **Proposed Legislation Summary Statistics.** Presents summary statistics of the environmental bills used in the main analysis. Republican, Democratic, and total cosponsors were used to construct the bipartisanship indicator. Bill final status and floor vote describe the distribution of outcomes for sponsored environmental bills and are not included in the main analysis.

Appendix B: Measuring Influence in Constituent Communication

The appendix contains the following information:

1. Topic model validation;
2. Alternative model specifications;
3. Network model specification.

B.1 Topic Model Validation

The final models selected contain 30 topics for both Democratic and Republican press releases. This selection was the product of both qualitative and quantitative evaluations. Models ranging from 20 to 75 topic clusters were tested using a gradient descent-like procedure, starting with 10-cluster increments and eventually comparing 1-cluster increments. 20 topics produced semantically coherent topics from a human-judgement perspective with expected policy topics such as national security and health care. 75 topics produced additional politically-salient categories such as social media and gun control, but also resulted in many non-politically relevant or nonsense topics such as the days of the week as a topic.

To search for a balance between coherent topics and distinct topics, two areas were concentrated on. The first was 40-46 topics to replicate the results of Grimmer (2010) who found 40-46 topics to be optimal for 2007 Senate press releases and settled on 44 topics (see also Barberá et al. (2019) with Twitter data). The second was 20-30 topics to match the Comparative Agendas Project major topic codes as well as other researchers who found within this range for topic models estimated on legislative texts (Jones and Baumgartner, 2005; Dietrich, Hayes and O'Brien, 2019; McDonald, Porter and Treul, 2020). Models with topics in the 40-46 range did not result in good topic clusters. While some additional distinct topics emerged, a large number of nonsense topics also emerged. The 20-30 range resulted in more coherent topics. Topics were inspected manually in this range using the estimated topic labels (Roberts, Stewart and Tingley, 2019) and reading a random selection of documents within each topic to confirm that the documents were consistent with each other and the topic label.

In addition to the qualitative model assessments, quantitative methods were used to supplement topic validation. Several metrics have been proposed for assessing model validity. Each metric has tradeoffs, and they therefore should be holistically and in combination with human judgement when the purpose is topic detection rather than prediction. Held-out likelihood, or perplexity, is the most common validation metric (Roberts, Stewart and Tingley, 2019). It is constructed by holding out a sample of documents and measuring how well the model predicts out-of-sample. However, when topic models are being used to replace human coding, as they are in this case, prediction-based metrics should not be relied upon alone as there is no objective "good" (Grimmer and Stewart, 2013). Furthermore, research has shown a negative correlation between

held-out likelihood and human interpretability (Mimno et al., 2011).

Mimno et al. (2011) proposes using semantic coherence an alternate performance metric that more closely measures the goal of topic models. Semantic coherence is maximized when the most probable words in a given topic frequently co-occur together. The authors show that semantic coherence correlates well with human judgement of goodness of topic. The drawback of the semantic coherence metric is that it is easily maximized by specifying relatively few topics, resulting in the most-common words in each topic to be generally-common words (Roberts, Stewart and Tingley, 2019).

To address the tendency of semantic coherence to favor generally-frequent words, Roberts, Stewart and Tingley (2019) proposing combining it with exclusivity. A topic is exclusive if the top words of a topic are not likely to also be the top words in other topics. Semantic coherence has a negative correlation with exclusivity, and the two metrics should be considered together to minimize the disadvantages of both. Figures B.1 and B.2 demonstrate the negative correlation between semantic coherence and exclusivity in a sample of press release topic models.

Two final metrics considered are the approximation of the lower bound and the residuals. The lower bound of the marginal likelihood represents the model's internal measure of fit. Residuals describe how much of the corpus is unexplained by the model, and favor overfitting (Roberts et al., 2014). Figures B.3 and B.4 compare multiple diagnostic metrics across models. Theoretically, a correctly-specified model has high held-out likelihood, low residuals, high semantic coherence, and high lower bound approximation. Because of the contradictory nature of the metrics, they should be considered together. The metrics are not replacements for human judgement, and should only be used as

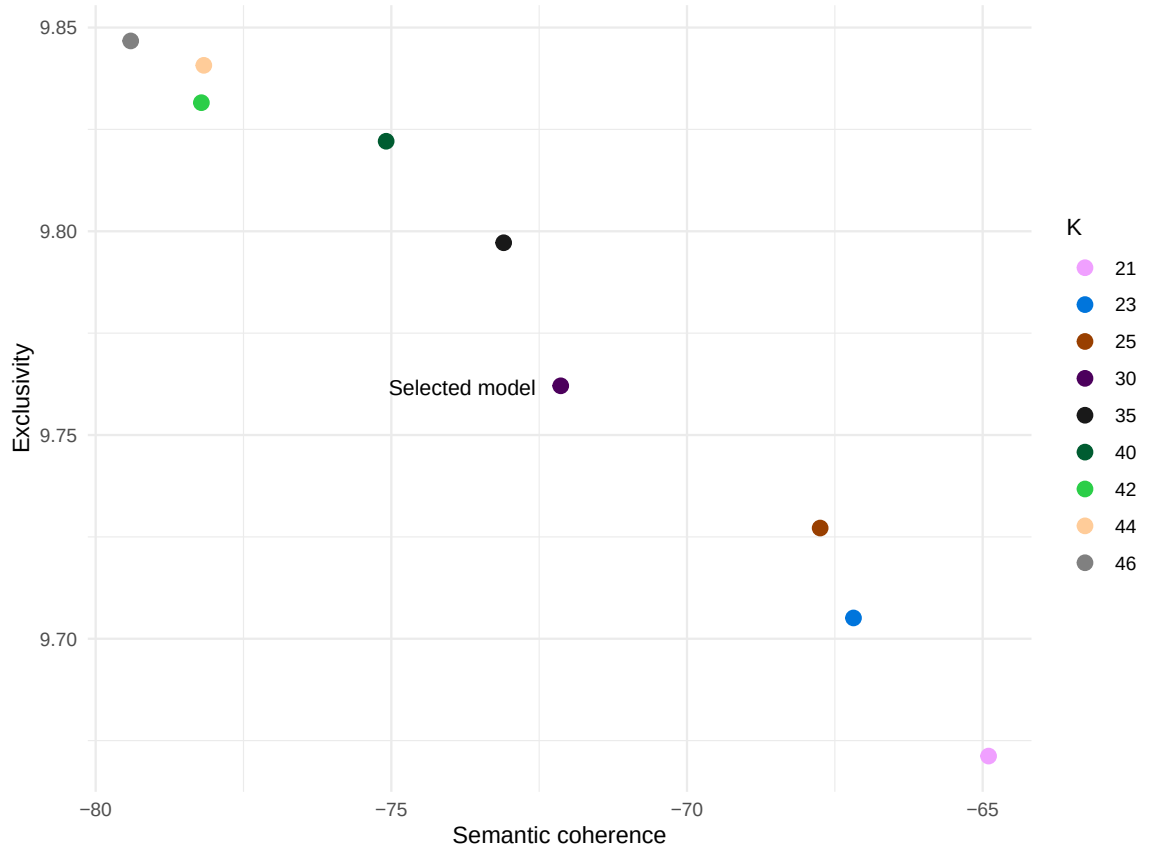

Figure B.1: **Trade-off between Exclusivity and Semantic Coherence: Democratic Press Releases.** Illustrates the negative correlation between semantic coherence and exclusivity with a selection of Democratic press release topic models. Models with fewer topics have higher semantic coherence, and models with more topics have higher exclusivity. 30 topics was chosen because the model results in a balance between the two metrics. This was validated with quantitative selection methods.

supplements for model selection (Grimmer and Stewart, 2013).

Tables B.1 and B.2 display the final topic models used in the main analysis. For both parties, $k = 30$ was selected based on the qualitative and quantitative considerations described above. Topic names were given manually based on the FREX words and the body of randomly-sampled press releases in each cluster. FREX words are the stems that best differentiate topics from each other by being both frequent across relevant documents and exclusive to those documents (Roberts, Stewart and Tingley, 2019). Alternative topic

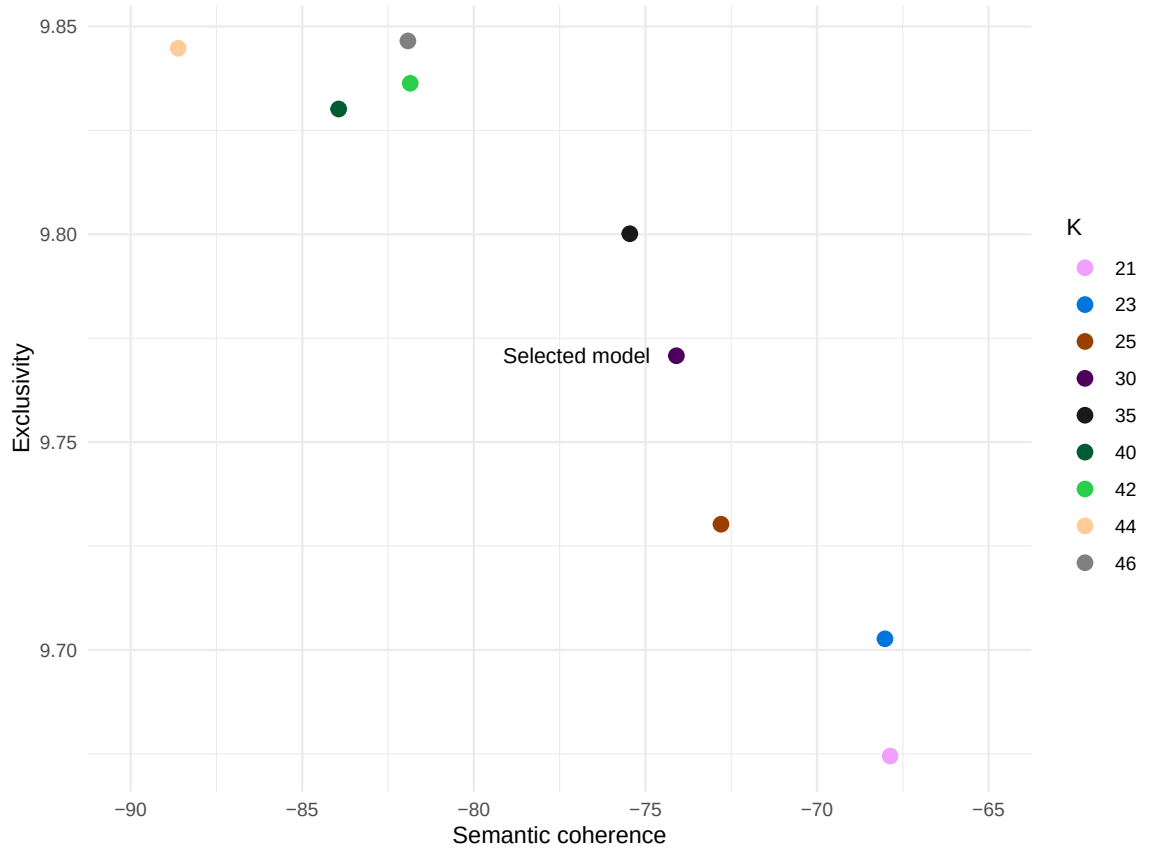

Figure B.2: **Trade-off between Exclusivity and Semantic Coherence: Republican Press Releases.** Illustrates the negative correlation between semantic coherence and exclusivity with a selection of Republican press release topic models. Models with fewer topics have higher semantic coherence, and models with more topics have higher exclusivity. 30 topics was chosen because the model results in a balance between the two metrics. This was validated with quantitative selection methods.

models and their FREX stems are illustrated in the following section.

B.2 Alternative k Topic Clusters House Republicans

$$k = c(20, 40, 75)$$

The section below illustrates alternative number of topic clusters and the FREX stems associated with each cluster. The FREX stems illustrate the fact that increasing the

FREX stems	Topic
educ; school; student; program	Higher edu.
state; iran; unit; presid	Iran nuclear
energi; research; technolog; develop	Energy
feder; act; requir; govern	Govt agency
investig; impeach; american; democrat	Trump
veteran; care; servic; affair	Veterans' affairs
health; care; insur; obamacar	Healthcare
busi; small; loan; financi	Small business
communiti; fund; rural; grant	Project funding
water; project; infrastructur; fund	Infastructure
trade; agricultur; farmer; farm	Agriculture
covid; health; coronavirus; state	COVID-19
children; traffick; victim; abort	Human trafficking
law; enforc; polic; offic	Law and order
land; nation; forest; manag	Public lands
right; china; icon; freedom	China/human rights
tax; job; american; famili	Taxes
hous; vote; pass; congress	Legislation pass
militari; defens; nation; forc	Defense
secur; border; immigr; illeg	Immigration
academi; school; u.; high	Education
presid; obama; rule; state	Executive power
r; legisl; bipartisan; act	Legislation intro
honor; famili; nation; day	Military honor
hous; committe; member; chairman	Govt operations
said; peopl; get; go	Other
congression; competit; art; school	Edu. excellence
congressman; follow; statement; today	Other
offic; district; meet; constitu	District business
counti; offic; citi; street	Other

Table B.1: **Final Republican Topic Model.** Republican press releases clustered in 30 topics representing the final model used in the main analysis. FREX stems are the top words in each topic cluster that are both frequent and exclusive and are best able to distinguish the topic. Topics in gray represent those that may not be considered politically relevant.

FREX stems	Topic
letter; depart; report; request	Govt agency
infrastructur; transport; invest; job	Infastructure
fund; program; million; grant	Project funding
act; legisl; h.r; introduc	Legislation pass
busi; small; food; program	Agriculture
safeti; epa; air; airport	Environment
covid; coronavirus; pandem; health	COVID-19
immigr; border; polic; enforc	Immigration
vote; right; court; elect	Voters' rights
presid; trump; administr; investig	Trump
educ; student; school; program	Education
american; women; nation; right	Civil rights
state; u.; unit; secur	Iran nuclear
research; nation; technolog; develop	Drug research
violenc; gun; victim; sexual	Violence
veteran; militari; servic; defens	Defense
energi; water; climat; nation	Climate
health; care; access; afford	Healthcare
inform; consum; compani; data	Consumers
tax; american; republican; famili	Taxes
worker; job; work; employ	Minimum wage
d; r; e; f	Other
said; senat; state; deleg	State politics
peopl; speaker; go; say	Other
communiti; counti; local; servic	District business
district; congression; school; high	Edu. excellence
work; congressman; will; continu	Other
offic; constitu; district; staff	Other
will; park; citi; center	Local politics
hous; committe; member; congress	Govt operations

Table B.2: **Final Democratic Topic Model.** Democratic press releases clustered in 30 topics representing the final model used in the main analysis. FREX stems are the top words in each topic cluster that are both frequent and exclusive and are best able to distinguish the topic. Topics in gray represent those that may not be considered politically relevant.

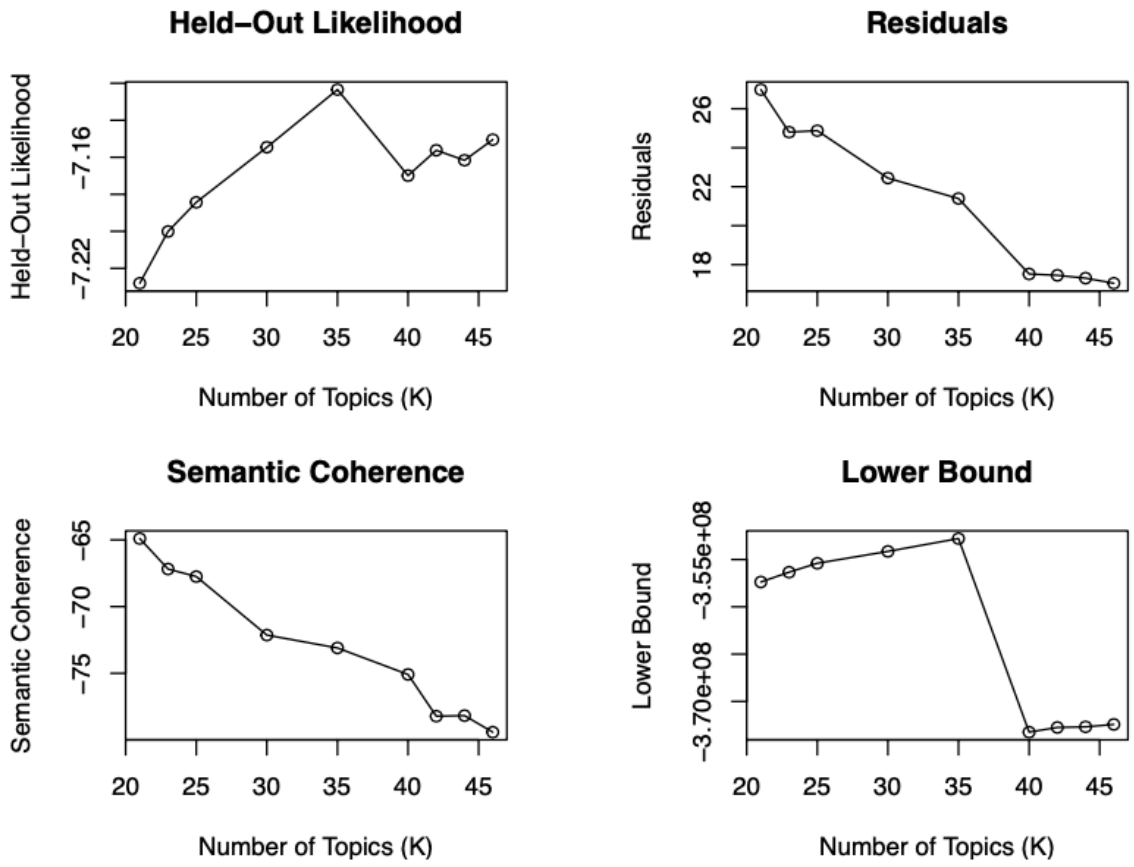

Figure B.3: **Democratic Topic Diagnostic Plots.** Plots diagnostic metrics of Democratic press release topic models for model comparison. Held-out likelihood at its highest between 30 and 45 topics. Residuals are at their lowest with greater numbers of topics, and semantic coherence is at its highest with fewer numbers of topics. The lower bound goodness of fit measure is at its highest with 35 or fewer topics. The diagnostic plots suggest that 30 topics results in a good balance between the measures. 30 topics was also validated as best-fit with qualitative methods.

number of clusters results in more detailed topics, but it also results in more nonsensical Topics. For example, with $k = 20$, Health Care is one large topic. When we increase k to 40, we get separate topic clusters for COVID-19, Community Healthcare, and Healthcare Reform. However, we also get an increase in irrelevant Topics (e.g. "time, march, month, may, june" and "pa, tom, phone, reed, keller"). By the time we get to $k = 75$, the majority

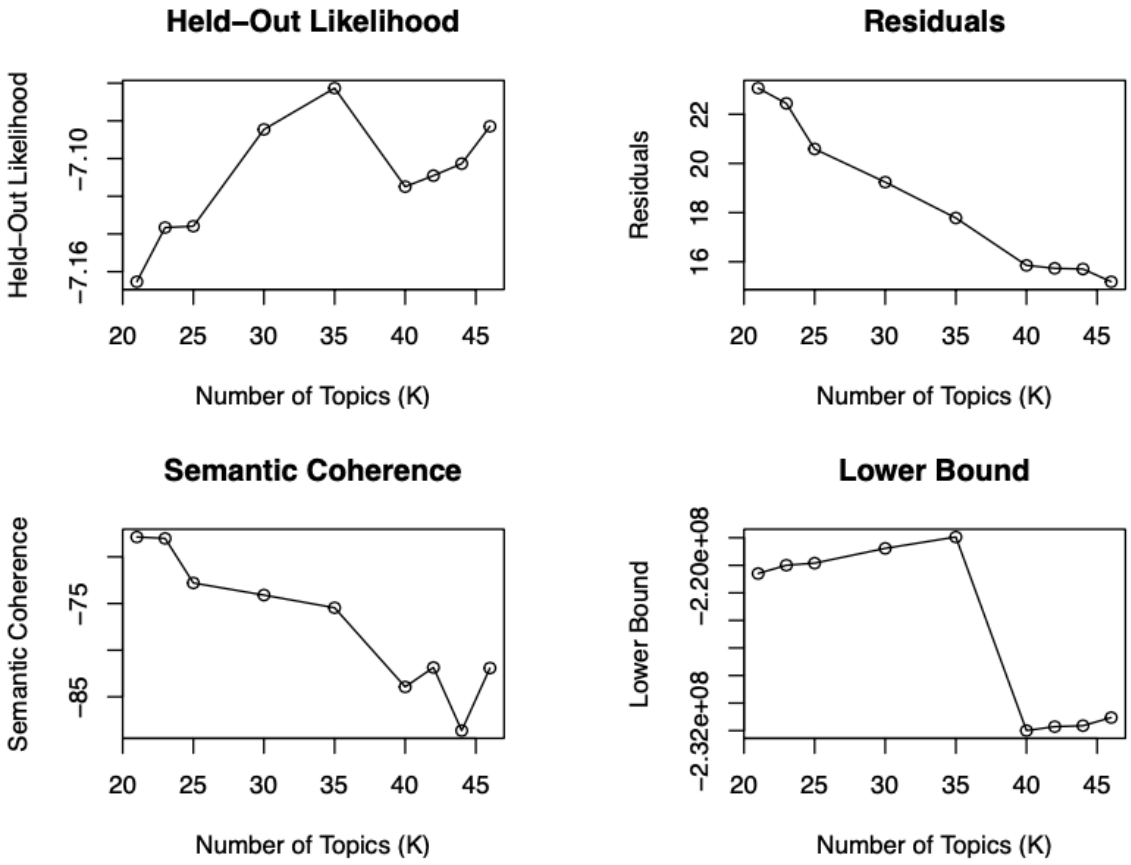

Figure B.4: **Republican Topic Diagnostic Plots.** Plots diagnostic metrics of Republican press release topic models for model comparison. Held-out likelihood at its highest between 30 and 45 topics. Residuals are at their lowest with greater numbers of topics, and semantic coherence is at its highest with fewer numbers of topics. The lower bound goodness of fit measure is at its highest with 35 or fewer topics. The diagnostic plots suggest that 30 topics results in a good balance between the measures. 30 topics was also validated as best-fit with qualitative methods.

of topics are irrelevant or even nonsensical, suggesting that 75 clusters is inappropriate for modeling press release topics. Topic models were considered from $k = 20$ to $k = 75$ in shrinking intervals, and 30 topic clusters was chosen as the most appropriate for its balance of exclusivity and semantic coherence. The example alternate model specifications below serve as evidence to support their rejection.

20 clusters

Topic 1: school, student, educ, high, congression

Topic 2: offic, counti, district, will, congressman

Topic 3: r, hous, bill, committe, legisl

Topic 4: energi, trade, agricultur, farmer, u.

Topic 5: academi, u., high, school, nomin

Topic 6: law, protect, enforc, act, right

Topic 7: water, project, land, will, state

Topic 8: drug, health, research, opioid, treatment

Topic 9: tax, health, care, american, cost

Topic 10: state, u., unit, iran, foreign

Topic 11: defens, militari, nation, secur, fund

Topic 12: veteran, va, care, servic, health

Topic 13: feder, rule, requir, agenc, govern

Topic 14: presid, statement, follow, congressman, hous

Topic 15: busi, small, job, financi, econom

Topic 16: honor, nation, famili, day, serv

Topic 17: fund, program, provid, communiti, grant

Topic 18: work, need, will, congress, can

Topic 19: border, presid, democrat, immigr, trump

Topic 20: said, peopl, go, get, one

40 clusters

Topic 1: congression, school, competit, art, high

Topic 2: pa, tom, phone, reed, keller

Topic 3: offic, staff, polic, district, assist

Topic 4: energi, agricultur, farmer, farm, produc

Topic 5: covid, coronavirus, pandem, state, health

Topic 6: icon, inform, data, communic, broadband

Topic 7: hurd, wa, san, southwest, eastern

Topic 8: busi, job, small, economi, worker

Topic 9: hear, click, read, today, mr

Topic 10: state, iran, unit, u., terrorist

Topic 11: militari, defens, nation, forc, air

Topic 12: veteran, va, care, servic, affair

Topic 13: state, feder, administr, rule, agenc

Topic 14: secur, border, law, immigr, enforc

Topic 15: financi, bank, servic, loan, credit

Topic 16: committe, hous, member, congress, chairman

Topic 17: health, care, communiti, servic, provid

Topic 18: fund, govern, budget, year, spend

Topic 19: investig, impeach, report, general, ir

Topic 20: time, march, month, may, june

Topic 21: fl, 00pm, buchanan, noem, hour

Topic 22: presid, trump, democrat, american, vote

Topic 23: counti, citi, street, pm, st

Topic 24: research, diseas, technolog, drug, innov

Topic 25: congressman, follow, statement, releas, today

Topic 26: water, disast, flood, lake, state

Topic 27: said, go, get, peopl, just

Topic 28: tax, health, care, american, reform

Topic 29: academi, school, high, u., nomin

Topic 30: r, d, tx, senat, said

Topic 31: educ, school, student, program, children

Topic 32: will, meet, congressman, town, hall

Topic 33: land, nation, forest, manag, park

Topic 34: trade, china, american, u., agreement

Topic 35: c, oh, public, renacci, burgess

Topic 36: human, traffick, victim, abort, right

Topic 37: project, will, infrastructur, grant, transport

Topic 38: bill, act, legisl, hous, pass

Topic 39: honor, famili, nation, day, american

Topic 40: work, can, continu, need, will

75 clusters

Topic 1: technolog, research, innov, develop, scienc

Topic 2: phone, collin, reed, tom, mail

Topic 3: offic, staff, district, constitu, congression

Topic 4: energi, gas, oil, job, coal

Topic 5: impeach, investig, democrat, general, attorney

Topic 6: wa, newhous, southwest, river, dave

Topic 7: icon, news, media, facebook, email

Topic 8: letter, state, secretari, depart, request

Topic 9: associ, nation, award, congressman, chamber

Topic 10: hear, click, today, mr, read

Topic 11: law, enforc, polic, victim, justic

Topic 12: china, right, human, u., govern

Topic 13: honor, servic, war, serv, medal

Topic 14: time, year, last, week, day

Topic 15: grant, communiti, fund, will, program

Topic 16: presid, trump, american, work, state

Topic 17: budget, govern, spend, congress, nation

Topic 18: nc, david, street, b, mckinley

Topic 19: presid, obama, administr, congress, american

Topic 20: fl, ros, lehtinen, yoho, ross

Topic 21: diseas, medic, research, health, cancer

Topic 22: court, suprem, constitut, rule, judg

Topic 23: land, water, lake, manag, forest

Topic 24: il, davi, said, upton, mi

Topic 25: said, get, go, peopl, just

Topic 26: congressman, follow, statement, releas, today

Topic 27: health, care, obamacar, insur, plan

Topic 28: educ, student, colleg, univers, workforc

Topic 29: project, infrastructur, transport, corp, airport

Topic 30: trade, manufactur, agreement, u., american

Topic 31: counti, p.m, hour, a.m, street

Topic 32: rule, regul, epa, agenc, feder

Topic 33: traffick, abort, human, life, protect

Topic 34: public, c, line, renacci, type

Topic 35: town, hall, will, event, congressman

Topic 36: counti, region, area, site, econom

Topic 37: union, counti, post, pm, va

Topic 38: day, us, famili, live, life

Topic 39: fund, program, million, includ, provid

Topic 40: rural, access, servic, broadband, internet

Topic 41: border, secur, immigr, illeg, homeland

Topic 42: bill, act, legisl, hous, pass

Topic 43: iran, state, terrorist, israel, unit

Topic 44: may, press, confer, nj, 5th

Topic 45: congression, art, competit, high, school

Topic 46: johnson, grave, la, scalis, whip

Topic 47: drug, opioid, mental, health, crisi

Topic 48: covid, health, coronavirus, pandem, care

Topic 49: feder, govern, taxpay, dollar, cost

Topic 50: school, educ, student, teacher, children

Topic 51: disast, flood, damag, assist, feder

Topic 52: tax, job, reform, american, rate

Topic 53: fire, emerg, safeti, depart, respond

Topic 54: pa, said, fitzpatrick, keller, congressman

Topic 55: financi, bank, consum, credit, compani

Topic 56: citi, said, hurd, san, mayor

Topic 57: zeldin, team, island, congressman, lee

Topic 58: inform, report, agenc, secur, ir

Topic 59: amend, state, right, law, protect

Topic 60: republican, democrat, hous, vote, elect

Topic 61: valley, ca, water, cook, calvert

Topic 62: academi, school, high, u., nomin

Topic 63: busi, small, worker, employe, loan

Topic 64: organ, communiti, black, youth, donat

Topic 65: r, d, senat, oh, rep

Topic 66: militari, defens, nation, forc, air

Topic 67: caucus, nation, young, women, brook

Topic 68: tx, michael, william, carter, r

Topic 69: veteran, va, care, affair, servic

Topic 70: agricultur, farm, farmer, food, produc

Topic 71: smith, said, west, south, chris

Topic 72: meet, district, visit, discuss, work

Topic 73: committe, hous, member, chairman, subcommitte

Topic 74: famili, children, work, help, benefit

Topic 75: new, will, ad, recent, work

B.3 Network Inference: Descriptive Statistics

B.3.1 First Use of Topics

Modeling diffusion implies a change in a node's status (Walker, 1969; Desmarais, Harden and Boehmke, 2015). In epidemiological diffusion studies, for example, a node is either infected with a disease or it is not. In topic diffusion, a node's status defined by whether they have published on a topic in a given Congress or not. Therefore, first use of each topic by a member within a Congress is the dependent variable for estimating the network graph. Figure B.5 displays the time distribution for both parties of members' first use of all topics. The distributions are right-skewed with the greatest density of first usage at the beginning of the Congressional term. Figure B.6 displays similar distributions for the 116th Congress alone to illustrate first-use timing by topic. Most topics display a right-skewed distribution with variation across topics.

B.3.2 Cascades

The `NetInf` algorithm (Gomez-Rodriguez, Leskovec and Krause, 2012) infers the most-likely stable diffusion network by identifying repeated patterns in topic adoption among a set of actors. The algorithm takes in a set of *cascades* which are defined by the node names, the event times, and the event identifier. Figure B.7 displays two topic cascades from the first 10 days of the 115th Congress as an illustrative example. Table B.3 contains summary statistics for all 30 cascades associated with each Congress and party.

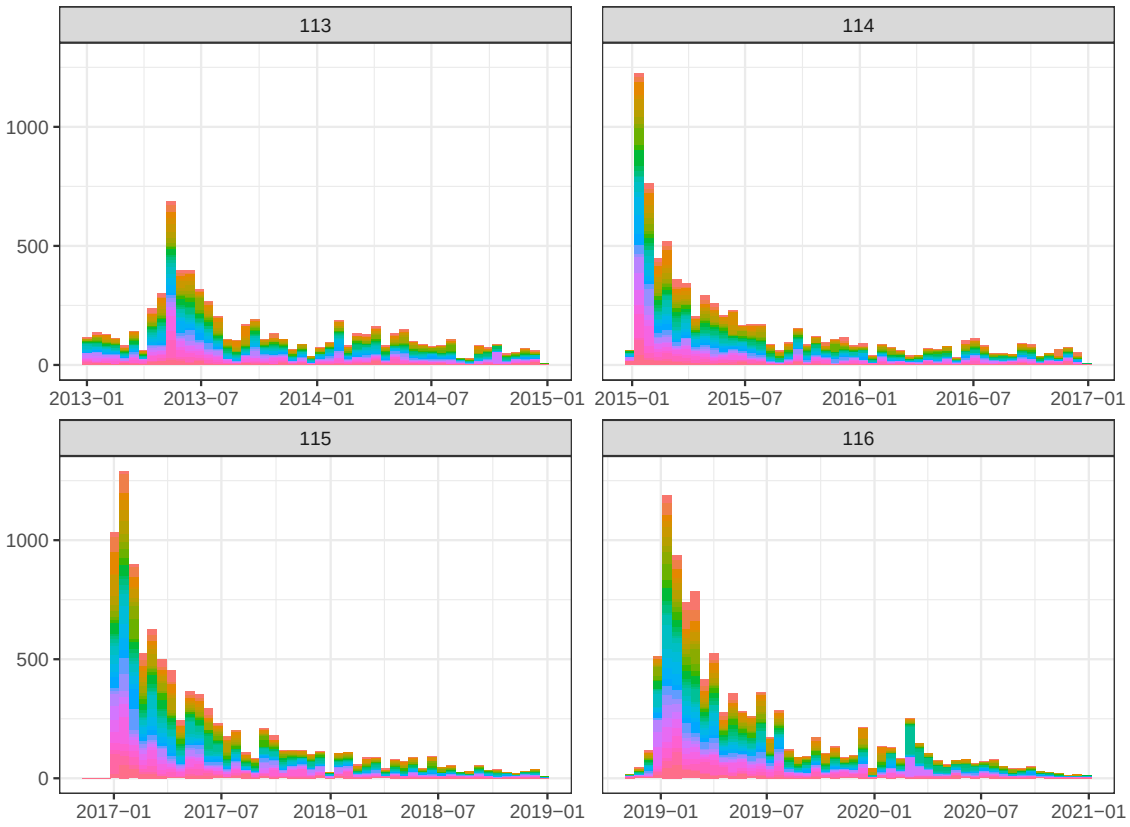

Figure B.5: **Distribution of First Topic Usage by Congress.** Displays first-use of topics frequency by Congress with all topics overlaid to illustrate aggregate patterns in first-usage. First use of a topic by a member in each Congress is the dependent variable for inferring diffusion network graphs. When taking both parties and all topics together, the adoption pattern is right-skewed suggesting that members are more likely to first use a topic earlier in the term than towards the end. Members who first adopt a topic significantly later in a term are therefore less likely to be cue-taking from early adopters, on average. This interpretation is reflected in the probabilistic network inference algorithm.

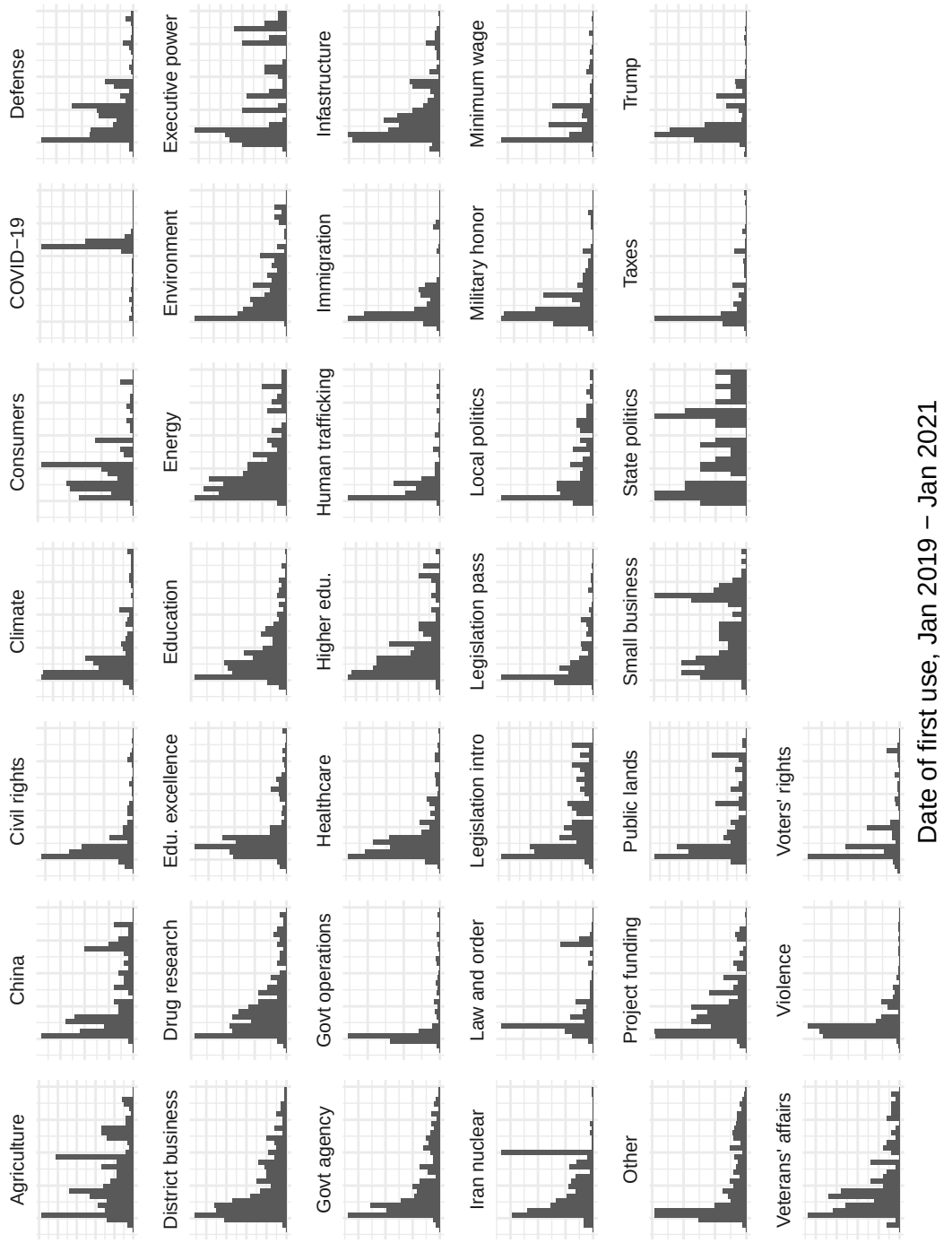

Figure B.6: **First Use Distribution in the 116th Congress by Topic.** Displays first-use frequency by topic for the 116th Congress as an illustrative example of the dependent variable in the estimation of the diffusion networks. Although right-skewed on average, there is variable distribution across topics. First-use by one member that occurs significantly later than first-use by another member has a low probability of being a diffusion tie in the network inference algorithm.

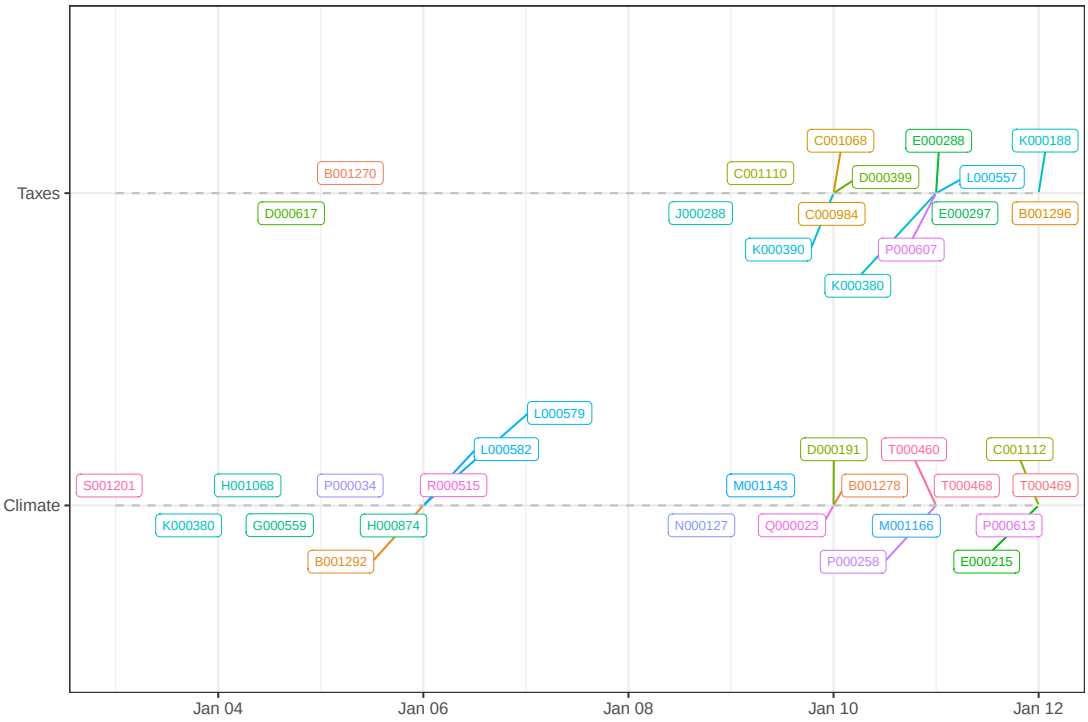

Figure B.7: **Illustration of Cascades.** Plots two Democratic example cascades from the first 10 days of the 115th Congress. Repeated patterns across cascades are used to estimate the maximum likelihood stable network structure. Members of Congress are labeled with their Bioguide IDs.

	Republicans		Democrats	
113	**Cascades**	30	**Cascades**	30
	Nodes	174	**Nodes**	156
	Nodes in cascades	174	**Nodes in cascades**	156
	Possible edges	28,892	**Possible edges**	22,549
114	**Cascades**	30	**Cascades**	30
	Nodes	204	**Nodes**	164
	Nodes in cascades	204	**Nodes in cascades**	164
	Possible edges	38,971	**Possible edges**	24,813
115	**Cascades**	30	**Cascades**	30
	Nodes	234	**Nodes**	192
	Nodes in cascades	234	**Nodes in cascades**	192
	Possible edges	53,179	**Possible edges**	35,897
116	**Cascades**	30	**Cascades**	30
	Nodes	195	**Nodes**	232
	Nodes in cascades	195	**Nodes in cascades**	232
	Possible edges	36,976	**Possible edges**	53,507

Table B.3: **Cascade Summary Statistics.** Reports summary statistics for cascades used by the `NetInf` algorithm to determine the most likely diffusion network structures. Each network was given 30 topics in the form of cascades. Nodes report how many party members were in each Congress. In each set of data, every node appears, indicating that they published on at least one of the topics. The number of possible edges is slightly smaller than $n(n-1)$ because in order for there to be a diffusion edge from A to B, A must publish before B in at least one cascade.

B.3.3 Network Estimation

The `NetInf` algorithm uses the cascade data to probabilistically infer diffusion ties between the actors in the network based on repeated cascade patterns (Gomez-Rodriguez, Leskovec and Krause, 2012; Desmarais, Harden and Boehmke, 2015). The model is formulated using three joint probabilities:

$$P_c(i, j),$$

the probability that communication topic, c spread from member, i, to member, j;

$$P(c|T),$$

the likelihood that all of those dyadic tie probabilities compose a given tree pattern, T; and

$$P(c|G),$$

the probability that a cascade occurs in the network, G. The model then uses these probabilities to estimate the maximum likelihood network, $\hat{G}$.

Edges are added iteratively to the model on the basis of these three probabilities. The algorithm uses three criteria for determining the probability that Member A is a source for Member B. The first is the number of times A adopts a topic before B. The second is the wait time between A's adoption and B's adoption. Time intervals are assumed to be exponentially distributed, so the algorithm preferences shorter intervals over longer intervals. Finally, precision of prediction is used as a criterion for inferring a tie between two actors, modeled as the probability that an adoption by A predicts an adoption by B. The algorithm also allows for a small probability that a member adopted a topic completely independent of any influence from colleagues.

Figure B.8 shows the marginal improvement in model fit across all cascades for each edge added to the inferred network. The algorithm continues to infer edges until reaching

the p-value cutoff of 0.1. P-values are determined with a Vuong closeness test. Vuong tests compare two models and test the null hypothesis that both models are equally close to the true data generating process, with the alternative being that one of the models is closer. Figure B.9 displays the p-value from a Vuong test of closeness for each additional edge inferred by the algorithm. As the number of edges increase, the average p-value for new edges also increases until the stopping criteria of p-value = 0.1 is reached.

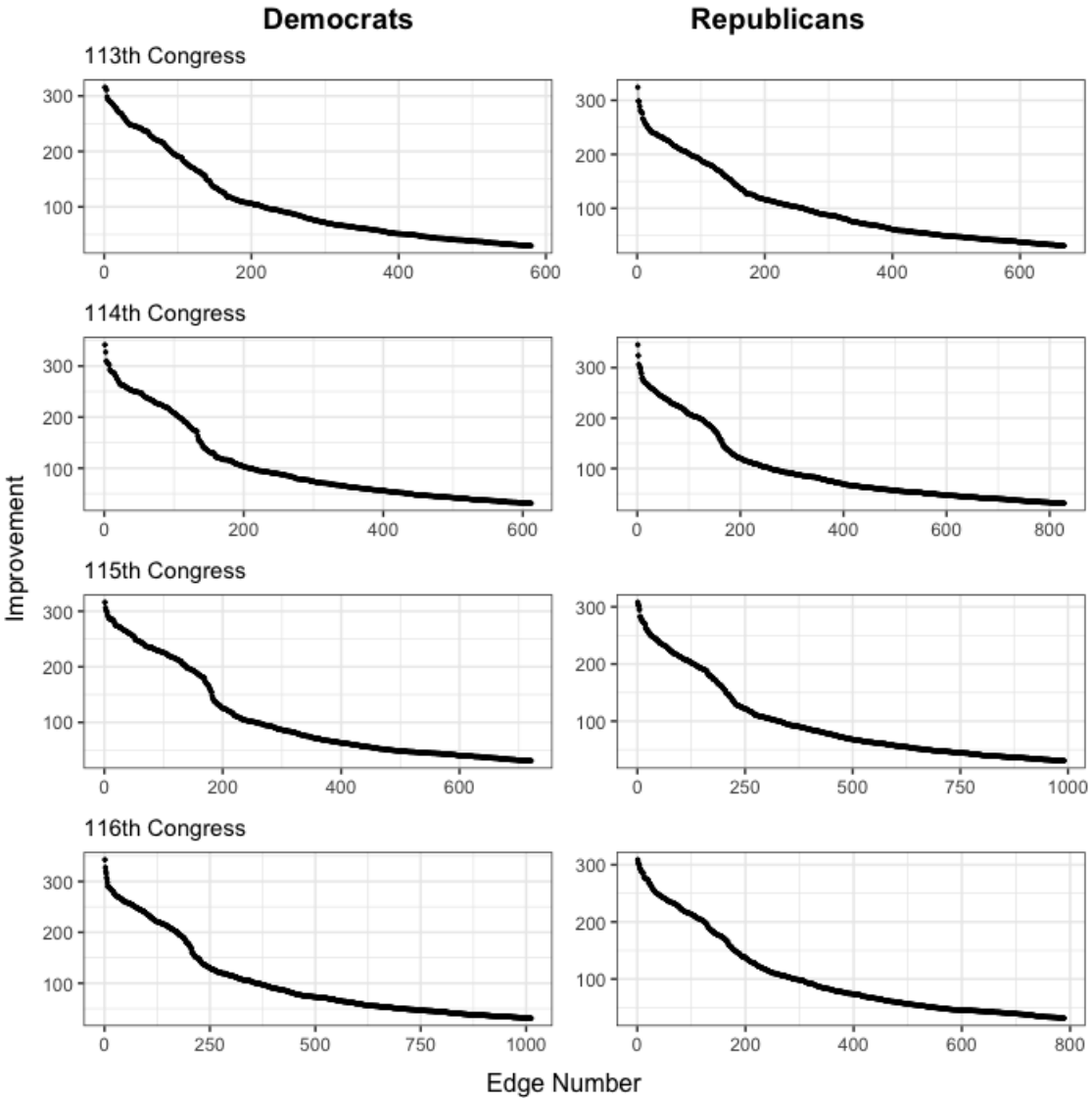

Figure B.8: **Marginal Improvement in Network Model Fit.** Shows the marginal improvement in model fit for each edge added to the network. For each attempted edge, the algorithm performs a Vuong closeness test which compares the new model to the previous model and tests the null hypothesis that both models are equally close to the latent data generating process. Edges are inferred until the p-value cut-off of 0.1 is reached. We can see that the stopping point varies by network and is anywhere between 580 edges for Democrats in the 113th Congress and 1012 for Democrats in the 116th congress.

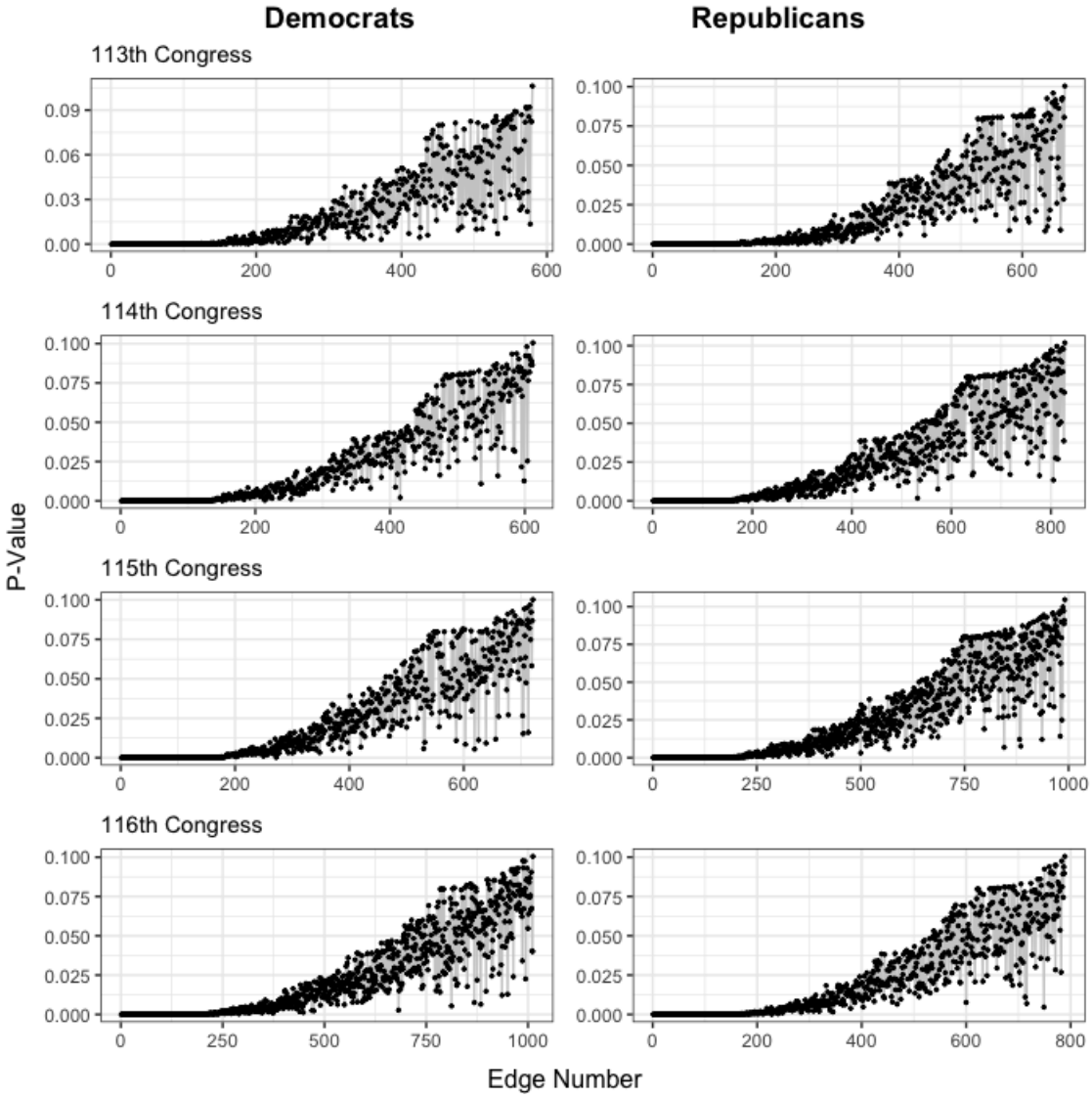

Figure B.9: **Vuong Test of Closeness Significance Values.** Displays the p-value from a Vuong test of closeness for each additional edge inferred by the algorithm. The test compares the previous model to a model with the additional edge and tests the null hypothesis that the two models are the just as close to the true data generating process. If the p-value on the statistic is less than 0.1, the null in rejected and the additional edge is added. We can see that when there are very few edges, every additional edge improves the model. As the number of edges increase, the average p-value for new edges also increases until the stopping criteria of p-value = 0.1 is reached.

Appendix C: Influence and the Diffusion of Ideas in Constituent Communication

The appendix contains the following information:

1. Alternate model specifications;
2. Data.

C.1 Alternate Model Specifications

This section reports all models contained in the chapter. It also fully reports effect sizes associated with control variables. Models are organized into the following sections: OLS models, fixed effects models, random effects models.

	Model 1	Model 2	Model 3
Member characteristics			
Party leadership	**3.16**	**3.09**	1.79
	(1.21)	(1.28)	(1.25)
Committee leadership	1.01	1.23	**2.18**
	(1.04)	(1.09)	(1.06)
Faction member	−0.32	−0.17	−0.15
	(0.67)	(0.70)	(0.68)
log(Seniority)	**−1.19**	**−1.13**	**−1.37**
	(0.30)	(0.32)	(0.31)
log(LES)	**0.92**	**0.65**	0.54
	(0.29)	(0.32)	(0.31)
Extremism	**−0.97**	**−0.87**	**−0.77**
	(0.28)	(0.32)	(0.31)
Majority party	**−2.72**	**−2.85**	**−3.40**
	(0.68)	(0.73)	(0.71)
Republican	0.51	1.07	**1.92**
	(0.67)	(0.93)	(0.91)
Controls			
Win vote pct.		0.09	0.02
		(0.33)	(0.32)
Black		**−3.02**	**−2.22**
		(1.03)	(1.00)
Latino		**−3.12**	**−2.54**
		(1.10)	(1.07)
Asian/PI		0.05	0.14
		(1.79)	(1.73)
Native Am.		2.15	1.50
		(3.53)	(3.42)
Female		**2.63**	**2.03**
		(0.75)	(0.73)
log(Bills cosponsored)		**0.75**	**0.82**
		(0.37)	(0.36)
log(Votes w/ party pct.)		3.49	3.67
		(3.17)	(3.07)
Extra Control			
Total press releases			**2.49**
			(0.26)
R^2	0.04	0.06	0.12
Num. obs.	1428	1337	1337

Table C.1: **OLS Models.** Shows coefficient estimates and statistical significance for the Ordinary Least Squares models accounting for member influence. Coefficients are bold at the 0.05 significance level.

	Model 1	Model 2	Model 3
Member characteristics			
Party leadership	**2.89**	**2.92**	1.29
	(1.21)	(1.27)	(1.23)
Committee leadership	0.66	0.73	1.10
	(1.06)	(1.11)	(1.06)
Faction member	−0.06	0.04	0.17
	(0.67)	(0.70)	(0.67)
log(Seniority)	**−1.02**	**−0.89**	**−0.91**
	(0.31)	(0.33)	(0.32)
log(LES)	**0.98**	**0.65**	0.46
	(0.29)	(0.32)	(0.31)
Extremism	**−0.95**	**−0.88**	**−0.74**
	(0.28)	(0.32)	(0.31)
Majority party	**−2.78**	**−3.03**	**−3.80**
	(0.68)	(0.73)	(0.70)
Republican	0.50	1.44	**2.78**
	(0.67)	(0.94)	(0.91)
Controls			
Win vote pct.		0.02	−0.10
		(0.33)	(0.32)
Black		**−2.92**	−1.89
		(1.03)	(0.99)
Latino		**−2.94**	**−2.11**
		(1.10)	(1.05)
Asian/PI		0.39	0.79
		(1.78)	(1.71)
Native Am.		1.90	0.98
		(3.52)	(3.37)
Female		**2.59**	**1.84**
		(0.74)	(0.72)
log(Bills cosponsored)		**0.96**	**1.32**
		(0.38)	(0.37)
log(Votes w/ party pct.)		5.37	**6.40**
		(3.21)	(3.08)
Extra Control			
Total press releases			**3.00**
			(0.28)
R^2	0.03	0.06	0.14
Num. obs.	1428	1337	1337

Table C.2: **Time Fixed Effects Models.** Shows coefficient estimates and statistical significance for the time fixed effects models accounting for member influence. Coefficients are bold at the 0.05 significance level.

	Model 1	Model 2	Model 3
Member characteristics			
Party leadership	0.04	0.45	0.46
	(1.85)	(1.99)	(1.97)
Committee leadership	1.09	1.61	2.06
	(1.52)	(1.62)	(1.61)
Faction member	−0.25	−0.59	−0.50
	(1.23)	(1.31)	(1.30)
log(Seniority)	**−3.93**	**−3.87**	**−4.57**
	(0.66)	(0.76)	(0.77)
log(LES)	**0.98**	0.54	0.50
	(0.39)	(0.44)	(0.44)
Extremism	−3.23	−4.69	−4.52
	(3.92)	(4.13)	(4.10)
Majority party	**−2.99**	**−2.54**	**−3.07**
	(0.70)	(0.95)	(0.95)
Controls			
Win vote pct.		−0.42	−0.24
		(0.65)	(0.65)
log(Bills cosponsored)		**1.20**	**1.23**
		(0.52)	(0.51)
log(Votes w/ party pct.)		−0.67	0.86
		(6.94)	(6.89)
Extra Control			
Total press releases			**1.29**
			(0.32)
R^2	0.05	0.05	0.07
Num. obs.	1428	1337	1337

Table C.3: **Individual Fixed Effects Models.** Shows coefficient estimates and statistical significance for the individual fixed effects models accounting for member influence. Coefficients are bold at the 0.05 significance level.

	Model 1	Model 2	Model 3
Member characteristics			
Party leadership	**3.16**	**3.09**	1.79
	(1.21)	(1.28)	(1.25)
Committee leadership	1.01	1.23	**2.18**
	(1.04)	(1.09)	(1.06)
Faction member	−0.32	−0.17	−0.15
	(0.67)	(0.70)	(0.68)
log(Seniority)	**−1.19**	**−1.13**	**−1.37**
	(0.30)	(0.32)	(0.31)
log(LES)	**0.92**	**0.65**	0.54
	(0.29)	(0.32)	(0.31)
Extremism	**−0.97**	**−0.87**	**−0.77**
	(0.28)	(0.32)	(0.31)
Majority party	**−2.72**	**−2.85**	**−3.40**
	(0.68)	(0.73)	(0.71)
Controls			
Win vote pct.		0.09	0.02
		(0.33)	(0.32)
Black		**−3.02**	**−2.22**
		(1.03)	(1.00)
Latino		**−3.12**	**−2.54**
		(1.10)	(1.07)
Asian/PI		0.05	0.14
		(1.79)	(1.73)
Native Am.		2.15	1.50
		(3.53)	(3.42)
Female		**2.63**	**2.03**
		(0.75)	(0.73)
log(Bills cosponsored)		**0.75**	**0.82**
		(0.37)	(0.36)
log(Votes w/ party pct.)		3.49	3.67
		(3.17)	(3.07)
Extra Control			
Total press releases			**2.49**
			(0.26)
R^2	0.04	0.06	0.12
Num. obs.	1428	1337	1337

Table C.4: **Party Fixed Effects Models.** Shows coefficient estimates and statistical significance for the party fixed effects models accounting for member influence. Coefficients are bold at the 0.05 significance level.

	Model 1	Model 2	Model 3
Member characteristics			
Party leadership	2.32	2.64	1.77
	(1.30)	(1.36)	(1.29)
Committee leadership	1.21	1.46	**2.25**
	(1.09)	(1.14)	(1.09)
Faction member	−0.50	−0.42	−0.28
	(0.74)	(0.77)	(0.72)
log(Seniority)	**−1.52**	**−1.40**	**−1.52**
	(0.33)	(0.35)	(0.33)
log(LES)	**0.91**	0.60	0.52
	(0.31)	(0.33)	(0.32)
Extremism	**−0.91**	**−0.80**	**−0.75**
	(0.34)	(0.37)	(0.34)
Majority party	**−2.78**	**−2.74**	**−3.31**
	(0.64)	(0.71)	(0.70)
Republican	0.50	1.02	1.82
	(0.76)	(1.04)	(0.96)
Controls			
Win vote pct.		0.05	0.02
		(0.36)	(0.34)
Black		**−2.83**	**−2.20**
		(1.21)	(1.09)
Latino		**−2.92**	**−2.50**
		(1.28)	(1.15)
Asian/PI		−0.10	0.05
		(2.09)	(1.87)
Native Am.		2.24	1.61
		(4.31)	(3.80)
Female		**2.66**	**2.09**
		(0.88)	(0.79)
log(Bills cosponsored)		**0.78**	**0.81**
		(0.38)	(0.37)
log(Votes w/ party pct.)		2.38	3.11
		(3.52)	(3.26)
Extra Control			
Total press releases			**2.29**
			(0.27)
R^2	0.04	0.05	0.10
Num. obs.	1428	1337	1337

Table C.5: **Individual Random Effects Models.** Shows coefficient estimates and statistical significance for the individual random effects models accounting for member influence. Coefficients are bold at the 0.05 significance level.

C.2 Data

The dependent variable is communication influence score constructed from press releases and their publication date. Press releases were clustered into 30 topics for each party individually and were allowed to change in prevalence over time. Figures C.1 and C.2 display the distribution of topics over the entire time period of the data set. Some topics remain relatively consistent over time, while others, such as civil rights and voters' rights for the Democrats and China for the Republicans have increased over time. Influence scores are estimated separately for each congress to account for changes in topic popularity.

Table C.6 displays summary statistics for the primary independent variables. Faction membership indicates membership in one of the following ideological factions (Clarke, 2020); the Congressional Progressive Caucus, the Populist Caucus, the New Democrat Coalition, the Blue Dog Coalition, the Republican Main Street Partnership, the Republican Study Committee, the House Liberty Caucus, or the Tea Party Caucus. Table C.7 displays summaries of the control variables included in some of the models. The number of bills sponsored is highly correlated with the number of bills cosponsored, and so cosponsorship data was used as it provides information about more representatives.

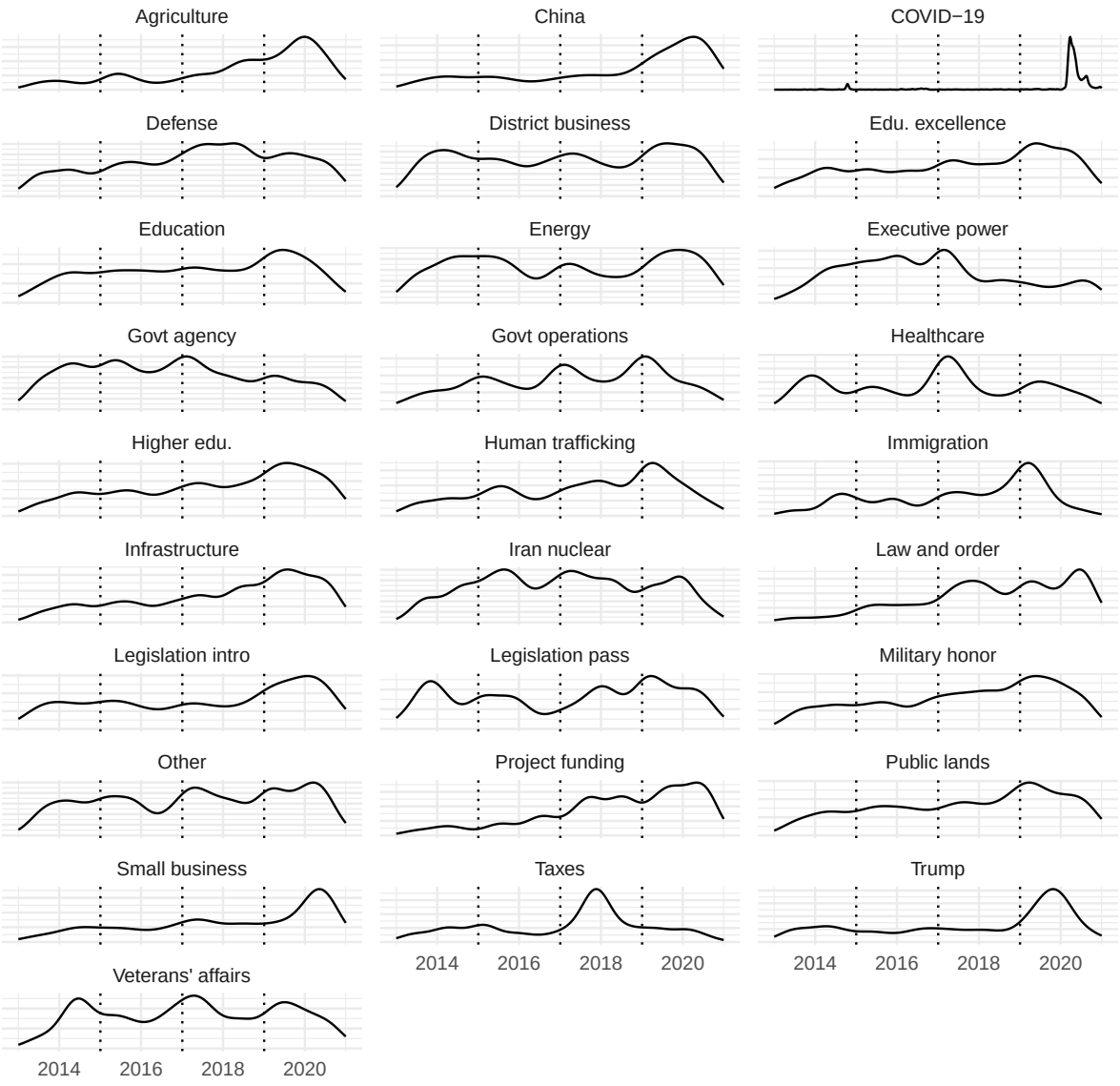

Figure C.1: **Relative Density of Republican Topics in the 113-116th Congresses.** Shows the prevalence of topics for Republicans across the entire data set. The y-axes have free scales, and so the density is relative within in each topic, allowing density changes over time to be visualized for both small and large topics.

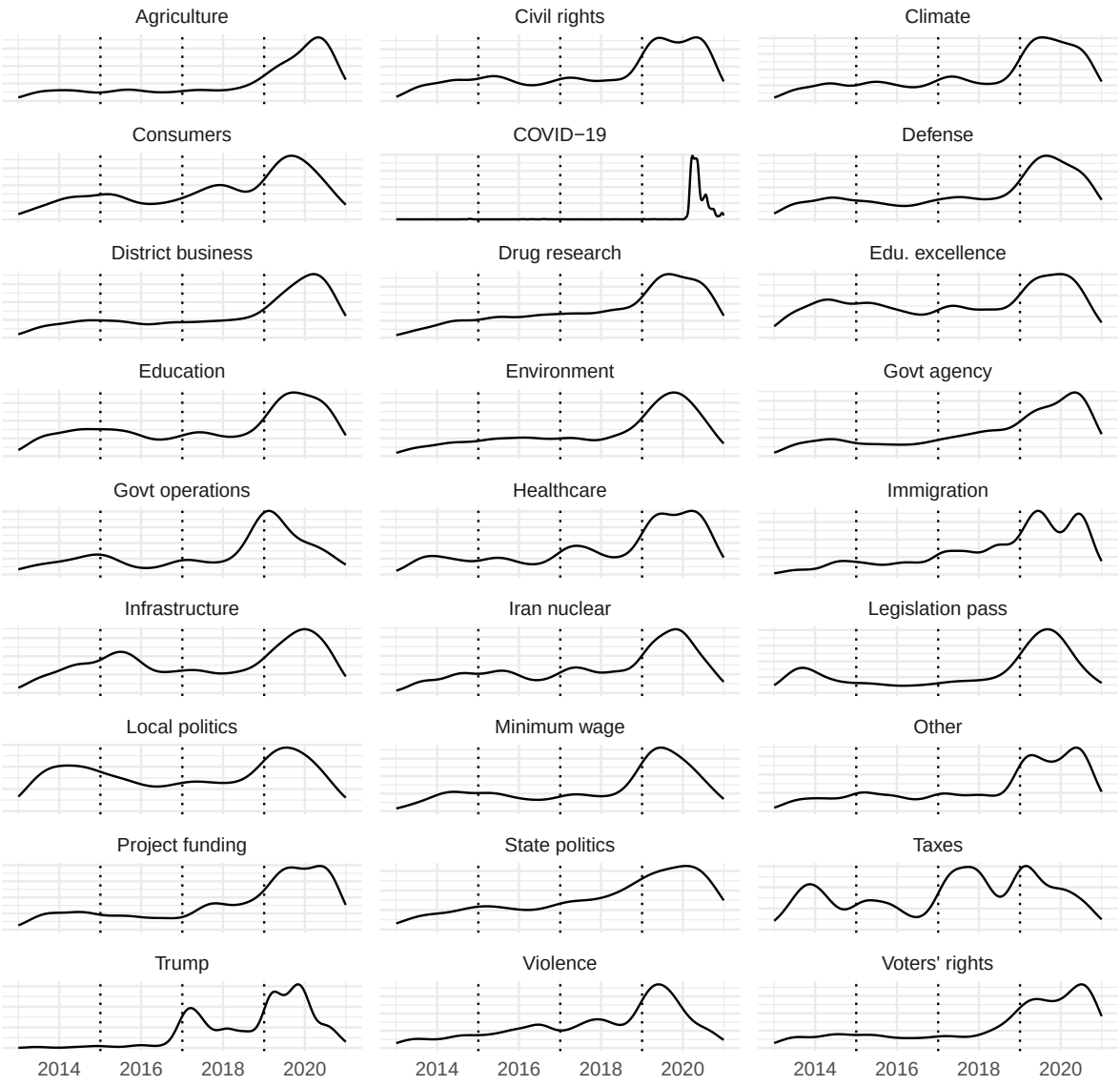

Figure C.2: **Relative Density of Democratic Topics in the 113-116th Congresses.** Shows the prevalence of topics for Democrats across the entire data set. The y-axes have free scales, and so the density is relative within in each topic, allowing density changes over time to be visualized for both small and large topics.

Characteristic	113	114	115	116
Party leadership	20 (6.1%)	25 (6.8%)	15 (3.6%)	14 (3.3%)
Missing	0	1	7	0
Committee leadership	30 (9.1%)	38 (10%)	44 (11%)	0 (0%)
Missing	0	1	7	0
Caucus member	231 (70%)	282 (77%)	342 (81%)	338 (79%)
Seniority				
Mean (SD)	5.4 (4.6)	5.5 (4.4)	5.9 (4.6)	5.4 (4.6)
Range	1.0, 25.0	1.0, 26.0	1.0, 27.0	1.0, 24.0
Missing	0	1	7	0
Legislative Effectiveness				
Mean (SD)	0.99 (1.15)	1.01 (1.02)	1.00 (0.92)	1.02 (1.04)
Range	0.00, 7.59	0.00, 6.31	0.00, 5.94	0.00, 10.30
Missing	3	5	7	1
Folded DW-NOMINATE				
Mean (SD)	0.44 (0.13)	0.44 (0.14)	0.44 (0.14)	0.44 (0.14)
Range	0.15, 0.90	0.15, 0.82	0.09, 0.93	0.12, 0.88
Missing	4	5	9	97

Table C.6: **Summary of Independent Variables.** Displays summary statistics for the primary independent variables used in the analysis.

Characteristic	113	114	115	116
Winning vote pct.				
Mean (SD)	65 (10)	66 (11)	64 (8)	64 (11)
Range	47, 97	47, 99	44, 95	48, 98
Missing	12	25	58	13
Race / Ethnicity				
White	263 (80%)	290 (79%)	329 (79%)	321 (75%)
Black	35 (11%)	39 (11%)	43 (10%)	52 (12%)
Latino	21 (6.4%)	26 (7.1%)	30 (7.2%)	35 (8.2%)
Asian PI	8 (2.4%)	8 (2.2%)	12 (2.9%)	15 (3.5%)
Native Am	2 (0.6%)	2 (0.5%)	2 (0.5%)	4 (0.9%)
Missing	0	1	7	0
Gender				
Male	265 (81%)	295 (81%)	336 (81%)	321 (75%)
Female	64 (19%)	70 (19%)	80 (19%)	106 (25%)
Missing	0	1	7	0
Bills cosponsored				
Mean (SD)	270 (126)	225 (110)	312 (175)	402 (251)
Range	0, 804	0, 793	3, 1,377	9, 2,115
Missing	1	1	2	1
Votes w/ party pct.				
Mean (SD)	92.5 (9.6)	94.7 (3.9)	95.3 (3.8)	94.8 (5.5)
Range	0.0, 97.9	65.1, 100.0	61.3, 100.0	44.5, 99.6
Missing	1	5	8	2

Table C.7: **Summary of Control Variables.** Displays summary statistics for the control variables used in some models in the analysis.