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Pulling Closer and Moving Apart:
Interaction, Identity, and Influence in the U.S. Senate, 1973-2009*

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Abstract

This article reconciles two seemingly incompatible expectations about interpersonal interaction and social influence. One theoretical perspective predicts that an increase in interaction between two actors will promote subsequent convergence in their attitudes and behaviors, while another view anticipates divergence. We examine the role of political identity in moderating the effects of interaction on influence. Our investigation takes place in the U.S. Senate—a setting in which actors forge political identities for public consumption based on the external constraints, normative obligations, and reputational concerns they face. We argue that interaction between senators who share the same political identity promotes convergence in their voting behavior, while interaction between actors with opposing political identities leads to divergence. Moreover, we theorize that the consequences of political identity for interpersonal influence depend on the local interaction context: Political identity's effects on influence are greater in more divided Senate committees than in less divided ones. We find support for these hypotheses in analyses of data, spanning over three decades, of voting behavior, interaction, and political identity in the Senate. These findings contribute to research on social influence; elite integration and political polarization; and identity theory.

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The consequences of interpersonal interaction for social influence—for example, how contact between individuals and groups can lead to shifts in their respective attitudes, beliefs, or behavior—have been longstanding concerns for both sociologists and social psychologists (De Groot 1974; French 1956; Marsden 1981). Indeed, the interplay of interaction and influence has animated research on topics as wide-ranging as attitude change in small groups (e.g., Friedkin 1999), risk-taking in individual versus group settings (e.g., Cartwright 1971), the polarization of public opinion and political ideology (e.g., Baldassarri and Gelman 2008), and the role of elites in promoting similarity in corporate behavior (e.g., Mizruchi 1989).

Across these diverse contexts, a central line of inquiry has united research on social influence: How do proximity and the frequency of interaction affect the tendency for actors' attitudes, beliefs, or behavior to either converge or diverge? One set of conceptual arguments has emphasized convergence. Friedkin (1993: 862-863) succinctly summarizes this view: "Frequent communication tends to embed opinions in a supporting fabric of arguments and information…. Hence the pressure toward uniformity of opinions that arises from a comparison of opinions…is likely to be more pronounced and sustained when issue-related communication is frequent." An alternative perspective has instead highlighted divergence and group polarization—stemming, for example, from social comparisons (e.g., Baron et al.1996), persuasive arguments (e.g., Burnstein 1982), and repeated attitude expressions (e.g., Brauer, Gliner, and Judd 1995).

In line with attempts to integrate these disparate research traditions (e.g., Baldassarri and Bearman 2007; Friedkin 1999), we seek to deepen our understanding of the conditions under which heightened interaction leads to convergence or divergence in attitudes and behaviors. Building on the burgeoning literature on political networks (McClurg and Lazer 2014; Parigi and Bearman 2008; Parigi and Sartori 2014), we situate our investigation in the context of the United

States Senate from 1973 to 2009. Although social attitudes in the U.S. have, with few exceptions, not become more polarized in recent years (DiMaggio, Evans, and Bryson 1996; Fiorina and Abrams 2008), the U.S. Senate has witnessed marked increases in political polarization during this period (Hetherington 2001; McCarty, Poole, and Rosenthal 2006). As Poole and Rosenthal (1997: 232) presciently concluded from their seminal study of voting behavior in Congress: "The degree of polarization in Congress is approaching levels not seen since the 1890s…. Intense conflict between…parties will continue." Given that senators have coherent, visible, and resonant political identities and seek to exert influence over one another through interaction, the U.S. Senate is an apt setting for the study of interaction, identity, and influence.

In this article, we strive to make three main contributions. First, we provide an account of increased polarization in the U.S. Senate that complements prevailing explanations such as the geographic sorting of voters along partisan lines and the growing importance of political activists who are themselves more polarized (Theriault 2008). We do not seek to adjudicate among these macro-level explanations; rather, our aim is to uncover the *microfoundations* of these behavioral shifts. To do so, we draw on a rich dataset of period-to-period changes in the distance between pairs of senators on a well-established measure of political voting behavior (Poole and Rosenthal 1997) and their proximity to one another in physical and social space, as defined by their seat locations on the chamber floor and committee co-membership, respectively. Second, we help to reconcile the competing theoretical perspectives on interaction and behavior change by highlighting the moderating role of *political identity*. To preview our findings, we show that greater interaction among senators sharing the same political identity resulted in convergence in their subsequent attitudes and behaviors, while an increase in contact among senators with opposing political identities led to divergence. Finally, our work shows how the *local context* in which interaction occurs can moderate the effects of identity on social influence. We report evidence that political identity played a role in voting behavior change in more divided Senate committees but did not matter in less divided ones.

In the remainder of the article, we first ground our work in network-analytic approaches to social influence. We then derive hypotheses about how political identity moderates the effects of interaction on influence and about the local contexts in which political identity matters most. Next, we describe the research setting, analytical approach, and empirical results. We conclude with implications of our findings for research on social influence, elite integration and political polarization, and social identity.

THEORY

Network-Analytic Approaches to Social Influence

As Marsden and Friedkin (1993: 127) note, "The study of social influence is a strategic arena for social network research; it links the structure of social relations to attitudes and behaviors of the actors who compose a network." Early conceptual work in this vein began with simple mathematical formulations, which described the structural origins of group consensus (De Groot 1974; French 1956; Harary 1959). Later work accounted for group outcomes that fell short of full consensus (Friedkin and Johnson 1990; Marsden 1981).

A prominent formulation, referred to as social influence network theory (Friedkin 1998), suggests that a person's attitudes and behaviors can change both endogenously through the influence of others and exogenously by the conditions that formed their original views. We draw on a recent conceptualization (Baldassarri and Bearman 2007), which assumes that actors hold multiple opinions on diverse issues, that their overall perspective can be characterized by aggregating their views on these issues, that their views are susceptible to influence from all other actors to whom they are connected, and that attitude and behavior change occurs through interaction with others who have similar or opposing views. We turn next to explicating the role of political identity in this approach to social influence.

Political Identity in the U.S. Senate

Identity is a core feature of social life and a key theoretical construct in psychology (Ellemers and Haslam 2012; Hogg and Turner 1985; Tajfel and Turner 1979), sociology (Burke and Stets 2009; Hogg and Ridgeway 2003; McCall and Simmons 1978; Stryker and Burke 2000), and political science (Fowler and Kam 2007; Ringe, Victor, and Gross 2013; Schildkraut 2011; Shayo 2009). Identity involves "the recognition of and participation in a web of social relations or communities that envelop the self and through which individuals feel themselves as identical with others" (Berezin 2001: 84). It is often multifaceted, as people relate to and derive meaning from multiple communities of similar selves (Agnew and Brusa 1999; Calhoun 1993). People possess both private identities, which are informed by emotion and tradition, and public identities, which are governed by interest and rationality. We focus on a particular kind of identity—political identity—that has both private and public elements (Berezin 2001; Kanazawa 2000; Somers 1993).

In the U.S. Congress, senators forge political identities for public consumption based on external constraints, such as promises they made on the campaign trail and to key donors; normative obligations, such as commitments they made to party leaders and the history of prior support they received from colleagues; and reputational concerns, such as the extent to which they are known for hewing to and reinforcing the party line. In the Senate, perhaps the most salient manifestation of political identity is party affiliation. Each of the two main parties—

Republican and Democratic—has a collective political reputation, shared leadership, a common party line, a history of supporting and sanctioning same-party colleagues, and a common opponent in the form of the other party. At the same time, political identities in the Senate can also transcend party boundaries. For example, two senators from states that have shared economic interests or matching levels of religiosity may construct similar political identities, while those whose constituents have competing economic, social, or moral interests may fashion opposing identities.

Political Identity and Social Influence

Once an identity—including a political identity—is deemed salient, the normative pressures defined by that identity lead people to think and act in ways that conform to the norms of the identity group. That is, when activated, identities create the conditions for social influence (for a review, see Abrams and Hogg [1990]). Specifically, the process unfolds in the following steps: (1) people define themselves as members of a social category—for example, a group defined by party affiliation; (2) they learn the expected and desirable behaviors that are correlated with membership in that category; (3) they assign the norms and attributes of the category to themselves through a process of internalization; and (4) their behavior changes to conform to the norm as their category membership becomes more salient (Turner and Reynolds 2012).

Experimental evidence from social psychology supports this conceptualization. For example, subjects in an experimental study were better able to recall information they thought relevant to the group with which they identified, than information considered not relevant to that group (Maitner et al. 2010). Similarly, in another study, subjects were more likely to change their attitudes in response to arguments they perceived were made by members of their identity group than to arguments they thought were made by people not in their identity group (Mackie and

Cooper 1984). Outside of the laboratory setting, a longitudinal field study found that students' political views were more likely to converge when they shared a positive tie than when they did not share a positive tie (Lazer et al. 2010). Finally, agent-based simulations of group dynamics have shown that interaction among actors with shared identity in the form of a positive relationship reduces the ideological distance between them (Kitts 2006; Macy et al. 2003).

In the U.S. Senate, identity-based sources of social influence are amplified because of the fundamental oppositional nature of the two main political parties. In a sense, we can think of senators from the same party as having a positive tie to one another in terms of their political identity—even if they have an acrimonious personal relationship. Conversely, senators who are across the aisle in terms of party affiliation have a negative tie to one another regardless of whether they have an amicable or antagonistic personal relationship (cf. Almquist and Butts 2013). These positive and negative ties of political identity create strong normative pressure to conform to the expected attitudes and behaviors of a senator's party or other salient political identity group. Because senators (like most people) have a desire to maintain a positive self-concept, thinking or acting in ways that violate these expectations creates cognitive dissonance, which in turn causes attitudes and behaviors to fall in line with expectations (Aronson 1968; Festinger 1957; Stone and Cooper 2001; Thibodeau and Aronson 1992). Thus, when two people sharing the same political identity come into greater contact with one another, their shared political identity becomes more salient and the normative pressure to reach alignment in thoughts and action increases. Moreover, strategic and public self-presentations, of the kind that senators routinely undertake when they interact with each other, tend to produce lasting changes in views of the self and behavior change that persists across social settings (Schienker, Dlugolecki, and

Doherty 1994). We therefore argue that an increase in interpersonal interaction between senators sharing the same political identity will lead to convergence in voting behavior. Thus, we posit:

Hypothesis 1a: The more senators with the <u>same</u> political identity interact with one another, the more their subsequent voting behavior will tend to <u>converge</u>.

How can we expect an increase in contact between people with *opposing* political identities to change their attitudes and behaviors? One set of insights comes from the agent-based simulations mentioned above. These studies have also shown that interaction among actors who are negatively tied to one another increases distance and leads to group polarization (Kitts 2006; Macy et al. 2003). Another perspective suggests that interaction among people with opposing views can result in compromise or conflict, depending on their relative positions on a broader set of topics. As Baldassari and Bearman (2007: 792) note: “If [two actors] have contrasting views on a focal issue, but share similar opinions on the remaining issues, they compromise by reducing their commitment on the salient issue, thus moving closer to each other. In contrast, if they disagree on other issues, their commitment to the focal issue is reinforced and their opinions diverge further.” In already polarized settings such as the U.S. Senate, heightened interaction among senators with opposing political identities will lead to divergence in voting behavior because the senators’ conflicting identities will become more salient and the normative pressure to move further apart in thoughts and action will intensify. Subject to the scope condition of pre-existing polarization, we therefore expect:

Hypothesis 1b: The more senators with conflicting political identities interact with one another, the more their subsequent voting behavior will tend to diverge.

Local Context—Degree of Past Division in Committees

Having contended that political identity will moderate the effects of interaction on social influence, we turn next to exploring how the local context in which interaction occurs can amplify or dampen this effect. We posit that group contexts in which members have experienced past division across identity group lines will tend to make political identities more salient. By contrast, political identities will matter less in group contexts in which members have collaborated effectively in the past across identity group lines. Thus, political identity can be expected to play a more important role in moderating the effects of interaction on identity in the former context, relative to the latter.

In the U.S. Senate, the committees on which senators serve and deliberate on key issues represent one of the most prominent contexts for local interaction. Within these committees senators discuss, debate, and amend preliminary pieces of legislation, or bills, which are assigned to them by the broader legislative body. Committee deliberations represent the most significant hurdle for the passage of bills: once a bill passes through committee, it has a high likelihood of becoming law (Fenno 1973). Committees are venues in which senators wrangle with one another over bills but also seek to collaborate with one another by co-sponsoring bills that matter to them, their constituents, and other key stakeholders. Because tradition dictates that party representation on committees should reflect the overall composition of the Senate, committees are key sites for both within-party and cross-party political interaction.

Committees vary considerably in membership, with some committees consisting of senators who have a track record of co-sponsoring bills extensively across party lines and others whose members have co-sponsored bills primarily within party lines. We can think of these different kinds of committees as varying in their level of past division. The former is less divided because senators on that committee have a history of working effectively across party lines, while the latter is more divided because senators on that committee have collaborated primarily within party lines.

We suggest that the more divided a Senate committee is, the more likely it is to create a local interaction context in which senators' political identities become salient. In a divided committee, where senators have not collaborated extensively across party lines, the political fissures between the two main parties will be more evident to committee members.[1] Thus, the tendency for political identity to moderate the effects of interaction on voting behavior convergence will be amplified when senators' interactions take place in the context of more divided committees. By contrast, interaction in the context of less divided committees is less likely to trigger identity-based sources of social influence because senators in such settings are surrounded by colleagues who have collaborated effectively across party lines. Together, these arguments suggest:

Hypothesis 2: The tendency for political identities to influence the convergence or divergence of senators' voting behavior will be greater in more divided Senate committees than in less divided committees.

DATA AND METHODS

Empirical Setting: The United State Senate

To test these hypotheses, we examined interactions, group contexts, and voting behavior changes in the Senate, the upper house of the U.S. national legislature. For four reasons, this empirical setting was especially well-suited to our theoretical aims. First, senators' voting behavior is part of the public record, and the (changing) distance in voting behavior between each pair of senators can be readily observed. Second, senators interact with one another in multiple, observable settings, including the Senate Chamber and a range of committees (Deering and Smith 1997). We can therefore derive two distinct indicators of interpersonal interaction. Third, we can characterize the local interaction context on different committees as more or less divided by drawing on the record of past bill co-sponsorships between each pair of same-party and different-party senators. Finally, because of the two party system in the U.S., senators construct political identities that are often in close alignment with or direct opposition to one another. In sum, the U.S. Senate represents a strategic site for the study of political identity, interaction, and influence.

Our hypotheses focus on the tendency for interaction to lead to the convergence or divergence of voting behavior—that is, we theorize about changes in the *voting distance* between two senators. As a consequence, we analyzed interpersonal influence at the level of dyads, rather individuals. Dyads were the appropriate unit of analysis for another key reason: rather than assuming that actors had the same level of influence over all other actors, we instead allowed for heterogeneity in actors' influence over other actors (Friedkin 1993: 865).[2]

Our analyses cover the years 1973 to 2009. This time frame allowed us to collate a rich dataset that encompassed a period of stable, two-party rule, with both parties occupying the White House at different times, and neither party outright dominating the other.

Dependent Variable

Because senators' votes on contentious issues—for example, regulation of business practices, tax policy, and abortion rights—are often highly correlated, one can distill these votes into a composite measure of voting behavior (cf. Baldassarri and Bearman 2007). We adopted Nokken and Poole's (2004) variant of a widely used measure of voting distance in the US Congress: Dynamic Weighted Nominate, or DW-Nominate. This approach extrapolates from each senator's observed voting record to map each senator's behavior in a given Congress onto a point in Euclidean space. In colloquial terms, one can think of this space as spanning the spectrum from "liberal" to "conservative" (Poole and Rosenthal 1997). Senators' composite voting behavior can range from -1 (especially liberal) to 1 (especially conservative). We used this behavioral score to construct our dependent variable: the absolute voting distance between two senators within a given Congress, which can range from 0 to 2. Figure 1 depicts the distribution of this variable.

*******Figure 1 about here*******

Independent Variables

We constructed two measures that proxy for the degree of interaction between senators. The first was based on geographic proximity. A long literature—dating back to Bossard's (1932) seminal work on marriage selection and Festinger, Schachter, and Back's (1950) treatise on spatial configurations—suggests that geographic proximity is one of the most salient determinants of interaction. To examine the effects of geographic proximity, we focused on the Senate chamber—a large, 16-by-26 meter room in which each senator is assigned a desk. It is in this chamber that senators debate legislation, work to build consensus, and vote on bills. Every two years, after an election, the chamber map is redrawn, and chamber desks are rebolted to new locations on the floor. By tradition, each party is apportioned a side of the chamber floor and senators sequentially choose their desks in order of seniority. See Figure 2 for a graphic representation of the chamber. Using archives of seating locations, we mapped each senator's desk location onto Cartesian space, and used these coordinates to construct the precise chamber distance between each pair of senators. Senators whose desks were closer together were more likely to interact with one another (Chown and Liu forthcoming). Hence, our first measure of interaction between senators was: *Chamber Distance*. Figure 3 depicts the distribution of this variable.

*******Figure 2 about here*******

*******Figure 3 about here*******

The second measure considered the extent to which two individuals had overlapping sites of interaction within the Senate. Specifically, we counted the number of committees that two senators served on together, *Committee Co-Memberships*, within a Congress (Nelson and Stewart III 2011; Stewart III and Woon 2011). Senate committees are formally constituted subgroups of the larger legislative body. After initial legislation in the form of a bill is drafted, it is then referred to the appropriate committee, which gathers information, holds hearings, and revises the bill. Most bills fail to garner sufficient support at the committee stage and are never voted on by the full Senate. Because a significant amount of senatorial work is conducted in committees, these groups represent a major locus of interpersonal interaction and influence.

Our theory suggests that the effects of interaction may lead to convergence or divergence of voting behavior, depending on the political identities of individuals. We use an individual's party affiliation (i.e., Democrat, Republican, or Independent) as an indicator of his or her political identity.[3] Party affiliations define a senator's core electorate and also trace his or her most likely alliance partners and sources of opposition within the chamber. Members of the same party typically seek to craft a common political agenda and are apt to lend one another political support, while members of differing parties are more likely to oppose one another. As a reflection of the importance of party affiliation, members of the same party are seated in separate halves of the Senate chamber and are designated as majority or minority members of a committee. Our measure of shared or contrasting political identity was *Same Party*, an indicator set to one for dyads in which both senators had the same party affiliation and to zero otherwise. To test Hypothesis 1, we interacted our measures of the intensity of interaction, *Chamber Distance* and *Committee Co-Membership*, with our indicator variable of shared political identity, *Same Party*. In supplemental analyses described below, we also generated an alternative measure of political identity based on the degree of religiosity among constituents of the states that senators represent.

In developing Hypotheses 2, we theorized that contextual features of the groups in which interaction occurs will shape the tendency toward ideological convergence or divergence. To measure the level of past division that occurred in a committee, we used data on bill co-sponsorships among U.S. senators (Fowler 2006a; Fowler 2006b). Bill co-sponsorships are public endorsements of support that one senator makes for another's policy initiatives. In our data, within any given Congress, about 45% of bills received one or more co-sponsors.

To capture the history of division within a committee, we generated the average number of bill co-sponsorships per dyadic pair on the committee, separated out by bill co-sponsorships that were within the same political party and those that were across party lines. For each committee, we then measured the ratio of within-party to cross-party co-sponsorships (see Figure 4). When this ratio is close to 1, bill co-sponsorships are just as likely to occur between senators from the same party as between senators from opposing parties. In such committees, cross-party division is low. By contrast, a ratio greater than 1 indicates that bill co-sponsorships are more likely to occur between senators from the same party than between senators from opposing parties. For these committees, division is expected to be high. As Figure 4 illustrates, committees vary considerably in past division. To capture this variation, we implemented a median split of committees based on their ratio of within- to cross-party co-sponsorships and then created two separate counts of shared committees of each type between pairs of senators.[4] Finally, we created interaction terms of these committee co-membership counts and our measure of shared political identity, *Same Party*, to test Hypothesis 2.

*******Figure 4 about here*******

Estimation

To examine the impact of changes in interaction on voting distance between two senators, we regressed voting distance in the next period on the degree of interpersonal interaction that occurred within the Senate in the present period. Formally, our baseline regression model is represented as:

$$E[y_{ijt+1}|X_{ijt}] = \beta_0+\beta_1 Chamber\ Distance_{ijt}+\beta_2 Commmittee\ Co\text{-}Membership_{ijt}+\beta_3 X_{ijt}+\delta_t+\gamma_{ij}+\varepsilon_{ijt},$$

where y is the voting distance between i and j in the subsequent Congress, $t+1$, *Chamber Distance* is the geographic distance between senators i and j in meters in Congress t, *Committee Co-Membership* is a count of the committees shared by i and j in Congress t, X is a vector of control variables, δ_t represents fixed effects for each Congress, and the γ_{ij} corresponds to dyad fixed effects.

Importantly, the inclusion of dyad fixed effects allowed us to focus on *within-dyad* variation. In this specification, all time-invariant characteristics of individuals—for example, gender, party affiliation, starting ideology, or cohort—as well as characteristics of dyads—for example, whether two senators were of the same gender, were elected at the same time, or shared the same ideology at the time they were elected—were netted out. Put differently, we linked changes in voting distance, our dependent variable, to changes within the dyad (e.g., chamber distance or committee co-membership) over time. We controlled for any residual effects of increasing seniority in dyads by including the sum of their senate tenures and their changing personal relationship over time by including their history of bill co-sponsorships (logged). The inclusion of Congress fixed effects accounted for unobserved time heterogeneity—for example, years in which those elected to the Senate held especially extreme ideological views.

Non-Independence of Observations

The error terms in regressions of dyadic network data will be correlated across observations—a problem referred to as network autocorrelation (i.e., clustering). The failure to account for clustering can lead to under-estimated standard errors and over-rejection of hypothesis tests. To address this issue, we employed a variance estimator that enables cluster-robust inference (Cameron, Gelbach, and Miller 2011). This approach to adjusting standard errors is appropriate for the analysis of social network data (e.g., Dahlander and McFarland 2013; Kleinbaum, Stuart, and Tushman 2013). We also considered but decided against another alternative: stochastic actor-based models of the kind estimated using the software program, SIENA (Steglich, Snijders, and West 2006). These models assume a dichotomous dependent variable and become more difficult to estimate as the number of time periods increases (Snijders, van de Bunt, and Steglich

2010); thus, they are not appropriate for analyzing a data set in which the dependent variable is a distance measure and that spans such a long time period.

Accounting for the Role of Selection onto Committees

Although regressions with dyad fixed effects account for unobserved heterogeneity among individual senators and pairs of senators, questions about how senators sorted onto committees could still undermine our claims about the role of political identity in moderating the effects of interaction on influence. For example, it is conceivable that senators from the same party chose to jointly serve on a committee because they expected their behaviors to later converge. Alternatively, a senator from one party might have chosen to serve on a committee to block the influence of a senator from a different party whose voting patterns were diverging from her own. We addressed these concerns in two ways: (a) by reviewing institutional features and norms of the U.S. Senate that make it unlikely that senators chose committees or were assigned to committees in ways that could provide an alternative explanation for our findings; and (b) by explicitly accounting for selection onto committees in supplemental regression analyses.

The committee assignment process in the Senate has three goals: (a) ensuring that each committee is staffed with the requisite number of senators; (b) responding to the preferences of individual senators; and (c) limiting direct personal conflict among senators who have overlapping preferences. After each election, the Senate Committee on Committees determines the size of each committee. Each party's share of committee seats reflects the overall party composition of the Senate in that Congress. Although each party allocates its members to committees independently, both parties adhere to longstanding norms. First, members can retain their committee assignments for as long as they desire. Second, both parties defer to seniority when it comes to resolving competing demands. Finally, senators are limited to two major committee assignments and one minor committee assignments (though exceptions are sometimes granted) (Deering and Smith 1997).

As a consequence of these norms, senators often do not receive their preferred committee assignments. For example, Senator Dan Quayle related the following experience:

> "You literally sit around in a room with a sheet of paper in front of you and pick committees in order of seniority. Foreign Relations had no vacancies. It would have been my first choice. My next choice was Finance. [Three other senators] took it before me, so I missed it. I said 'Armed Service.' It covers some of the same problems as Foreign Relations….On the second round, I wanted Governmental Affairs. But I sat there watching, and I saw that I could be third ranking on Labor and Human Resources. I noticed everyone was shying away from it. I didn't have any interest in it, to tell you the truth. I hadn't even thought of it. But if I were third ranking—and Bob Stafford retired next year, I could be second ranking—assuming Orrin Hatch is reelected. So I said to myself right there, "Why not take it? There are a lot of important policies there—education, employment, labor. I took it on the spot" (Fenno 1989: 23-24).

Concerns about anticipated alignment or misalignment in voting behavior did not factor into Senator Quayle's account or other comparable accounts of how members chose or were assigned to their committees.

Although these institutional features significantly reduce concerns about the threat to causal inference from the process by which senators sorted onto committees, we nevertheless conducted supplemental analyses that directly accounted for this selection mechanism. In particular, we used an empirical approach that has gained acceptance in biostatistics and has since diffused to the social sciences: Inverse Probability of Treatment Weighted (IPTW) estimation (Hernán, Brumback, and Robins 2001; Robins, Hernán, and Brumback 2000). This estimator is related to propensity-score matching (Rubin 2006) and similarly assumes that selection into treatment is based on observable characteristics (Azoulay, Ding, and Stuart 2009).

We implemented the procedure in three steps. First, we estimated for each dyad in our sample the probability of serving together on at least one committee as a function of: *Same Party—Democrat*; *Same Party—Republican*; *Same Cohort*; *Same Gender*; and *Same State*. Next, we computed the inverse of this predicted probability. Finally, in the models pertaining to committee co-membership (i.e., those reported in Tables 5 and 6), we weighted observations by the inverse of these predicted probabilities. This methodology in effect created a quasi-random sample, giving more weight to atypical observations and less weight to typical ones.

RESULTS

We begin with a description of the data. Table 1, Panel A describes the characteristics of the 276 senators in our dataset. The median senator was male and joined the Senate in 1979 (i.e., the 96th Congress). On average, 12 senators entered each Congress, although this number ranged widely from six to 21 in our sample. Across the entirety of our dataset, senators were evenly divided between political parties, and voting behavior was centered at 0. Table 1, Panel B describes characteristics of the 64,856 senator dyads in our data set. The median senator pair had a voting behavioral distance of 0.417, a chamber distance of approximately 10 meters, and sat on 0.57 committees together. Table 2 shows the distribution of dyads by number of shared committees. Over 54% of dyads had no shared committees and 35% had just one. Less than 1% of dyads served on three or more committees together.

*******Table 1 about here*******

*******Table 2 about here*******

Table 3 describes patterns in how the distance in voting behavior among pairs of senators changed over time. Across all Congresses, the mean distance between senators was 0.42 (on a scale ranging from 0 to 2), although this distance increased significantly over the observation period (column 1). Much of this increase in polarization was driven by cross-party (column 3), rather than within-party (column 2), changes. This increasing polarization could have resulted from incumbents shifting their behaviors to adopt more extreme positions, newcomers becoming increasingly radicalized, or both. To further illuminate these trends, we examined these changes within two subsets of dyads: senators who entered the Congress before the observation period (i.e., pre-existing senators, column 5) and entering senators (column 7). Aggregate increases in cross-party polarization arose from increases in voting distance in both sets of dyads.

*******Table 3 about here*******

Our empirical analyses sought to explain shifts in voting distance stemming from changes in interaction, using two distinct indicators of interaction: geographic distance in the Senate Chamber and committee co-membership. The mean chamber distance between senators was 10 meters. Given the allocation of chamber seats by party, the mean intra-party distance was 6 meters, while the mean inter-party distance was 14 meters (see Figure 3). Between Congresses, the median senator moved 1.7 meters on the floor, though relocations tended to occur in the early years of a senator's tenure. After the fifth Congress (i.e., 10 years of service), a senator typically settled into a fixed desk position on the Chamber floor. The mean number of committee co-memberships was 0.5.

Table 4 reports the first set of analyses pertaining to Hypotheses 1a and 1b: that an increase interaction, as indicated by greater physical proximity, between senators sharing the same salient political identity will lead to subsequent convergence in voting behavior, while an increase in interaction between senators with oppositional political identities will lead to divergence. In Model 1, the baseline, we first examined the effects of interaction on voting distance, without taking into account senators' political identities. Both *Chamber Distance* and *Committee Co-Membership* had a statistically significant effect. Interestingly, the two coefficients each indicated that the more two senators interacted with each other, the *less* similar their voting behaviors became in the subsequent period. In interpreting the effects, note that *Chamber Distance* and *Committee Co-Membership* are opposing indicators of interaction: an increase in chamber distance is associated with a decrease in interaction, while an increase in committee co-membership suggests more interaction.

Our next set of analyses sought to unpack the aggregate effect of increased interaction on voting behavior change by considering the role of political identity. In Table 4, Model 2, we interacted *Chamber Distance* with the political identity indicator, *Same Party*. The main effect of same party membership, which was time-invariant, was subsumed by the dyad fixed effects. Results indicated that when two senators from the same party moved closer together on the chamber floor, their voting distance in the next period decreased. By contrast, when two senators from different parties moved closer together, their voting distance increased. For senators from the same party, a one standard deviation decrease in chamber distance resulted in a 10.4% *decrease* in voting distance while for different-party senators, a one standard deviation increase resulted in a 2.7% *increase* in voting distance.[5]

Although these changes may seem modest, they are substantively meaningful when we consider the baseline stability in senators' voting behavior. For the median cross-party dyad, there was only a 14.1% change over the observation period. Thus, a 2.7% increase in voting distance represents nearly one-fifth of the lifetime change in voting behavior in the median cross-party dyad. Another way to interpret the magnitude of this effect is to consider how it would affect the location of a focal dyad on the distribution of dyads by voting distance. If the median (i.e., 50^{th} percentile) same-party dyad moved one standard deviation closer together in the senate chamber, that dyad would move to the 45^{th} percentile of voting distance in the next period. In sum, changes in the physical proximity of senators on the chamber floor yielded modest yet perceptible shifts in their subsequent voting distance.

Model 3 decomposed the same party variable into *Same Party—Republican* and *Same Party—Democrat*, and revealed no significant differences in political identity dynamics between the two major parties. Finally, Model 4 did not assume a linear relationship between chamber distance and the subsequent change in voting behavior. Instead, we introduced indicators that allowed us to flexibly identify the effects of especially close versus less close proximity on voting distance. Results indicated that the effects of chamber distance were more pronounced when senators come into especially close physical proximity, with effects tapering beyond 10 meters.

*******Table 4 about here*******

Table 5, Model 5 reports results of the second set of analyses relating to Hypotheses 1a and 1b: the effects of committee co-memberships and political identities on voting behavior convergence or divergence. Consistent with Table 4, we found that same-party senators converged in their subsequent voting behavior when they experienced an increase in committee co-memberships. For median same-party dyads, each additional committee they served on together led to a 5.8% decrease in their subsequent voting distance. By contrast, different-party senators who served on more committees together tended to diverge in voting behavior. For the median different-party dyad, each additional committee co-membership was associated with a 1.1% increase in voting distance. These results were consistent for both parties, although Democrats exhibited greater influence on one another in voting behavior convergence than did Republicans (Model 6); the difference between these two coefficients was significant at the .005 level.

Model 7 did not assume a linear relationship between shared committees and voting behavior change; rather, we introduced two indicator variables to disentangle the effects of having one shared committee from that of having two or more shared committees. Results indicated a 4.5% decrease in voting distance when two senators from the same party went from serving on zero committees together to serving on one committee together. The same change in committee co-memberships led to a 0.9% increase in voting distance for different-party dyads. When same-party dyads went from having one shared committee to two or more shared committees, they experienced a further 5.4% decrease in voting distance. This same change in committee co-memberships led to a further 1.7% increase in voting distance for different-party dyads. Finally, Model 8 was an integrated model that considered how changes in Chamber distance and committee co-memberships jointly affected voting behavior change. The hypothesized effects were robust to the inclusion of both measures of interpersonal interaction. In sum, Models 1 through 8 provided strong support for Hypotheses 1a and 1b.[6]

*******Table 5 about here*******

Table 6 reports results that speak to Hypothesis 2: that the effects of political identity and interaction on voting behavior change will be greater in more divided committees than on less divided committees. Model 10 disaggregated committees into those that were above or below the median level of division and then interacted these two committee counts with the political identity indicator, *Same Party*. In support of Hypothesis 2, the convergence or divergence in voting behavior held only for changes in co-memberships on more divided committees (Model 10). For median same-party dyads, each increase in the number of divided committees served on together was associated with a 10.3% decrease in subsequent voting distance. For the median different-party dyad, each increase in the number of divided committees served on together was associated with a 1.4% increase in voting distance. The effect was not statistically significant for changes in co-memberships on committees with a more equitable ratio of same- to cross-party bill co-sponsorships. Moreover, these results were robust to the inclusion of chamber distance (Model 11).

*******Table 6 about here*******

To account for selection of senators to committees, we implemented an Inverse Probability of Treatment Weighted (IPTW) estimation approach. We first estimated the likelihood that two senators would serve on a committee together and then, in the second-stage, inverse weighted each observation by its predicted probability. Thus, this approach netted out observable correlates of joint selection to a committee. Results from this analysis (not reported) showed only negligible changes to our results in Tables 5 and 6 and assuaged concerns about endogeneity arising from senators self-selecting onto committees based on anticipated changes in voting behavior.

Finally, we conducted a number of supplemental analyses (see Appendix) to ensure that our results were robust to alternative specifications and modeling choices. Our results were substantively unchanged when we estimated random effects models with time-invariant covariates, included time-varying covariates such as whether or not members of a dyad were committee chairs in a given Congress, added controls for triadic closure, and modeled the dynamics of interaction and influence at the individual, rather than dyadic, level.

Empirical Extension: Political Identities Based on the Religiosity of Senators' Constituents. The analyses reported above provided evidence that one type of political identity, party affiliation, moderated the effects of interaction on behavioral convergence or divergence. To demonstrate the generalizability of these findings, we examined whether comparable moderation effects could be detected using a different measure of political identity. In particular, we conducted a supplemental analysis based on the degree of religiosity among constituents of the states that senators represented. Our theory predicts that senators from states with comparable rates of religiosity will construct matching political identities with respect to divisive social issues, while those from states with very different rates of religiosity will construct opposing political identities with respect to those same issues.

We derived our state-level religiosity measure from responses to a Gallup poll that asked respondents the extent to which "religion is an important part of their daily life."[7] Importantly, this measure of religiosity was not highly correlated with party affiliation: although statistically significant, the correlation between being Republican and greater state religiosity was only 0.063. Thus, political identities defined using this religiosity measure are distinct from political identities based on party affiliation.

Because our theory is predicated upon matching or oppositional identities, we identified the subset of senator dyads whose political identities with respect to constituent religiosity would be either closely aligned or opposing. To do so, we first arrayed states on a religiosity index that ranged from 0 to 100 and placed them into quartile bins. Next, we restricted our sample to dyads of senators representing states with either very high (top quartile) or very low (bottom quartile) rates of religiosity. That is, we dropped senators from states with moderate (middle two quartiles) rates of religiosity. Then we created an indicator variable, *Same State Religiosity*, which was set to one for dyads in which both members came from states with very high or very low rates of religiosity. Because the middle of the distribution was dropped, the reference category was therefore dyads from states with sharply contrasting rates of religiosity. This analytical approach sought to parallel the identity dynamics that we theorized about and empirically assessed using party affiliation. In both cases, the indicator variable represented a positive tie in terms of political identity (regardless of whether the two senators had a positive or negative interpersonal relationship), and the reference category indicated a negative tie in terms of political identity.

Table 7 reports results of these analyses. Model 12 provided the baseline and again showed a negative relationship between chamber distance and voting distance in the next period. Model 13 included the interaction of *Same State Religiosity* and *Chamber Distance*, which was negative and statistically significant.[8] These results lent further support for Hypotheses 1a and 1b, suggesting that a one standard deviation decrease in chamber distance (that is, an increase in interaction) was associated with a 2.8% decrease in voting distance for senators from states with the same level of state religiosity. By contrast, a one standard deviation decrease in chamber distance (that is, an increase in interaction) induced a 4.4% increase in voting distance for senators from states with sharply contrasting rates of religiosity. Model 14, indicated that these effects were robust to the inclusion of *Same Party* and its interaction with *Chamber Distance*.

*******Table 7 about here*******

Finally, in supplemental analyses (not reported), we found that when the sample was constructed based on dyads that came from states that were less starkly polarized in constituent religiosity (for example, when dyads from states with the same religiosity were compared to dyads from states that were only one or two quartiles apart rather than three quartiles apart in religiosity), these effects were attenuated and not statistically significant. Taken together, these analyses support the contention that political identities—specifically political identities that match or are opposed to one another—moderate the effects of interaction on the tendency for attitudes and behaviors to converge or diverge.

DISCUSSION

The goal of this article has been to contribute to our understanding of the conditions under which interaction between actors leads to greater similarity in their attitudes and behavior and the conditions under which it promotes dissimilarity. Our empirical context was the U.S. Senate, where senators forge political identities for public consumption in response to the external constraints, normative pressures, and reputational concerns they face. We first argued that greater interaction between senators with the same political identity will promote subsequent convergence in their voting behavior. Next, we posited that more interaction between senators with opposing political identities will lead to divergence in their voting behavior. Finally, we considered how the local context in which interaction occurs can affect the extent to which political identity motivations are made salient and thereby condition the effect of political identity on influence. We argued that the effects of political identity on interaction and voting behavior change will be greater in more divided interaction contexts than in less divided contexts.

Empirical support for these propositions came from analyses of interaction, identity, and influence in the U.S. Senate from 1973 to 2009. Using two distinct indicators of political identity, we demonstrated that, as the level of interaction between senators changed, their voting behavior converged or diverged as a function of their respective political identities. For political identity based on party affiliation, we found remarkable consistency in these patterns across two disparate indicators of interpersonal interaction—committee co-membership and physical proximity. Finally, our results indicated that the committee co-membership effect was concentrated in interactions that took place within more divided Senate committees but was not operative in less divided committees.

Limitations

That our findings proved robust across two distinct measures of political identity and two different indicators of social interaction bolsters confidence in our conclusions. Moreover, the use of stringent statistical controls (e.g., dyad fixed effects) helped address concerns about unobserved heterogeneity among individual senators and senator pairs. Nevertheless, concerns about the role of selection—for example, the possibility that senators sought to change their level of interaction with others because they anticipated moving closer or further apart in voting distance—cannot be fully eliminated. To address this concern, we explicitly modeled the probability of two senators sorting into the same committee and then weighted our observations by the inverse of these probabilities. Reassuringly, this analysis replicated our main findings. Still, our models could not account for unobserved, time-varying attributes of individuals or dyads that could have affected the dynamics of social influence. Thus, we cannot completely rule out the possibility of potentially confounding, unobserved attributes.

Moreover, because the U.S. Senate represents a specialized institutional setting, we urge caution in generalizing this paper's findings to other contexts. That the hypothesized pattern of convergence and divergence held not only for political identity defined by party affiliation but also for identity based on the religiosity of a senator's constituents suggests that our findings may well generalize to social contexts in which oppositional groups with public identities come into contact with one another and seek to influence each other's views and behavior. Examples of such contexts include labor-management relations and the enforcement of environmental regulations. We see great promise in future research that extends our theory and empirical approach into such settings.

Contributions

This study makes a number of noteworthy contributions. First, our findings help to reconcile two seemingly inconsistent expectations about the tendency of increased interaction to promote convergence or divergence of attitudes, beliefs, and behavior. Indeed, Bonacich and Lu (2012: 216) list the question of "how groups become polarized or how two groups can become more and more different" as among the most important unsolved problems in sociology. By highlighting the moderating role of identity, this work informs research across a range of sociological subfields on when and how interaction leads to polarization.

Scholars of opinion change in groups have, for example, noted the absence of consistent empirical evidence for negative influence—a mechanism that can help account for group polarization (for a review, see Mäs and Flache [2013]). Yet much of the empirical evidence on negative influence comes from laboratory settings, in which subjects lack a shared history, do not strongly dislike outgroup members, and discuss issues that are not especially important to them (Krizan and Baron 2007). The lack of consistent empirical support for negative influence has led mathematical sociologists to propose alternative mechanisms—for example, based on homophily and the content of communication among similar or dissimilar people—that can account for polarization (Mäs and Flache 2013). The present study does not discount these alternative mechanisms. It does, however, provide compelling evidence that negative influence, which has heretofore been theorized and modeled in agent-based simulations and experiments (Mäs, Flache, and Kitts 2014), can be observed in interactions that take place in an important real-world setting where people have shared histories, feel animosity toward outgroup members, and grapple with issues about which they care deeply. Moreover, whereas prior work has theorized about the role of identity in negative influence (Kitts 2000), this study provides empirical evidence of the role of oppositional political identities in social influence.

Similarly, a common theme in institutional theory centers on how interactions among actors in the same field promote convergence in their behaviors. Indeed, fields are often defined as settings where actors "partake of a common meaning system and … *interact more frequently and fatefully with one another* than with actors outside the field" (Scott 2001: 84; emphasis added). Research on geographic communities, for example, considers how interaction among elites promotes the convergence of corporate behaviors within communities that host multiple corporate headquarters (for a review, see Tilcsik and Marquis [2013]). Within such communities, executives from these different firms are assumed to interact with one another and then to "look to the actions of other locally headquartered companies for standards of appropriateness" (Marquis et al. 2007: 927). Along the same lines, upper-class social clubs in communities are thought to "provide institutionalized informal settings in which elites are socialized and socially controlled to adhere to normative business attitudes and behaviors" (Kono et al. 1998: 868). The findings from this study suggest the need to rethink and potentially revise these assumptions. They suggest that the tendency for an executive to emulate the actions of another executive from a different locally headquartered firm or to adopt the same norms and attitudes about business may depend on the extent to which the two executives share a salient public identity and on the local context in which their interactions take place.

Our work also provides novel insight for research on the coevolution of networks and political attitudes and ideology (e.g., Huckfeldt, Johnson, and Sprague 2004; Mutz 2002). For example, Lazer et al. (2010) found in a longitudinal field study that social, rather than task, ties among students were associated with subsequent convergence in their political ideology. They concluded that “persuasion may be more a function of affect than information transfer, and persuasion is unlikely to be a function merely of interaction frequency” (Lazer et al. 2010: 267). Our findings suggest the need to broaden this proposition to account for the roles of public identity and the local context of interaction. We would expect, for example, that social ties would promote convergence of political attitudes when two students share the same political identity but would either have no effect or even a negative effect on political alignment when two students have opposing political identities.

Second, these findings contribute to research on integration and disunion among elites (e.g., Hetherington 2001; McCarty et al. 2006; Mizruchi 1989; Poole and Rosenthal 1997). We provide insight into these dynamics in a setting that has served as perhaps the most important focal point for the study of elite polarization: the U.S. Senate. Whereas the polarization literature has tended to focus on the macro-structural factors, such as geographic sorting of voters along partisan lines (Theriault 2008), that have contributed to increased polarization in the Senate, our study illuminates a complementary set of explanations: the microfoundations of polarization that arise through subtle, day-to-day interactions among senators with shared or opposing political identities. Although compositional shifts in the Senate—for example, the tendency for people holding more extreme views to enter the chamber and for moderates to exit—likely account for much of the increase in polarization, our work shows how interactions among senators during their period of joint service in the chamber may have exacerbated this tendency.

Our theoretical arguments also provide an intriguing hint about the prospects for future political polarization. Were the macro-structural forces somehow reversed, such that the Senate comprised people with more moderate views, our arguments suggest that the tendency toward polarization resulting from interaction between senators from the two main parties might also diminish. Recall that we imposed an important scope condition on the tendency for people with opposing political identities to diverge in attitudes and behavior following interaction on a contentious issue: that they also tend to disagree on other issues beyond the focal issue. Thus, if senators from different parties had more common ground, interaction between them need not lead to further polarization.

Finally, the present study importantly informs research on social psychological research on identity and influence (e.g., Baron et al. 1996; Hogg and Abrams 2003; Hogg and Ridgeway 2003; Maitner et al. 2010). Whereas this literature has tended to focus on social influence between individuals in one-off interactions in laboratory settings (for a review and critique of this literature, see Mason, Conrey, and Smith [2007]), our investigation shows how the desire for a positive self-concept and the pressure to conform to norms consistent with salient identities (Aronson 1968; Thibodeau and Aronson 1992) operate in real-world settings, where actors are embedded in networks, have multiple public identities, and are engaged in repeated interactions over time (cf. Srivastava and Banaji 2011). Moreover, we bring to research on identity and influence fresh insight about the role of the structural context. Our findings indicate that identity matters for social influence in certain group settings—for example, senate committees with a history of past division—but not in others.

In sum, this article illustrates the value of bringing together insights from sociology, political science, and social psychology in the study of the dynamics of social influence. This cross-disciplinary exchange promises to yield novel insight on how attitudes, beliefs, and behaviors form and evolve and about the interpenetration of identity and social structure.

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Tables and Figures

Table 1:
Descriptive Statistics

Panel A: Senator characteristics (N = 276)

	Mean	SD	Min	Max
Female	0.043	0.204	0	1
Democrat	0.486	0.501	0	1
Republican	0.504	0.501	0	1
First Congress	96.82	7.576	77	109
Last Congress	104.3	6.839	94	112
Tenure (in Congresses)	2.547	3.210	1	18
Voting Behavior Index	0.012	0.383	-0.700	0.992

Note: Sample included the 276 senators who were included in the dyad-level regressions.

Panel B: Senator-dyad characteristics (N = 64,856)

	Mean	**SD**	**Min**	**Max**
Same gender	0.912	0.283	0	1
Same party	0.498	0.500	0	1
Same state	0.010	0.099	0	1
Voting distance	0.417	0.311	0.00	1.81
Chamber distance (meters)	10.04	5.620	0.68	24.0
Committee co-membership (count)	0.570	0.707	0	5
Committee division	1.234	0.178	0.38	1.94

Note: Sample included 19,038 unique dyads (i.e., ij) and 64,856 observations (i.e., ijt). For average committee division, we report averages only for those 29,532 dyads that had 1 or more shared committees.

Table 2:

Distribution of Dyads by Committee Co-Membership

# of ij committee co-memberships	Frequency	Percent
0	35,324	54.47
1	22,901	35.31
2	5,892	9.08
3	694	1.07
4	41	0.06
5	4	0.01

Table 3:

Mean Voting Distance by Type of Dyad, Over the Observation Period

	(1) All Dyads	(2) Same Party Dyads	(3) Different Party Dyads	(4) Pre-existing-Same Party Dyads	(5) Pre-existing-Different Party Dyads	(6) First Year-Same Party Dyads	(7) First Year-Different Party Dyads
94^{th} Congress	0.401	0.235	0.569	0.247	0.559	0.163	0.794
95^{th} Congress	0.389	0.230	0.556	0.252	0.535	0.197	0.630
96^{th} Congress	0.359	0.174	0.545	0.179	0.524	0.183	0.556
97^{th} Congress	0.381	0.198	0.555	0.211	0.539	0.217	0.621
98^{th} Congress	0.377	0.200	0.555	0.211	0.535	0.144	0.683
99^{th} Congress	0.387	0.213	0.559	0.236	0.527	0.122	0.783
100^{th} Congress	0.389	0.171	0.606	0.192	0.536	0.141	0.638
101^{st} Congress	0.398	0.171	0.625	0.216	0.635	0.161	0.585
102^{nd} Congress	0.407	0.174	0.642	0.197	0.634	0.300	1.080
103^{rd} Congress	0.421	0.173	0.671	0.211	0.632	0.165	0.870
104^{th} Congress	0.445	0.180	0.708	0.176	0.615	0.222	NA
105^{th} Congress	0.468	0.184	0.753	0.192	0.709	0.188	0.800
106^{th} Congress	0.473	0.179	0.767	0.188	0.725	0.162	0.749
107^{th} Congress	0.466	0.176	0.751	0.159	0.920	0.185	0.708
108^{th} Congress	0.447	0.163	0.715	0.091	0.744	0.112	0.687
109^{th} Congress	0.481	0.182	0.770	0.093	0.672	0.256	0.937

Note: Mean voting distances were based upon Nokken and Poole's (2004) measure. We defined pre-existing dyads as dyads composed of senators who both entered before the 96^{th} Congress. First-year dyads consisted of senators who both entered in the given Congress. For the 104^{th} Congress, all entering first-year senators were Republicans.

Table 4: OLS Regressions of Distance in Voting Behavior on Interaction and Political Identity (H1a, H1b—interaction based on chamber distance)

	(1)	(2)	(3)	(4)
Chamber Distance	-0.002***	-0.004***	-0.004***	
	(0.000)	(0.001)	(0.001)	
Committee Co-Membership	0.003*	0.003*	0.003*	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Chamber Distance X Same Party		0.005***		
		(0.001)		
Chamber Distance X Same Party-Republican			0.005***	
			(0.001)	
Chamber Distance X Same Party-Democrat			0.005***	
			(0.001)	
Chamber Distance				0.055***
(0-2 meters)				(0.016)
Chamber Distance				0.038***
(2-10 meters)				(0.007)
Chamber Distance				0.019***
(10-15 meters)				(0.004)
Chamber Distance				-0.062**
(0-2 meters) X Same Party				(0.020)
Chamber Distance				-0.043**
(2-10 meters) X Same Party				(0.014)
Chamber Distance				-0.019
(10-15 meters) X Same Party				(0.012)
Prior Bill Co-Sponsorships (Log)	-0.006	-0.006	-0.006	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.443***	0.450***	0.450***	0.415***
	(0.015)	(0.015)	(0.016)	(0.014)
Congress Fixed Effects	Yes	Yes	Yes	Yes
Dyad Fixed Effects	Yes	Yes	Yes	Yes
prob>Chi2	5.9e-199	9.2e-239	1.7e-238	1.9e-226
N	64856	64856	64856	64856

Note: Chamber Distance (75-100%) was the excluded category in Model 4. The summed tenure of i and j was included, but not shown. * p<0.05, ** p<0.01, *** p<0.001. Two-tailed tests. Standard errors clustered in two dimensions: by i and by j.

Table 5: OLS Regressions of Distance in Voting Behavior on Interaction and Political Identity (H1a, H1b—interaction based on committee co-membership and integrated model)

	(5)	(6)	(7)	(8)
Chamber Distance	-0.002***	-0.002***	-0.002***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.001)
Committee Co-Membership	0.007**	0.007**		0.006**
	(0.002)	(0.002)		(0.002)
Same Party X Committee Co-Membership	-0.009***			-0.006**
	(0.002)			(0.002)
Same Party-Republican X Committee Co-Membership		-0.005*		
		(0.002)		
Same Party-Democrat X Committee Co-Membership		-0.013***		
		(0.003)		
Single (1) Committee Co-Membership			0.006*	
			(0.002)	
Multiple (>1) Committee Co-Membership			0.017***	
			(0.004)	
Single (1) Committee Co-Membership X Same Party			-0.009**	
			(0.003)	
Multiple (>1) Committee Co-Membership X Same Party			-0.019***	
			(0.005)	
Chamber Distance X Same Party				0.005***
				(0.001)
Prior Bill Co-Sponsorships (Log)	-0.006	-0.006	-0.006	-0.006
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.443***	0.443***	0.443***	0.449***
	(0.015)	(0.015)	(0.015)	(0.016)
Congress Fixed Effects	Yes	Yes	Yes	Yes
Dyad Fixed Effects	Yes	Yes	Yes	Yes
prob>Chi2	3.1e-203	5.7e-206	6.6e-205	4.1e-240
N	64856	64856	64856	64856

Note: No Committee Co-Membership (i.e., zero shared committees) was the excluded category in Model 7. The summed tenure of i and j was included, but not shown. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Two-tailed tests. Standard errors clustered in two dimensions: by i and by j.

Table 6: OLS Regressions of Distance in Voting Behavior on Committee Co-Memberships and Political Identity, by Committee Division (H2)

	(9)	(10)	(11)
Chamber Distance	-0.002***	-0.002***	-0.004***
	(0.000)	(0.000)	(0.001)
Committee Co-Membership Count (Less Divided)	0.004	0.004	0.003
	(0.002)	(0.003)	(0.003)
Committee Co-Membership Count (More Divided)	0.002	0.009**	0.008**
	(0.002)	(0.003)	(0.003)
Committee Co-Membership Count (Less Divided) X Same Party		-0.001	0.000
		(0.003)	(0.003)
Committee Co-Membership Count (More Divided) X Same Party		-0.015***	-0.012***
		(0.004)	(0.003)
Chamber Distance X Same Party			0.005***
			(0.001)
Prior Bill Co-Sponsorships (Log)	-0.006	-0.006	-0.006
	(0.004)	(0.004)	(0.004)
Constant	0.443***	0.442***	0.449***
	(0.015)	(0.015)	(0.016)
Congress Fixed Effects	Yes	Yes	Yes
Dyad Fixed Effects	Yes	Yes	Yes
prob>Chi2	2.9e-202	1.8e-211	3.2e-247
N	64856	64856	64856

Note: Less divided committees were those in which the ratio of same- to cross-party bill co-sponsorship rates was below the median, while more divided committees were those with ratios above the median. The summed tenure of i and j was included, but not shown. * p<0.05, ** p<0.01, *** p<0.001. Two-tailed tests. Standard errors clustered in two dimensions: by i and by j.

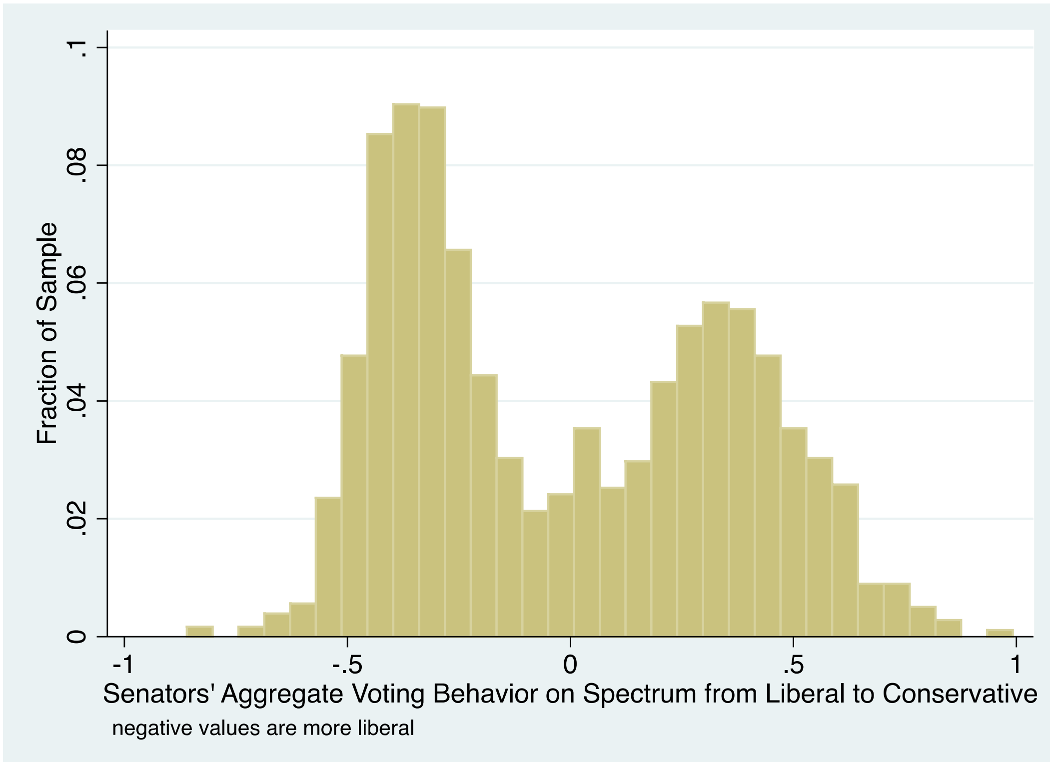
Table 7: OLS Regressions of Distance in Voting Behavior on Interaction and Political Identity (H1a, H1b—political identity based on the religiosity of senators' constituents)

	(12)	(13)	(14)
Data	i & j represent states with 0-25% or 75-100% religiosity		
Chamber Distance	-0.002**	-0.003**	-0.005***
	(0.001)	(0.001)	(0.001)
Committee Co-Membership	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)
Chamber Distance X Same State Religiosity		0.002*	0.002*
		(0.001)	(0.001)
Chamber Distance X Same Party			0.006***
			(0.001)
Prior Bill Co-Sponsorships (Log)	-0.005	-0.005	-0.006
	(0.005)	(0.005)	(0.005)
Constant	0.471***	0.470***	0.483***
	(0.024)	(0.024)	(0.025)
Congress Fixed Effects	Yes	Yes	Yes
Dyad Fixed Effects	Yes	Yes	Yes
prob>Chi2	2.77e-65	7.91e-66	3.93e-84
N	14851	14851	14851

Note: The regression only included dyads where i and j represented states that were either in the least religious (0-25%) quartile or in the most religious (75-100%) quartile. The variable *Same State Religiosity* was an indicator variable set to 1 if both i and j represented states with the same religiosity quartile (i.e., both 0-25% or both 75-100%), and set to 0 if otherwise (e.g., one 0-25% and one 75-100%). The summed tenure of i and j was included, but not shown. * p<0.05, ** p<0.01, *** p<0.001. Two-tailed tests. Standard errors clustered in two dimensions: by i and by j.

Figure 1:

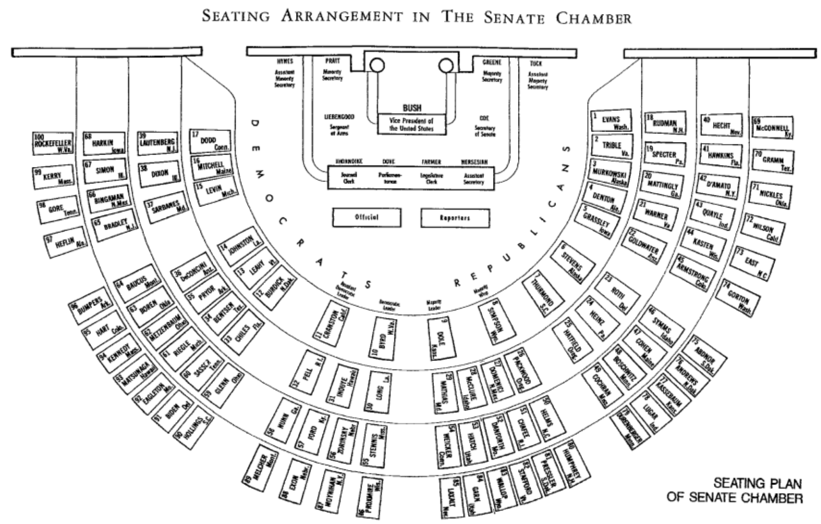
Distribution of Senators' Aggregate Voting Behavior on Spectrum from Liberal to Conservative



Note: Senators' aggregate voting behavior was based on Nokken and Poole's (2004) variant of the DW-Nominate measure (Poole and Rosenthal 1997). This linear distribution was used to generate voting distances between all *ij* combinations.

Figure 2:

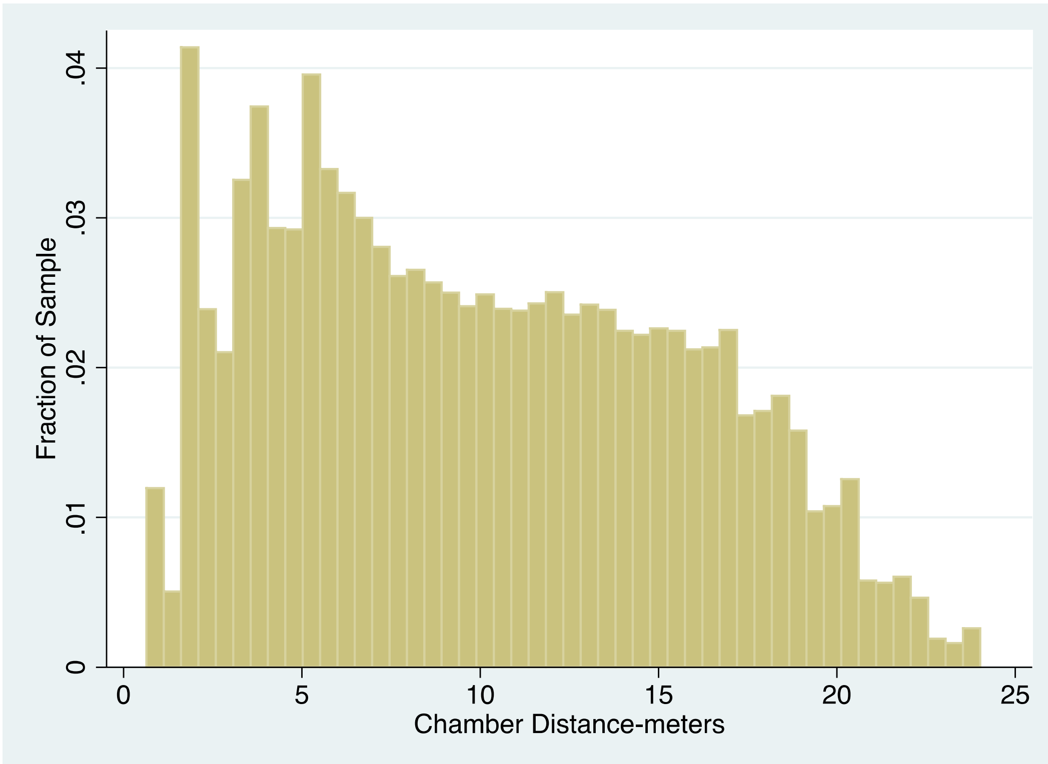
U.S. Senate—Map of the Chamber Floor



Note: Map of Senate Chamber seating for the 99th Congress (1985–1987). The Chamber's dimensions are approximately 16 x 26 meters. Republicans were seated on the right side of the Chamber and Democrats were seated to the left.

Figure 3:

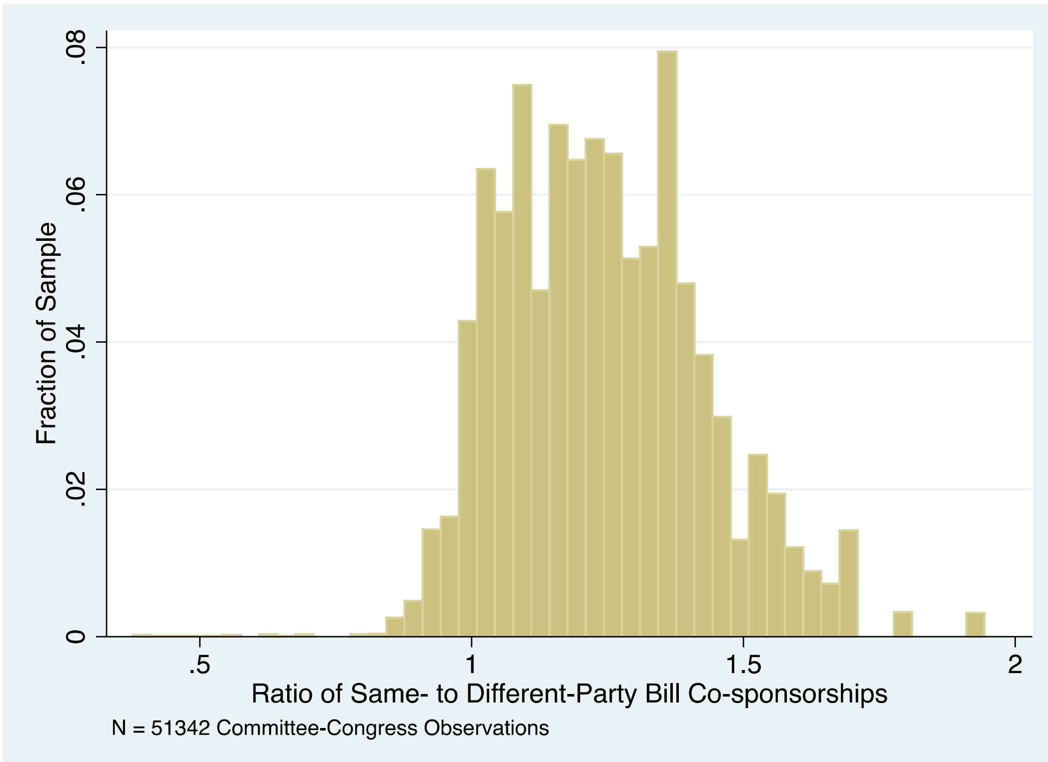
Distribution of Chamber Distance between Dyadic Pairs



Note: Chamber Distances are shown for the 64,856 dyads in our sample. Using historical data on desk locations in the Senate Chamber, each senator's location was translated into Cartesian space. The distance between senators was then computed using the Pythagorean Theorem.

Figure 4:

Distribution of Committee Division



Note: We used the ratio of same- to different-party bill co-sponsorships, to measure how divided each committee is at a given point in time. Higher ratios, to the right in the histogram, indicated greater proportions of within-party bill co-sponsorships, consistent with a divided environment within that committee.

Appendix: Additional Robustness Checks

Although the use of dyad-level models was justified based on principles of model selection and was consistent with the approach taken in several prominent prior studies (see Endnote 2), we implemented two additional sets of analyses to ensure the robustness of the findings.

A1. Robustness Checks with Dyad-Level Models

First, although the use of dyad fixed effects (i.e., the within-dyad estimator) represented a conservative choice in that it accounted for all unobserved, time-invariant traits of each member of the dyad and of the dyadic pair, it resulted in our estimates being based on the subset of dyads that experienced change. Although a Hausman test (Wooldridge 2002) favored the use of fixed effects over random effects, we estimated random effects models to: (1) enable estimation of certain time-invariant controls that were otherwise subsumed in the dyad fixed effects; and (2) enable estimation on the whole network (i.e., the full set of dyads in the sample). We also included in these models: (3) a measure of triadic closure based on bill co-sponsorships; and (4) certain time-varying controls, such as whether members of the dyadic pair were both committee chairs, which were potentially related to interpersonal influence. These results are reported in Table A1, Models A1-1 through A1-3. In Model A1-1, the baseline, *Same Party* and *Prior Bill Co-Sponsorships (Log)*, had negative and significant coefficients. Relative to dyads in which neither member was a committee chair, dyads in which both members were committee chairs also tended to converge in their subsequent voting behavior. Relative to mixed gender dyads, both-male dyads tended to diverge while both-female dyads tended to converge in voting behavior. Model A1-2 included the relevant interaction terms to test H1a and H1b and replicated the results of Table 5, Model 8. Similarly, Model A1-3 included the relevant interaction terms to test H2 and replicated the results of Table 6, Model 11.

Second, we retained the measure of triadic closure and the time-varying controls but reverted to dyad fixed effects. Model A1-4 represented the baseline. Note that *Same Party*, *Same Gender-Male*, and *Same Gender-Female* could no longer be directly estimated because they were subsumed in the dyad fixed effects. Model A1-5 included the interaction terms to test H1a and H1b and once again replicated the findings from Table 5, Model 8. Similarly, Model A1-6 included the interaction terms to test H2 and replicated the findings from Table 6, Model 11.

In sum, these supplemental analyses provided confidence that our results were robust to estimation on the whole network of all dyads, to random effects specification, to the inclusion of time-invariant controls that would otherwise be subsumed in dyad fixed effects, to the inclusion of time-varying controls associated with interpersonal influence, and to the inclusion of a measure of triadic closure.

*******Table A1 about here*******

A2. Robustness Checks with Individual-Level Models

To provide further reassurance that our results were not an artifact of our choice to use dyad-level models, we implemented additional robustness checks at the individual-level of analysis. This approach was more coarse-grained than the dyad-level analyses because it required aggregating the effects of interaction on influence across all senators with whom a focal senator interacted. Nevertheless, if this individual-level analysis replicated findings from the dyad-level analysis, it would further mitigate concerns that the findings reported above were an artifact of the modeling choice.

For each senator, we computed as dependent variables his or her distance from the mean voting behavior of his or her own party and the distance from the mean voting behavior of the other party. For simplicity (given the non-linear relationship between physical distance and influence described above), we focused this analysis on interaction as measured by committee co-memberships. We then generated a lagged count of the number of committee co-memberships the focal senator had with senators from the same party, as well as a lagged count of the number of committee co-memberships the focal senator had with senators from the other party.

Because an increase in committee co-memberships with same or different party senators is expected to *simultaneously* affect the focal senator's distance from the same-party and from the different-party mean, we estimated both models together using Seemingly Unrelated Regressions (Wooldridge 2002; Zellner 1962) with robust standard errors. In all models, we included individual-level controls (e.g., party affiliation, seniority) that could be associated with interpersonal influence.

Table A2 presents these results. Models A2-7a and A2-7b together tested Hypothesis 1a. Having more committee co-memberships with senators from the same party led to a subsequent decrease in voting distance from the same-party mean and a subsequent increase in voting distance from the other-party mean. Thus, the individual-level analyses also supported Hypothesis 1a. Models A2-8a and A2-8b together tested Hypothesis 1b. Having more committee co-memberships with senators from the other party led to a subsequent increase in voting distance from the other party mean and a subsequent decrease in voting distance from the same party mean. Again, the individual-level analyses also supported Hypothesis 1b. As for the magnitude of this effect, a one standard deviation increase in the number of committee co-memberships with senators from the same party led to a 7.5% decrease in the distance from the same-party mean and a 3% increase in the distance from the other-party mean. Comparable effect sizes were obtained for a one standard deviation increase in the number of committee co-memberships with senators from the other party. Models A2-9a, A2-9b, A2-10a, and A2-10b together tested Hypothesis 2, demonstrating at the individual level that the effects of political identity on interpersonal influence were operative in more divided senate committees.

*******Table A2 about here*******

Taken together, these two supplemental analyses—at the dyadic level and at the individual level—demonstrated that the main findings were robust to alternative modeling approaches, different specifications, time-varying controls, and triad-level controls. We nevertheless acknowledge that these analyses could not account for unobserved, time-varying factors that could be associated with interpersonal influence.

Table A1: OLS Regressions of Distance in Voting Behavior on Chamber Distance, Committee Co-Memberships and Political Identity—with individual, dyad, network controls

	(A1-1)	(A1-2)	(A1-3)	(A1-4)	(A1-5)	(A1-6)
Chamber Distance	-0.001**	-0.003**	-0.003**	-0.002***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Committee Co-Membership	0.003*	0.008***		0.003*	0.006***	
	(0.001)	(0.002)		(0.001)	(0.002)	
Same Party	-0.457***	-0.482***	-0.481***			
	(0.022)	(0.025)	(0.025)			
Chamber Distance X Same Party		0.003***	0.003***		0.005***	0.005***
		(0.001)	(0.001)		(0.001)	(0.001)
Committee Co-Membership X Same Party		-0.011***			-0.006**	
		(0.002)			(0.002)	
Committee Co-Membership Count (Less			-0.003			0.004
Divided)			(0.003)			(0.003)
Committee Co-Membership Count (More			0.014***			0.008**
Divided)			(0.002)			(0.003)
Committee Co-Membership Count (Less			0.002			0.000
Divided) X Same Party			(0.003)			(0.003)
Committee Co-Membership Count (More			-0.023***			-0.012***
Divided) X Same Party			(0.004)			(0.003)
Sum of Tenures	0.001	0.000	0.000	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Prior Bill Co-Sponsorship (Log)	-0.015***	-0.015***	-0.015***	-0.006	-0.006	-0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Triadic Closure	-0.003	-0.004	-0.003	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Either i or j is committee chair	0.003	0.002	0.002	0.002	-0.000	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Both i & j are committee chairs	-0.012***	-0.012**	-0.012***	-0.012***	-0.012***	-0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Same Gender - Male	0.032*	0.032*	0.032*			
	(0.014)	(0.014)	(0.014)			
Same Gender - Female	-0.102**	-0.100**	-0.100**			
	(0.034)	(0.034)	(0.034)			

Constant	0.685*** (0.031)	0.683*** (0.032)	0.682*** (0.031)	0.446*** (0.016)	0.452*** (0.016)	0.451*** (0.016)
Congress Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Dyad Fixed Effects	No	No	No	Yes	Yes	Yes
Chi2	25431.690	25457.811	25736.834			
prob>Chi2	0	0	0	6.5e-163	1.0e-193	3.2e-195
N	64856	64856	64856	64856	64856	64856

Note: Models A1-1/A1-4, A1-2/A1-5, and A1-3/1-A6 correspond to Table 4, Model 1, Table 5, Model 8, and Table 6, Model 11, respectively. Triadic closure was the count of k individuals, where $k \neq i$ and $k \neq j$, and k had more than the median number of bill co-sponsorships with both i and j. * p<0.05, ** p<0.01, *** p<0.001. Two-tailed tests. Standard errors clustered in two dimensions: by i and by j.

Table A2: Seeming Unrelated Regression Regression of Same / Different Party Voting Distance on the Lagged Count of Same / Different Party Committee Memberships

DV	(A2-7a) Same-Party Voting Distance	(S2-7b) Diff-Party Voting Distance	(A2-8a) Same-Party Voting Distance	(A2-8b) Diff-Party Voting Distance	(A2-9a) Same-Party Voting Distance	(A2-9b) Diff-Party Voting Distance	(A2-10a) Same-Party Voting Distance	(A2-10b) Diff-Party Voting Distance
# of Same Party CoMembers-All	-0.0012*** (0.0003)	0.0020*** (0.0005)						
# of Same Party CoMembers-Divided					-0.0013*** (0.0003)	0.0070*** (0.0005)		
# of Different Party CoMembers-All			-0.0014*** (0.0003)	0.0019*** (0.0005)				
# of Different Party CoMembers-Divided							-0.0014*** (0.0003)	0.0067*** (0.0005)
Democrat	-0.0568*** (0.0057)	0.0169 (0.0100)	-0.0632*** (0.0061)	0.0263* (0.0105)	-0.05877*** (0.0058)	0.0217* (0.0096)	-0.0618*** (0.0059)	0.0363*** (0.0099)
Female	0.0164 (0.0117)	-0.0222 (0.0210)	0.0176 (0.0116)	-0.0223 (0.0213)	0.0186 (0.0119)	-0.0643** (0.0198)	0.0196 (0.0119)	-0.0635** (0.0207)
Senior Member	0.0064 (0.0075)	-0.0440** (0.0140)	0.0058 (0.0075)	-0.0434** (0.0140)	0.0047 (0.0075)	-0.0290* (0.0136)	0.0042 (0.0075)	-0.0283* (0.0136)
Tenure	-0.0015 (0.0012)	0.0064** (0.0022)	-0.0016* (0.0012)	0.0063** (0.0022)	-0.0007 (0.0011)	0.0061** (0.0021)	-0.0006 (0.0011)	0.0058** (0.0021)
Constant	0.1737*** (0.0137)	0.6805*** (0.0252)	0.1819*** (0.0147)	0.6741*** (0.0261)	0.1643*** (0.0127)	0.6306*** (0.0230)	0.1683*** (0.0129)	0.6215*** (0.0232)
Chi2	108.29		108.57		109.21		110.58	
Number of Observations	1470		1470		1470		1470	

Note: *Same-Party Voting Distance* is the absolute distance of *i*'s Nokken and Poole (2004) score to the mean score of *i*'s same party colleagues in Congress *t*. *Diff-Party Voting Distance* is the absolute distance of *i*'s Nokken and Poole (2004) score to the mean score of *i*'s opposition party colleagues in Congress *t*. "CoMembers" is the count of j senators who share committee co-memberships with i, split across same/different party and all/divided committees. * p<0.05, ** p<0.01, *** p<0.001. Two-tailed tests. Robust standard errors.

Endnotes

[1] There are at least two plausible ways in which committee division could make political identities salient. First, senators may observe colleagues on a committee who have a known history of past conflict. Second, certain committees may be more inclined than others to grapple with key divisive issues such as health care reform or abortion. In many divided committees, we expect that both factors are likely at play simultaneously and jointly serve to activate the political identities of committee members. We are grateful to an anonymous reviewer for helping to clarify this point.

[2] Mizruchi and Marquis (2006) argued that dyad-level models are superior to individual-level models when: (1) the dependent variable is quantitative (rather than a discrete event); (2) the dependent variable is a composite of a large number of individual events; and (3) the predictors of theoretical interest are relational variables. In our case, the dependent variable, a continuous measure that ranges from 0 to 2, was clearly quantitative. In addition, the dependent variable—an index of voting behavior on a linear spectrum of conservative to liberal—was derived from a composite based on thousands of individual roll call votes made by each senator (Poole and Rosenthal 1997). Finally, our predictor variables of interest—whether or not two senators have matching or opposed political identities, changes in the physical distance and number of shared comemberships between pairs of senators, and the interaction of these two sets of variables—were clearly relational (dyadic) in nature. Thus, we believe that our empirical set-up met all three of Mizruchi and Marquis' proposed criteria for the selection of dyad-level models over individual-level models. Other prominent empirical studies of the similarity or dissimilarity of actors' behavior have also used dyad-level analyses (see, for example, Burris [2005]; Dreiling and Darves [2011]; Mizruchi [1992]; and Mizruchi and Marquis [2006].) Nevertheless, to ensure that our results were not simply an artifact of our choice to use dyad-level models, we implemented a number of robustness checks (see Appendix), including an analysis at the individual level that that replicated the main findings from our dyad-level analyses. We thank an anonymous reviewer for prompting us to implement these robustness checks.

[3] Independents constitute only 1% (i.e., 3 senators) of the sample. Although they do not forge political identities that are consistently at odds with one of the other parties, we retain these senators in our main analyses. Our results are robust to the exclusion of Independents from the sample.

[4] Results were substantively unchanged when we used different category cutoffs (e.g., quartiles).

[5] Comparable effect sizes were obtained using individual-level models (see discussion of Appendix, Table A-2).

[6] In supplemental analyses (not reported), we investigated: (1) whether there was a time trend related to these effects; and (2) whether the effects were concentrated in dyads consisting of more or less senior senators. We did not find any systematic or consistent evidence of such variation.

[7] http://www.gallup.com/poll/153479/Mississippi-Religious-State.aspx#1; accessed March 14, 2014

[8] For this supplemental analysis, we focused on chamber distance rather than committee co-membership as the indicator of interaction because religiosity is not salient to deliberations on all committees. By contrast, physical space represents a more generalized locus of interaction.