Networks in the Legislative Arena:

How Group Dynamics Affect Cosponsorship

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ABSTRACT

In this study, we explore the determinants of cosponsorship activity within state legislatures. Previous literature has generally focused on individual level characteristics to explain legislative behavior, placing little emphasis on how collaboration and mutual interests shape the agenda-setting process. Utilizing a social dynamics framework, we develop and test a model of the interplay of the activities of sponsorship and cosponsorship that includes both individual-level and social network characteristics as determinants of agenda-setting behavior. We find several consistent factors that influence the frequency of activity: 1) ideological distance (the further the distance between the primary sponsor and a legislator, the less likely that legislator will cosponsor a measure) 2) the proximity of legislators' districts (legislators are more likely to cosponsor measures that are sponsored by legislators from neighboring districts) 3) homophily (legislators who share similar characteristics such as race, gender, and ethnicity are more likely to cosponsor each other's measures) and 4) transitivity (legislators who cosponsor the legislation sponsored by their colleagues are more likely to attract those colleagues as cosponsors on their own set of sponsored measures). Further, our analysis of network structure suggests that legislators in each state are organized into relatively small groups, exhibiting a "clique-like" quality, whereby members coalesce around several common traits and cosponsor each other's measures.

A rich literature in political science has recognized the importance of agenda-setting in legislative politics. Scholars have increasingly recognized that the sponsorship stage of lawmaking offers a unique context in which legislators have substantial discretion to craft policy proposals that satisfy multiple goals. In the roll-call voting stage of the legislative process, legislators are restricted to an up-down vote on a pre-determined set of policy proposals. In contrast, sponsorship and cosponsorship are among the core activities in legislative agenda-setting, which define the boundaries of legislative outcomes. Legislators can introduce and endorse policy proposals that help them garner electoral support from relevant constituencies, serve to advance their political career, and allow them to translate their own policy interests into outcomes. As Talbert and Potoski (2002, p. 889) observe, the pre-floor stages of lawmaking offer "a rich environment for ambitious policy entrepreneurs to structure and restructure their proposals along favorable evaluative dimensions."

From this literature, we have learned much about the determinants and the significance of legislative agenda-setting. We know, for example, that a variety of institutional, individual, and electoral factors shape the degree to which legislators participate in sponsoring and cosponsoring legislation (e.g. Cooper and Young 1989; Koger 2003; Garand and Burke 2006; Platt and Sinclair-Chapman 2008; Rocca and Sanchez 2008). Likewise, we know that multiple factors influence the types of policies that legislators place on the agenda (Swers 2002; Grose 2005; Bratton 2006; Woon 2008). Moreover, research has consistently demonstrated that these activities are significant. Sponsorship carries meaningful costs and benefits (Weissert 1991; Schiller 1995). The cosponsorship of legislation can serve as cues to fellow legislators regarding the importance and content of legislation (Kessler and Krehbiel 1996; Krutz 2005), provides information shortcuts to legislators who are simultaneously considering a plethora of issues (Kingdon 1989), and can contribute to legislative success and perceived effectiveness (Frantzich 1979; Weissert 1991; Krutz 2005).

Legislators can be thought of as individually sponsoring and cosponsoring measures, but agenda-setting as an institutional exercise is an activity that reflects *shared* interests, and certainly involves interaction among legislators. In the real world of legislative politics, agenda-setting is not an individualistic but a collaborative process. As Krutz (2005) notes, the likelihood that a measure receives serious attention – reflected in the number of legislators that endorse the measure through cosponsorship – is enhanced by legislative efforts to recruit supporters. The importance of gaining support for a legislative agenda becomes fairly evident when talking with

legislators, one on one, about how they engage in sponsoring and cosponsoring legislation. As one assembly member from California mentioned during a personal interview:

> Sponsorship is very important but it does not mean much if you do not build coalitions to garner support for your bill. You can sponsor bills all you want, but if you don't gain the necessary support for them, they won't go anywhere.[1]

Yet the extant scholarship tells us little about how the relationships between and among legislators lead to the expression of shared interests through the combined activities of sponsorship and cosponsorship. Most studies adopt an individual-level design and focus on sponsorship and cosponsorship as separate activities. However, reliance on individual-level methods means that structural tendencies such as transitivity or reciprocity cannot effectively be modeled. Given that social networks are composed of both a set of individuals and a set of relationships, it is essential to examine *matches* of individuals rather than just individual level data to better understand activities that are inherently dyadic" (Santos and Barrett 2008). Consider the following hypothetical situation: legislator A and legislator B represent similar constituencies and backgrounds and therefore have overlapping policy interests. At the same time, ideological similarities between legislator B and legislator C lead to overlapping policy interests. It is possible that legislator A and legislator C will develop similar policy interests, simply as a result of the lawmaking process over time, even above and beyond the observed similarities in their ideology, constituencies, and background. Likewise, legislators that receive support from colleagues may be inclined to "return the favor" and make it a point to endorse the measures that those colleagues bring to the agenda. Transitivity and reciprocity are common features of networks (Snijders et. al. 2006) and are relevant in the legislative arena (Fowler 2006), but the discipline's emphasis on individual-level methods makes it difficult to evaluate the impact of these network characteristics.

This issue is more than just a methodological problem; it is a conceptual and theoretical concern. One's community and one's individual characteristics and preferences influence political choices; political behavior is shaped by an interaction of individuals within a larger group (Huckfeldt 1984). In the real world of legislative politics, sponsorship and cosponsorship are linked activities, and agenda-setting is a process that legislators engage in as a group. Both the determinants and consequences of sponsorship activity depend not only on an individual

[1] From interviews conducted by the author with California assembly members in May 2008.

legislator's characteristics and institutional context, but also on how sponsorship activity represents *shared* interests and decisions about costs and benefits across legislators. In order to accurately capture the politics of agenda-setting, we need to model it as the interactive, collaborative process that it is.

In this paper, we examine legislative agenda setting in the lower chambers of nine state legislatures in 2001. We focus on the activities of sponsorship and cosponsorship, and use network analysis to model the influence of both structural tendencies and similarities in (or differences in) individual-level characteristics of legislators. We also contribute to existing knowledge about agenda-setting by taking advantage of the contrast between the act of sponsorship and that of cosponsorship to examine how majorities interact with minorities within legislatures, and how roles shape behavior. We present a model of cosponsorship that emphasizes the role of ideological and constituency similarities, incorporates network structural factors, and recognizes that both formal and informal positions inside a legislature shape how legislators work together.

Scholarship on Legislative Agenda-Setting

The study of legislative agenda-setting holds substantial appeal for scholars who seek to better understand legislative interests and priorities. While acknowledging that only a handful of bills introduced in the U.S. Congress become law, Schiller (1995) notes that bill sponsorship, as one of the few activities over which legislators have almost total control, is a particularly informative and significant legislative activity. Based on extensive interviews with U.S. Senators, she argues that "a senator's choice of bills is a strong indicator of which issues he or she wants to be associated with and the reputation he or she wants to acquire among colleagues (1995: 187)." Sponsorship is characterized as an important way in which legislators can meet a variety of goals relating to their electoral fortunes, party standing, and personal policy interests and preferences. Scholars have found that a variety of factors influence the absolute level of sponsorship activity, including majority party status (Garand and Burke 2006; Hogan, Kromer, and Wrzenski 2006; Platt and Sinclair-Chapman 2008), seniority (Garand and Burke 2006; Hibbing 1991; Hogan, Kromer, and Wrzenski 2006; Platt and Sinclair-Chapman 2008; Rocca and Sanchez 2008), ideological extremism (Garand and Burke 2006; Rocca and Sanchez 2008), committee position (Garand and Burke 2006; Rocca and Sanchez 2008; Schiller 1995; Taylor 1998), and race (Garand and Burke 2006; Platt and Sinclair-Chapman 2008; Rocca and Sanchez 2008). It appears that sponsorship is sometimes used by legislators who have relatively little

power, such as ideological extremists. However, high sponsorship activity seems to be associated with influential legislators, such as majority party members, committee chairs, and relatively senior legislators.

A substantial amount of research has also focused on cosponsorship activity. Similar to the findings on sponsorship, the conclusions about cosponsorship are mixed, in part due to differences in research design, time period and institution studied, and independent variables included in analyses. In general, it appears that the legislators who are most active in cosponsorship tend to be the less powerful legislators. Seniority tends to be negatively associated with cosponsorship levels (Campbell 1982; Burkett and Skvoretz 2005; Garand and Burke 2006; Rocca and Sanchez 2008), and ideological extremists cosponsor more measures (Campbell 1982; Garand and Burke 2006; Rocca and Sanchez 2008). Cosponsorship is also associated with minority party affiliation (Garand and Burke 2006; Koger 2003) and electoral vulnerability (Campbell 1982; Rocca and Sanchez 2008), particularly in the first term (Koger 2003).

Of course, scholars are concerned not only about legislative interests and priorities, but also about the translation of those interests and priorities into policy outcomes. Discussion of the link between sponsorship and outcomes focuses on whether sponsorship is an exercise in position-taking or policy-seeking. The pure position-taking model as presented by Mayhew (1974) suggests that legislators care only about electoral success, and completely set aside their own vision of good public policy when making decisions. Conversely, the policy-seeking model sees legislators as caring primarily about good public policy, rather than constituency or electoral concerns. In this vein, Kessler and Krehbiel's work (1996) presents cosponsorship as an instrument that allows legislators to signal information within the legislature, rather than as a way for legislators to take positions on issues for the sake of gaining an electoral advantage. Some scholars have noted that the two goals of re-election and policy making are sometimes, but not always, incompatible (Fenno 1973; Woon 2008).

Support for the policy-seeking model suggests that there should be a connection between agenda-setting on the one hand, and the eventual success of measures and effectiveness of legislators on the other, and researchers have generally found support for that connection. Legislators who sponsor more measures are relatively successful (Frantzich 1979), although there is some evidence that this relationship levels off at very high levels of sponsorship activity

(Anderson, Box-Steffensmeier, Sinclair-Chapman 2003). Legislators who introduce a relatively high number of bills are also perceived as more effective (Weissert 1991).

Likewise, the number of cosponsors on a measure seems to influence a measure's fate in the chamber; the number of cosponsors is associated with the likelihood that a bill will receive at least some consideration (Wilson and Young 1997; Woon 2008). Evidence on whether the number of cosponsors is related to bill passage is somewhat mixed; Wilson and Young (1997) find that the effect of the number of cosponsors is restricted to the likelihood that a bill receives consideration, whereas other scholars have found evidence of an effect on bill passage in the U.S. Congress (e.g., Adler and Wilkinson 2005) and at the state level (e.g. Browne 1985). Although Burstein, Bauldry and Froese (2007) do not find a link between the number of cosponsors and bill passage, they do find that trends in sponsorship are associated with enactment. Thus, the literature suggests that the number of cosponsors makes a difference in the eventual success of legislation, but much less is known about the significance of who is participating in such activity.

As noted above, a significant limitation of this literature is that it neglects the structural elements of legislative networks, and it often fails to consider the interdependent nature of sponsorship and cosponsorship. However, some exceptions do exist. Fowler (2006) uses social network analysis to examine cosponsorship from 1973 to 2004 in the U.S. Congress, and concludes that well-connected legislators are more successful at amending legislation and gaining support in floor votes. In other words, engaging in cosponsorship activity builds social networks which contribute to the overall effectiveness of legislators. Goodliffe, Rothenberg, and Sanders (2005) examine cosponsorship behavior in the U.S. Congress, using a hazard model with a pair, or dyad, of legislators as the unit of analysis. They find that ideological similarity is associated with the likelihood that two legislators will cosponsor with each other. In one of the few examinations of the interplay between sponsorship and cosponsorship, Burkett and Skvoretz (2005) analyze cosponsorship networks in the U.S. Senate, and find strong evidence of reciprocal effects—put simply, legislators who cosponsor their colleagues' measures can expect similar support in return. Gross (2008) uses a multilevel approach to analyze cosponsorship, and finds that ideological similarity, being from the same state, and sharing a committee assignment are significantly associated with cosponsorship.

Models of Sponsorship and Cosponsorship

What might account for a legislator's choice to cosponsor a measure that has been brought to the agenda by a primary sponsor? In this section, we outline several models of cosponsorship, as well as several hypotheses based on these models. Note that these models are generally not mutually exclusive, but they are theoretically distinct from each other.

First, the *General Homophily* model suggests that legislators who are similar to each other are relatively likely to work together.[2] More specifically, legislators are more likely to cosponsor measures if those legislators are similar to the primary sponsor in some significant way, such as shared experiences, policy interests, or ideological predispositions. A large amount of research indicates that social networks are structured first and foremost by similarity (McPherson, Smith-Lovin and Cook 2001). Some prior evidence suggests that homophily is present in legislatures: Gross (2008) finds that shared committee service, similarity in ideology, and being elected from the same state or region all contribute to cosponsorship. Zhang et. al. (2007) find that ideology, committee service, and geography all contribute to cosponsorship networks. Caldeira and Patterson (1987) find that legislative friendships are shaped by both propinquity (distance between districts, seatmates) and shared characteristics (similar levels of education, same party affiliation, shared committee assignments).

Based on this model, our first hypothesis is as follows:

H1: *Legislators will be relatively likely to cosponsor measures that are sponsored by legislators who are affiliated with the same party, who are elected from similar districts, who are elected from districts that are next to each other, who serve on the same committees, and who are similar in seniority.*

Social identity theory offers a somewhat different perspective that incorporates elements such as group boundaries and imbalance. The core of social identity theory is that social identity is shaped by the ways in which individuals categorize themselves, and the differences they perceive between themselves (and people like them) and others (Tajfel and Turner 1986). A "salient" social identity is one in which the influence of group members on perception and behavior is particularly pronounced (Oakes 1987). Research has found that identification with a

[2] More generally, homophily refers to the idea that members of a group forge close relationships with other members based on commonalities such as physical characteristics (e.g. race, ethnicity, gender), interests, and experiences. For a more detailed discussion see Ruef, Aldrich, and Carter (2003); van de Bunt, Wittek, and Klepper (2005).

subordinate group is more intense when that group is a minority (Huddy 2004). For example, McGuire (1978) found that ethnic identity is more salient when individuals are in an ethnic minority. Similarly, Gurin, Miller, and Gurin (1980) conceptualize "group consciousness" as depending on group identity, the perception that one's group is lacking in power or influence, the conviction that disparities in influence are illegitimate, and the belief that group members should work collectively to gain influence. Based on these "linkages," *minority* group members should be relatively likely to cosponsor each other's measures, and this should be particularly true of relatively cohesive groups, and particularly true when group boundaries are pronounced. One the other hand, majority group members do not share these common characteristics, and thus, would be less likely to cosponsor together.

Social identity theory also suggests that majority legislators may be less likely to cosponsor bills introduced by minority legislators. Research has conclusively shown that individuals generally perceive members of an out-group to be more homogeneous than members of the in-group with which they identify (Messick and Mackie 1989). Group size is positively related to perceptions of out-group diversity; therefore, majority group members are even more likely to view minority groups as homogeneous. Moreover, social boundaries generally exist in contexts of inequality, and have consequences for social interaction, both natural areas of study for scholars of legislative politics. Lamont and Molnár (2002, p.168) write that social boundaries are "objectified forms of social differences manifested in unequal access to and unequal distribution of resources…" We know that legislators do not thoroughly read each piece of legislation, but rather rely on cues about legislation (Kingdon 1989). All this may combine to mean that majority groups are more likely to see minority group members as holding relatively narrow interests, and may be less likely to cosponsor the legislation they introduce. We call this the *Social Identity* model.

Note that in H1, we outlined our expectation that legislators would be more likely to cosponsor bills introduced by legislators who were similar to them in terms of ideology, partisanship, or other factors. Likewise, the Social Identity model emphasizes similarity, but it focuses on demographic characteristics such as race, gender, and ethnicity that create boundaries and hierarchy in social life. When legislators are different, the Social Identity model would lead us to expect that behavior depends on status: the likelihood that majority legislators (in terms of partisanship, ideology, race, gender, or ethnicity) will cosponsor legislation introduced by minority legislators will be significantly lower than the likelihood that minority legislators will

cosponsor legislation introduced by majority legislators. In other words, the social identity model emphasizes the distinction between the position of primary sponsors and that of cosponsors, and emphasizes that the majority or minority status of the primary sponsor can serve as a signal to potential cosponsors.

Based on the Social Identity model, we therefore present a second and third hypothesis:

H2:*African-Americans will be relatively likely to cosponsor measures introduced by other African-American legislators, women will be relatively likely to cosponsor measures introduced by other women, and Latinos will be relatively likely to cosponsor measures introduced by other Latino legislators. We also expect that minority party members, and relative extremists at either end of the ideological scale, will be relatively likely to cosponsor measures introduced by other minority party legislators and those who share a similar ideology, respectively.*

H3: *Majority party members will be relatively unlikely to cosponsor the measures introduced by minority party members, less moderate legislators will be relatively unlikely to cosponsor the measures introduced by relatively extreme legislators, non-African American legislators will be less likely to cosponsor the measures introduced by African-American legislators, men are less likely to cosponsor the legislation introduced by women, and non-Latinos are less likely to cosponsor the measures introduced by Latino legislators.*

A third perspective on legislative interaction emphasizes not group size or social identity, but legislative roles. Much research has explored the existence (or lack thereof) of norms within legislatures. Matthews (1959, p.1064) observes about the U.S. Senate that the "first rule of Senate behavior – and the one most widely recognized off the Hill – is that new members are expected to serve an unobtrusive apprenticeship." . Asher (1973, p.509) defined the norm of apprenticeship as the expectation that very junior members of the U.S. House "would be more an observer than an active participant in the legislative process." However, Asher found that first-year representatives were far from uniform in their acknowledgment that such a norm existed. Subsequent research has indicated that even if norms were powerful in decades past, there is, at best, weak evidence that they operate in contemporary legislative politics (Hall 1996). However, the roles of "senior legislator" and "leader" may operate to shape legislative networks.

Legislators rely on cues to guide their behavior; it is likely that there is more information about the interests and preferences of senior members and legislative leaders than about their more junior, less powerful colleagues. Therefore, it may be more likely that a junior legislator cosponsors the measures introduced by senior legislator than the reverse. We call this model the *Legislative Roles* model.

Based on this model, we offer a fourth hypothesis:

H4: *Legislative leaders will be less likely to cosponsor the measures introduced by legislators who do not hold leadership positions, and more senior legislators will be less likely to cosponsor the measures introduced by relatively junior members.*

At the same time, it is also possible that the norm of reciprocity operates in cosponsorship. Matthews (1959) identified reciprocity as a key norm in the U.S. Senate: an implicit agreement that senators should help colleagues in need of assistance, and expect help in return. In recent years, however, the norm of reciprocity appears to have weakened (Sinclair 1995). Yet, with few exceptions (e.g., Burkett and Skvoretz 2005), most research on reciprocity has focused on roll-call voting, where individual reciprocity might give way to party loyalty and legislators have considerably less discretion over either the choice to participate or the options available. Reciprocity may be more apparent in cosponsorship, where legislators can instead pick and choose among measures to cosponsor. We call this the *Reciprocity* model.

The reciprocity model provides a final hypothesis:

H5: *Colleagues who receive support for their measures by other legislators through cosponsorship are more likely to cosponsor the measures introduced by those colleagues.*

Data and Methods

We analyze cosponsorship in 2001 in the lower chamber of nine state legislatures: Arizona, California, Colorado, Florida, Illinois, Maryland, Michigan, South Carolina, and Texas. We choose these states because they offer substantial variance in party control; gender, ethnic, and racial diversity; professionalism; and range of seniority (many of the variables that we hypothesize will affect legislative interaction during agenda-setting). We collected data on the bills that each legislator introduced as a primary sponsor, as well as the bills that each legislator

cosponsored. We include only bills, and exclude from the analysis amendments and resolutions. Information was gathered from state legislative manuals and websites, and from newspaper searches. Table 1 presents descriptive information regarding the race, gender, ethnicity, seniority, partisan, and ideological composition of the chambers.

[Table 1 About Here]

First, to get a sense of what cosponsorship networks look like, Figure 1 depicts an example of a cosponsorship network in Arizona in 2001, with ties or edges between legislators indicating "frequent cosponsorship". "Frequent cosponsorship" was coded as 1 if a legislator cosponsored over seven measures that were sponsored by the other legislator. Figure 1 indicates that partisanship appears to structure cosponsorship behavior.

[Figure 1 About Here]

We now turn to the analyses of cosponsorship activity in the nine states under investigation. The data are organized into a matrix for each state, where each column *i* and each row *j* represents a legislator, and the cell entries are the number of bills that legislator *i* introduces that are cosponsored by legislator *j*. For illustrative purposes, Table 2 presents a matrix including data on the cosponsorship activity (measured as a count) of five legislators in the Arizona legislature. Note that this is a "directed" graph or matrix; in other words, it is not symmetric. The number of bills that are introduced by Legislator A, and cosponsored by Legislator B, is not necessarily the same as the number of bills that are introduced by Legislator B, and cosponsored by Legislator A. Using both primary sponsorship and cosponsorship data is extremely valuable in that it allows us to assess models that focus on imbalance or inequality across groups. Note, as well, that the cells in the diagonals of these matrices have values of 0, because legislators do not cosponsor their own measures.

Given the hypothesized importance of relational ties on legislative activity, we use social network analysis (specifically, the Siena program of StOCNET) to estimate an exponential random graph model (ERGM) in each state.[3] It is well known that standard regression analysis

[3] Markov Chain Monte Carlo maximum likelihood estimation (MCMCMLE) is used to fit the exponential random graph model to the data. This type of estimation simulates the distribution of random graphs from a starting set of parameter values. For a detailed explanation of this estimation technique, see Snijders (2002); Snijders et al., (2006); Robins, Pattison et al., (2007); Robins, Snijders, et al., (2007).

will produce unreliable estimates because legislators are repeated through the matrix dataset, and observations are therefore non-independent within both rows and columns. ERGM (or p*) models are an appropriate choice for modeling transitivity, reciprocity, and individual attribute effects in non-longitudinal data (Snijders et. al. 2006). This approach allows us to estimate node-level effects (such as similarity in race, gender, ethnicity, party affiliation, etc.), as well as network effects (such as reciprocity and transitivity). The dependent variable is "**frequent cosponsorship**". Because we are estimating an ERGM model in StOCNET, the dependent variable must be in binary form. Therefore, we first calculate a cosponsorship count for each pair of legislators. This cosponsorship count is the number of bills legislator *j* cosponsors out of the set of bills on which legislator *i* serves as the primary sponsor. We then collapse the count down into a dummy variable, coded 1 for frequent cosponsorship, and 0 otherwise. Because the frequency of cosponsorship varies substantially across states, the actual threshold at which a legislator is considered to cosponsor "frequently" varies across states. We use a standard of at least two bills cosponsored between two legislators, or one standard deviation above the average number of bills cosponsored in that chamber, whichever was higher.[4]

The general homophily model led us to the expectation that similarity between a sponsor and potential cosponsor would be reflected in frequent cosponsorship. To measure the effect of homophily, we include several relevant independent variables. We include a measure for the **similarity in legislative ideology**, based on each legislator's w-Nominate score. We also include a measure for whether the legislators are **both Democrats**, and a separate measure for whether the legislators are **both Republicans**. Including both measures allows us to examine whether there is a general pattern of homophily, or whether majority and minority parties behave differently. We also include a measure for **similarity between district education**, and a measure for **average family income in district**, both gathered from the *Almanac of State Legislatures* (Lilley, DeFranco, and Diefenderfer 1994). We include a third measure of constituency similarity, **similarity in the racial / ethnic composition of the districts**.[5] We include a measure of **district proximity**, coded 1 if the districts shared a border and 0 otherwise. We include

[4] Collapsing the dependent variable into a binary form introduces a loss of information; however, the advantages of this method , including the ability to estimate effects for transitivity and reciprocity, outweigh these costs. Moreover, measuring cosponsorship by its relative frequency is in keeping with the reality of legislative politics: legislators often introduce a small number of measures with many of their colleagues, but choose to cosponsor a relatively high number of measures with only a select few.

[5] This measure is calculated for each legislator by totaling the percentage Asian-American in the district, the percentage Hispanic in the district, and the percentage African-American in the district, and subtracting from 100.

dummy variables that are coded 1 if the legislators are **both male, both white, both female**, **both African-American**, and **both Latino**, respectively.[6] Finally, we include a measure of **shared committee service** (the number of shared committees both legislators serve on together), as well as **similarity in seniority** levels.

Recall that the general homophily model led us to the expectation that similarity between a sponsor and potential cosponsor would promote cosponsorship, whereas the social identity model led us to the expectation that cosponsorship would be particularly frequent within minority groups. The variables of **both female**, **both African-American**, and **both Latino** will serve to test both the general homophily model and the social identity models (and the variables **both male** and **both white** serve to distinguish between the two models). We also can compare the estimated effects of the "**both Republican**" and "**both Democrat**" variables to assess whether cosponsorship is particularly pronounced within minority parties. Finally, we include a measure of whether legislators are **both relatively extreme ideologically** (i.e. either very liberal or very conservative) to assess whether ideological minorities are relatively likely to cosponsor together.

The social identity model also led us to the expectation that majority legislators would be relatively unlikely to sign on as cosponsors to the legislation introduced by minority legislators. We include three variables to examine whether this is true with respect to race, ethnicity, and gender. First, we include the variable **African-American sponsor, White cosponsor,** which is coded 1 if a primary sponsor was African-American, and a potential cosponsor was white (and 0 otherwise). Second, we include the variable **Latino sponsor, White cosponsor**, which is coded 1 if a primary sponsor was Latino, and a potential cosponsor was white (and 0 otherwise). And third, we include the variable **Female sponsor, Male cosponsor**, which is coded 1 if a primary sponsor was female, and a potential cosponsor was male. We also test whether the majority cosponsorship model applies to ideological balance by including a variable **Extreme sponsor, Moderate cosponsor**, coded 1 if the sponsor is relatively ideologically extreme, and the potential cosponsor is relatively moderate (and 0 otherwise).[7] Finally, we include a variable **Minority Party sponsor, Majority Party cosponsor**, coded 1 if the sponsor is in the minority party and the potential cosponsor is within the majority party (and 0 otherwise). This variable will allow us

[6] The "both African-American" variable was omitted in the states of Arizona and Colorado, where the chamber was not sufficiently racially diverse to permit analysis. The "both Latino" measure was omitted in analyses of the states of Maryland, Michigan, and South Carolina for equivalent reasons.

[7] We coded ideological extremism as those legislators whose absolute value of their w-nominate score was greater than .799. Legislators who were not extremists were considered moderate.

to assess whether majority party members are relatively likely to cosponsor when the primary sponsor is a minority member.

Recall that the *Legislative Roles* model led us to the expectation that more senior members and members in a leadership position would be more likely to serve as sponsors, and more junior members, and members that did not hold a formal position of influence would be more likely to serve as cosponsors. We include two variables to test these expectations. First, we include a variable **Junior Sponsor, Senior Cosponsor**, which is coded 1 if the sponsor has served fewer than three years in the chamber, and the potential cosponsor has served more than two years in the chamber (and 0 otherwise). Second, we include a variable **Leadership Differential,** which is a dummy variable, where 1 indicates that the sponsor holds a lower leadership position than the cosponsor.

We also include a number of variables that will tap into the network structure of legislative cosponsorship. In social network analysis, we can estimate a **network reciprocity** parameter, which will allow us to assess whether there is a pattern of reciprocity in cosponsorship. We also estimate a parameter for **network transitivity**, through the inclusion of alternating *k*-triangles ($\lambda = 2$), which will allow us to assess whether transitivity exists within legislative networks. Transitivity in social networks is the idea that *friends of my friends are my friends*; therefore, transitivity refers to a relationship between three individuals in a given network (triads).[8] In the case of cosponsorship, if legislator A cosponsors a relatively high number of legislator B's measures, and legislator B cosponsors a relatively high number of legislator C's measures, then transitivity would be reflected in the degree of frequency with which legislator A cosponsors legislator C's measures. To obtain a more meaningful estimate of transitivity, we also include a measure for **alternating independent two-paths**, par. 2, which controls for a variety of structural opportunities for legislators to form transitive relationships. Figures 2 and 3 depict two such two-path structures that potentially offer the opportunity to create transitive associations, where two indirectly connected legislators establish a direct connection.

[Figures 2 and 3 About Here]

[8] For a more detailed explanation of transitivity and triads, see Louch 2000; Snijders 2002; Robins et al., 2005.

Finally, we include four variables to control for overall cosponsorship activity. We include measures for the **total number of bills sponsored** by the sponsoring legislator, and the **total number of bills cosponsored** by the cosponsoring legislator. That is, these two measures control for a relatively high number of bills sponsored (and thus a relatively high number of opportunities to cosponsor) and a relatively high inclination on the part of a legislator to cosponsor. We also include a measure of **alternating out-*k*-stars** ($\lambda = 2$), which is a measure of the distribution of the number of other legislators with whom each legislator frequently cosponsors. And, we include a measure of **alternating in-*k*-stars** ($\lambda = 2$), which is a measure of the distribution of the number of other legislators who frequently cosponsor each legislator's proposed legislation. These two measures control for the ways in which the frequency of cosponsorship is distributed across legislators—whether cosponsorship is distributed relatively evenly across legislators, or whether we can identify groups of legislators that cosponsor relatively frequently, even after taking into account the influences of our independent variables.

Results

The results of the nine ERGM models are presented in Tables 3, 4, and 5.

[Tables 3 Through 5 About Here]

All analyses converged relatively well by accepted standards. Estimated effects were assessed using *t*-ratios calculated as the parameter estimates divided by the standard errors, and referring these to an approximating standard normal distribution as the null distribution. Given this, effects are statistically significant when *t*-statistics are approximately ≥ 2.[9]

What is the influence of homophily on legislative cosponsorship? Generally, we find support for fairly strong influence of some types of homophily on cosponsorship, including ideological similarity, district proximity (legislators elected from districts that share a border frequently cosponsor each other's measures), and shared committee service. The most important influence on cosponsorship is clearly shared ideology. In eight of the nine states under consideration, ideological proximity between the sponsoring legislator and a potential cosponsor was associated with an increased frequency of cosponsorship. The only exception is Michigan; it is the only state in which shared majority party affiliation significantly contributes to the

[9] As with any estimation procedure using Markov chain Monte Carlo (MCMC) for obtaining simulated draws from ERGMs, and for parameter estimation, results will be different for different starting values of the estimates and the random streams of the algorithm. We made several separate runs of the data, and all analyses produced the same substantive conclusions.

likelihood that legislators will frequently cosponsor with each other. This finding that legislators cosponsor bills introduced by their ideologically compatible colleagues is in keeping with Woon's (2008) argument that cosponsorship reflects the ideology of a measure. However, other factors beyond ideology clearly shape the choice to cosponsor legislation. The second most pronounced influence on frequent cosponsorship is district location—in seven states (the exceptions are Arizona and Texas), legislators were much more likely to cosponsor legislation introduced by those legislators who were elected from neighboring districts. Another important factor is shared committee service—in six of nine states (the exceptions are Arizona, California, and Texas), legislators who serve on the same committees are more likely to be frequent cosponsors with one another. This is not surprising, given that legislation is often referred to the committee on which the primary sponsor serves; it is likely that other committee members endorse that legislation through cosponsorship.

Not all types of homophily significantly promote the frequency with which a legislator cosponsors a colleague's bills. In most states, shared characteristics in terms of race, gender, or ethnicity significantly influenced the frequency with which a legislator cosponsored a colleague's bills. However, these results were not tremendously consistent; about one-third of forty estimated parameters were statistically significant. Constituency homophily has only modest effects on cosponsorship; in three states (Florida, Maryland, and Michigan) similarity in the racial and ethnic diversity within the district contributes to the frequency with which legislators cosponsored legislation introduced by other legislators, and in three states (California, Maryland, and Texas) similarity in the percentage of the district that is college-educated is associated with frequent cosponsorship. Similarity in average income in district contributes to frequent cosponsorship in only one state, Michigan. In other words, in five of the nine states, similarity in at least one of the three measures of district composition contributes to the likelihood of frequent cosponsorship; however, the magnitude of the effects pale in comparison to the effect of ideological proximity.

Recall that the *social identity* perspective suggested that frequent cosponsorship would be more likely to occur among minority group members than among majority group members. There is modest support for this perspective in terms of minority party status; minority party legislators cosponsor more frequently with other minority party legislators in three states (Arizona, Maryland and Michigan), whereas majority party legislators cosponsored more frequently with other majority party legislators in only Michigan. Legislators who were ideologically extreme

(i.e. either extremely liberal or extremely conservative) were more likely to cosponsor each other's measures in three states (California, Colorado, and Illinois). That is, in six of nine states, legislators who were in a minority, in either their partisanship or their ideology, were relatively likely to endorse the proposals of other, similarly situated legislators.

Social identity theory is also supported by the finding that shared minority status in terms of race, gender, and ethnicity significantly influenced the frequency with which legislators cosponsored legislation introduced by their colleagues. As noted above, majority status did occasionally influence cosponsorship. In three states (Colorado, Illinois, and South Carolina), male legislators are relatively likely to cosponsor legislation introduced by other male legislators. White legislators are significantly more likely to cosponsor with other white legislators in only one state, Texas. Nonetheless, the findings for cosponsorship within minority groups – women, Latino legislators, and African-American legislators – were much more pronounced. In a majority of state legislatures under consideration (Colorado, Florida, Maryland, Michigan, and Texas) women more frequently cosponsor measures if they are introduced by other women. In three of seven states where the chamber was sufficiently racially diverse to permit study (Illinois, Michigan, and South Carolina), African American legislators were relatively more likely to cosponsor bills introduced by other African American legislators. In three of the five states in which the chamber was sufficiently ethnically diverse to permit study (Arizona, Florida, and Texas), Latino legislators were more likely to cosponsor bills sponsored by other Latino legislators.

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The social identity model also predicted an effect based on the interaction between minority status and primary sponsorship. In essence, we expected that legislators who were identified with a minority group (partisan, ideological, racial, gender, or ethnic) would be less likely to attract majority legislators as cosponsors for their measures. In general, this expectation is not supported. There is no evidence that male legislators are less likely to cosponsor the legislation that women introduce. Similarly, there is no evidence that white legislators are less likely to cosponsor the legislation that Latino representatives introduce. Very little pattern seems to exist regarding the balance between a majority party member in relation to a minority party member. The results do indicate that in three states, moderate members are less likely to cosponsor the legislation sponsored by relatively ideologically extreme members; however, in three other states, moderate members are actually more likely to cosponsor the legislation

introduced by relatively extreme members. The one finding that does stand out fairly consistently is that white legislators are less likely to cosponsor measures that are introduced by African-American legislators. This effect is present even after controlling for the frequency of cosponsorship of measures introduced by a legislator's colleagues within the majority or minority party caucus.

Some modest evidence supports the expectation, rooted in the *legislative roles* model, that more senior representatives would be less likely to cosponsor legislation introduced by very junior representatives, and that legislative leaders would be less likely to cosponsor legislation introduced by those who did not hold leadership positions. The former is true in Florida and Texas, and the latter is true in Maryland, Michigan, and Texas. Note, however, that in Illinois and Maryland, the estimated effects are statistically significant in a direction that is opposite to the one expected.

There is strong evidence of transitivity— we find that the associates of each legislator are relatively likely to cosponsor together, even after taking into account a host of other powerful effects. The positive effect of the alternating *k*-triangles (labeled as "transitivity" in Table 3 through Table 5) combined with both the negative independent two-paths and the positive alternating out-*k*-stars indicate that the legislative network in each state is “clique-like,” with several relatively dense clusters of lawmakers cosponsoring each other's legislation. And, not surprisingly, overall activity in sponsorship and cosponsorship is a reliable predictor of the likelihood that one legislator will cosponsor another legislator's measures.

Discussion and Conclusion

Several conclusions can be drawn from this research. First, while some results vary across states, they are also very consistent in several respects. Ideological distance diminishes the likelihood that legislators will cosponsor each other's measures, while legislators from neighboring districts and legislators who serve on the same committees are relatively likely to cosponsor each other's legislation. While the congressional literature has often pointed to chamber characteristic such as ideology and committee service as determinants of legislative behavior, very little research has placed these factors within a social dynamic framework. It is clear that legislators who are similar to each other in terms of ideology, service, and district location tend to support each other's bills. We also found considerable evidence that similarities

in race, gender, and ethnicity increased the likelihood that a legislator would cosponsor a colleague's bill.

Likewise, it is clear that the importance of similarity across legislators has limits. Similarity across legislators, measured by characteristics such as leadership, seniority, and district composition, does not have a consistent significant effect in shaping cosponsorship. For example, we find, at best, modest support for the expectation that those who are relatively ideologically liberal or conservative (that is, ideological extremists) would cosponsor with like-minded colleagues. The strong effects of ideological similarity on cosponsorship patterns likely minimize an additional impact we could observe for cosponsorship among legislative extremists. Moreover, it may be that ideological status is simply more "in the eye of the beholder" than is race, gender, or ethnicity. The boundaries between ideological groups are likely perceived as somewhat unstable and permeable. And, it should be noted that in states such as California, Florida, and Michigan, roll call voting (and therefore legislative ideology) is polarized; most legislators are ideological extremists by any reasonable absolute definition. Likewise, we find that legislators within parties were in some states more likely to cosponsor with each other, but the results were not very consistent, again likely because the effect of ideological proximity dwarfed any partisan influence.

We do find fairly consistent evidence that cosponsorship is relatively likely to occur among legislators who share minority status in terms of race, gender, and ethnicity. Nonetheless, there remain substantial differences across states in the influence of race and ethnicity. What accounts for these differences? While we can only speculate, it may be that race and ethnicity is most likely to have an effect in Republican-controlled chambers. In five of the six cases in which race or ethnicity had a significant effect on cosponsorship, Republicans controlled the chamber; in six of seven cases in which the effect of race or ethnicity on cosponsorship was not statistically significant, Democrats controlled the chamber. It may be that the legislative agenda in states such as California, Illinois, and Maryland is such that collaboration within rather than across racial and ethnic groups is less evident. We also find strong evidence of transitivity; a legislator's associates are relatively likely to also work together, and the pattern of structural effects suggests that legislators are organized into relatively small groups. It may be that legislators self-organize based on issue or party caucuses or committees, or even based on small informal networks of collaboration.

We also demonstrate support for social identity theory in that we find substantial evidence that the group identity of the primary sponsor influences the likelihood that legislators will cosponsor, particularly with respect to race; white legislators are less likely to cosponsor the measures that African-American legislators introduce. However, there was little evidence that legislators less frequently cosponsored across majority-minority status boundaries in other respects. Moreover, there was little evidence that legislative roles – in terms of relative seniority or the leadership position held by a legislator -- shaped the decision to cosponsor the bills introduced by another legislator.

This research also sheds some light on two long-standing debates in political science. First, one of the of the most heated debates in the study of legislative politics is whether the party affiliation of legislators has any consequential effect (e.g., Rhode 1991; Krehbiel 1993; Aldrich 1995). We find only weak evidence that shared partisanship influence a legislator's decision to cosponsor a colleague's legislation—and when it matters, it is usually in terms of shared minority party status, rather than shared party affiliation in general. Second, there has been a long-standing line of research in legislative norms, dating to the 1950s (e.g., Matthews 1959; Asher 1973; Hall 1996). We find little evidence of apprenticeship in the form of relatively junior members more frequently cosponsoring legislation introduced by senior members. We do find strong evidence of transitivity and reciprocity, indicating that these network characteristics do structure agenda-setting choices.

In this paper we explored how group dynamics affect legislative agenda setting. We noted at the onset that literature on agenda setting has mainly focused on individual determinants of sponsorship and cosponsorship activity, and much less on how these activities are structured by group interests. By using network analysis as an additional tool to examine the legislative process, we were able to model not only the individual characteristics of legislators, but also the interaction and collaboration between and among legislators. This approach is a much more comprehensive way of studying legislative behavior, but it is certainly not exhaustive. Where should research go from here? First, it would be useful to combine a study of legislative networks with a study of the determinants of legislative activity in agenda-setting. In this study, individual influences on sponsorship and cosponsorship were subsumed under the more general effect of overall activity, but clearly constituency, partisan, ideological, and demographic characteristics likely shape overall legislative activity—and therefore shape not only the choice of how many measures to sponsor or cosponsor, but also influence the choice of which measures to

cosponsor. Second, it is important to trace the existence of networks throughout the legislative process, across chambers. Given that this research indicates that legislators organize themselves based on small working groups, it would be particularly informative to assess the process by which that occurs—and to assess how changes in careers can disrupt or enhance that practice. In relation to this, it would also be useful to understand who has what roles in a legislative network and how these roles change over time. Employing *positional analysis* (a tool in social network analysis) would permit scholars to analyze individual's relative strength and weaknesses within a legislative body. It is clear that legislators work together in systematic ways, and by exploring these different individual-level, group-level, and organizational-level characteristics, we can better understand the legislative process.

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Figure 1: Arizona Network of "Frequent Cosponsorship"

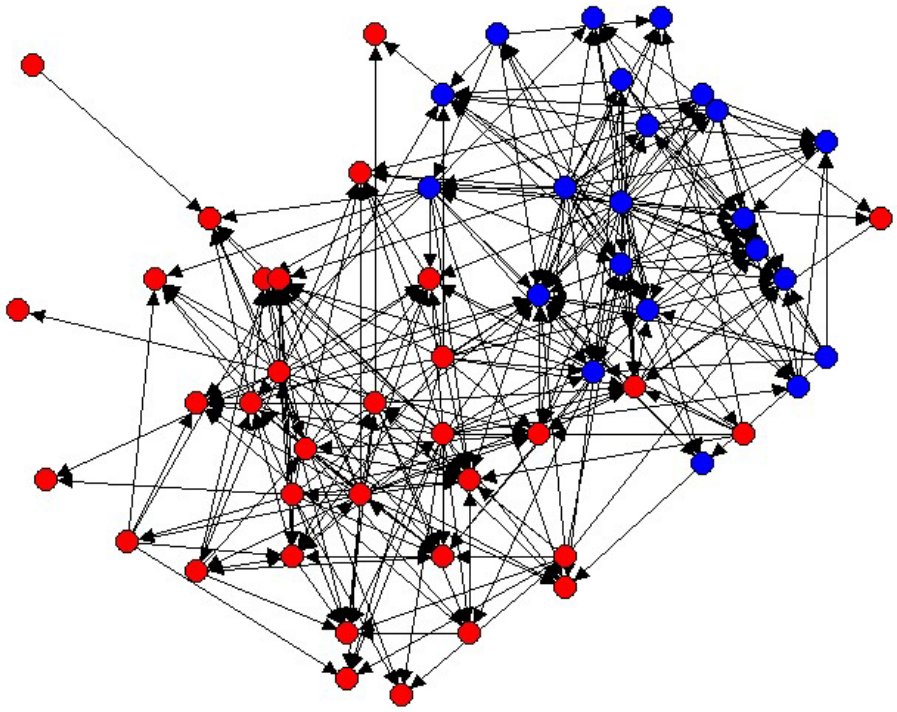

Table 1. Descriptive Information, Lower Chambers, Nine States, 2001

	Percentage Black[a]	**Percentage Latino**[a]	**Percentage Female**[a]	**Percentage Democratic**[a]	**Average Seniority (Std. Dev.)**[b]	**Standard Deviation, Ideology (Percentage > |.699|)**[b]
Arizona	2	11	36	38	3.1 (2.2)	.69 (48)
California	5	28	32	62	3.0 (2.8)	.71 (58)
Colorado	3	14	36	44	3.2 (2.0)	.63 (48)
Florida	14	12	26	36	2.5 (2.1)	.74 (69)
Illinois	14	3	27	53	8.3 (5.9)	**.61 (33)**
Maryland	20	0	33	75	9.6 (6.6)	**.47 (38)**
Michigan	17	2	25	46	3.0 (1.3)	**.78 (73)**
South Carolina	20	0	13	44	7.6 (6.0)	.63 (29)
Texas	25	9	20	52	8.9 (6.3)	**.55 (32)**

[a] Percentage of all legislators serving at some point during year.
[b] Percentage of legislators serving throughout year

Frequent Cosponsorship Defined as cosponsoring more than 7 of the other legislator's sponsored measures.
(Democrats in blue, Republicans in red)

Table 2: Example of Cosponsorship Matrix, Arizona: Five Legislators

	Legislator 1	Legislator 2	Legislator 3	Legislator 4	Legislator 5
Legislator 1	0	4	1	0	4
Legislator 2	2	0	0	1	7
Legislator 3	5	4	0	8	2
Legislator 4	4	6	3	0	3
Legislator 5	12	11	2	3	0

Figure 2: Independent 2-two-paths

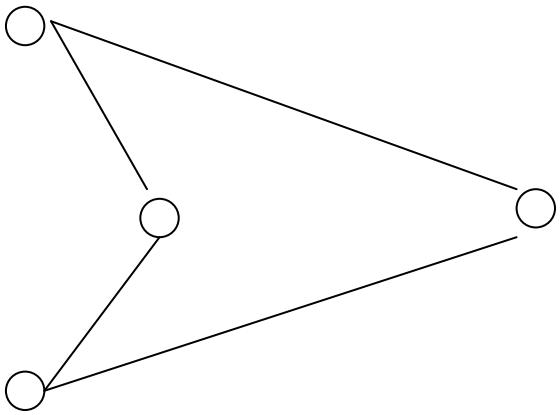

Figure 3: Independent 4-two-paths

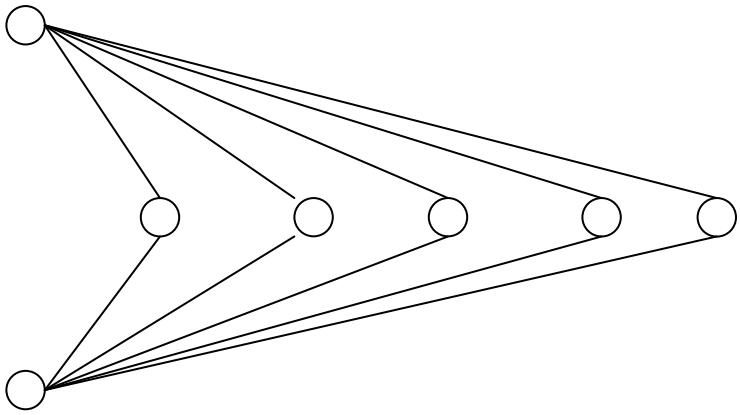

Table 3. Network Analysis of Cosponsorship, Arizona, California, and Colorado

	Arizona Estimate	Arizona Std. Error	California Estimates	California Std. Error	Colorado Estimates	Colorado Std. Error
Homophily						
Similarity, Ideology	2.445*	.356	2.389*	.638	1.686*	.256
Both Majority Party	-.194	.200	-.815	.398	-.075	.145
Similarity, District Education	.338	.320	.671*	.336	-.056	.237
Similarity, District Income	.015	.386	-.244	.306	-.072	.243
Similarity, District Diversity	-.832*	.309	.122	.283	-.061	.183
District Proximity	.206	.138	.636*	.172	.586*	.134
Both Male	.025	.140	.042	.130	.226*	.106
Both White	.200	.168	-.033	.119	-.075	.124
Shared Committee Service	.210	.121	.077	.099	.291*	.095
Similarity, Seniority	-.003	.167	.295	.398	.190	.135
Social Identity						
Both Female	-.219	.202	.039	.148	.253*	.118
Both Black	N/A	N/A	.471	.837	N/A	N/A
Both Latino	.855*	.392	-.035	.150	.021	.278
Both Ideologically Extreme	.126	.190	2.389*	.638	.766*	.257
Both Minority Party	.461*	.233	-.081	.408	-.247	.138
Female Sponsor, Male Cosponsor	-.193	.120	-.182	.139	.136	.107
Black Sponsor, White Cosponsor	N/A	N/A	-.319	.304	N/A	N/A
Latino Sponsor, White Cosponsor	-.068	.185	-.359*	.151	.048	.144
Extreme Sponsor, Moderate Cosponsor	.416*	.102	-.356*	.135	.085	.092
Minority Party Sponsor, Majority Party Cosponsor	.017	.159	-.678*	.226	.029	.136
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-.177	.136	.052	.114	-.111	.081
Leadership Differential	.125	.127	-.138	.112	-.092	.101
Network Factors						
Reciprocity	.033	.250	.372	.211	.351*	.147
Transitivity	.387*	.087	.370*	.079	.684*	.098
Two Paths (potential for transitivity)	-.152*	.016	-.035*	.014	-.110*	.010
Activity, Distribution of Activity						
Number of Bills Sponsored by Sponsor	.031*	.004	.045*	.009	.089*	.019
Number of Bills Cosponsored by Cosponsor	.031*	.004	.035*	.003	.024*	.002
Alternating In-*k*-Stars	-.015	.392	.080	.219	-3.639*	1.572
Alternating Out-*k*-Stars	1.188*	.220	1.660*	.201	1.261*	.248
Number of Legislators	58		78		65	
Percent of Frequent Cosponsors	18		.09		.21	

Table 4. Network Analysis of Cosponsorship, Florida, Illinois, and Maryland

	Florida Estimates	Florida Std. Error	Illinois Estimates	Illinois Std. Error	Maryland Estimates	Maryland Std. Error
Homophily						
Similarity, Ideology	1.055*	.434	.703*	.290	.418*	.172
Both Majority Party	-.388	.305	.200	.150	.034	.074
Similarity, District Education	.361	.230	-.044	.233	.841*	.191
Similarity, District Income	.123	.193	-.154	.249	-.062	.211
Similarity, District Diversity	.586*	.193	.202	.194	1.180*	.165
District Proximity	.704*	.133	.452*	.171	.615*	.067
Both Male	.077	.102	.037*	.113	-.031	.079
Both White	.100	.113	.140	.120	-.107	.086
Shared Committee Service	.382*	.089	.219*	.085	.724*	.063
Similarity, Seniority	.118	.088	-.007	.158	-.312*	.130
Social Identity						
Both Female	.355*	.123	.222	.126	.244*	.081
Both Black	.581*	.104	.286	.219	.172	.103
Both Latino	.596*	.202	.882	.566	N/A	N/A
Both Ideologically Extreme	.153	.092	.511*	.165	.271	.161
Both Minority Party	-.139	.304	.473*	.145	.548*	.083
Female Sponsor, Male Cosponsor	.129	.088	.119	.102	.119	.069
Black Sponsor, White Cosponsor	-.688*	.210	-.976*	.250	-.214*	.094
Latino Sponsor, White Cosponsor	.289*	.108	.435*	.175	N/A	N/A
Extreme Sponsor, Moderate Cosponsor	.046	.064	.104	.099	.414*	.074
Minority Party Sponsor, Majority Party Cosponsor	-.452	.144	-.065	.148	-.174*	.087
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-.271*	.087	.034	.096	.172*	.059
Leadership Differential	.093	.079	.200*	.092	-.141**	.069
Network Factors						
Reciprocity	.349	.202	-.295	.190	.595*	.125
Transitivity	.559*	.052	.821*	.066	.734*	.049
Two Paths (potential for transitivity)	-.082*	.009	-.067*	.009	-.095*	.005
Activity, Distribution of Activity						
Number of Bills Sponsored by Sponsor	.010*	.003	.007*	.002	.060*	.005
Number of Bills Cosponsored by Cosponsor	.015*	.002	.023*	.002	.015*	.002
Alternating In-*k*-Stars	-.141	.211	-1.030*	.268	-.650*	.255
Alternating Out-*k*-Stars	1.398*	.120	1.266*	.135	.688*	.116
Number of Legislators	118		110		134	
Percent of Frequent Cosponsors	.06		.06		.09	

Table5. Network Analysis of Cosponsorship, Michigan, South Carolina, and Texas

	Michigan Estimates	Michigan Std. Error	South Carolina Estimates	South Carolina Std. Error	Texas Estimates	Texas Std. Error
Homophily						
Similarity, Ideology	.045	.216	1.202*	.376	2.841*	.558
Both Majority Party	.867*	.182	.018	.174	-.155	.261
Similarity, District Education	.037	.200	.418	.301	1.525*	.483
Similarity, District Income	.853*	.346	-.170	.320	-.446	.477
Similarity, District Diversity	.599*	.202	.107	.271	-.114	.336
District Proximity	.655*	.128	1.410*	.158	.295	.255
Both Male	.083	.083	.365*	.163	-.415	.233
Both White	-.021	.125	-.095	.232	.448*	.180
Shared Committee Service	.301*	.077	.297*	.110	-.137	.190
Similarity, Seniority	.326*	.103	.023	.266	-.158	.225
Social Identity						
Both Female	.414*	.142	.780	.452	.559*	.239
Both Black	.825*	.147	.545*	.278	.076	.395
Both Latino	N/A	N/A	N/A	N/A	.504*	.165
Both Ideologically Extreme	-.087	.086	.411	.242	-.692*	.300
Both Minority Party	1.147*	.204	.067	.216	-.205	.279
Female Sponsor, Male Cosponsor	-.058	.103	.172	.201	.561*	.200
Black Sponsor, White Cosponsor	.027	.130	-.459	.265	-.802*	.289
Latino Sponsor, White Cosponsor	N/A	N/A	N/A	N/A	-.164	.216
Extreme Sponsor, Moderate Cosponsor	-.246*	.081	.255*	.103	-.463*	.212
Minority Party Sponsor, Majority Party Cosponsor	.366*	.107	-.205	.209	.229	.237
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-.055	.084	.060	.090	-.887*	.402
Leadership Differential	-.213*	.079	-.156	.141	-.426*	.197
Network Factors						
Reciprocity	.537*	.118	.244	.258	-.319	.438
Transitivity	.612*	.069	.668	.071	.705*	.090
Two Paths (potential for transitivity)	-.086*	.007	-.091	.013	-.071*	.018
Activity, Distribution of Activity						
Number of Bills Sponsored by Sponsor	.033*	.004	.024	.003	.010*	.002
Number of Bills Cosponsored by Cosponsor	.009*	.001	.024	.003	.054*	.007
Alternating In-*k*-Stars	-1.299*	.468	-.715*	.205	-.807*	.090
Alternating Out-*k*-Stars	1.235*	.187	1.710*	.142	1.737**	.141
Number of Legislators	105		124		149	
Percent of Frequent Cosponsors	.13		.03		.02	

Appendix

We also estimated the models with Multiple Regression Quadratic Assignment Procedure, or MRQAP (Krackhardt 1987, 1988). The advantage of an MRQAP is that it will use all information in the "frequency of cosponsorship" dependent variable; that is, the dependent variable is not constrained to a binary value, and instead is coded as the number of bills that legislator *i* sponsors that are cosponsored by legislator *j*. QAP is a simulation method that for each independent variable preserves the relationships between legislators (organized as before in dyads), but "scrambles" the relationship between each legislator dyad and the dependent variable of frequency of cosponsorship. In this manner, dependence between rows of legislators and columns of legislators are preserved (i.e. the structure of the network remains fixed), but dependence between the independent and dependent variables is eliminated (changes who is where in the network). This process is repeated a number of times in order to generate an empirical sampling distribution, which corresponds to the null hypothesis of "no association between independent and dependent variables". We can therefore use this sampling distribution to assess the estimated effect given our own data, while still preserving dependence across observations and controlling for autocorrelation.

We use UCINET (Borgatti, Everett, and Freeman 2002) to employ a QAP procedure to conduct nine regression analyses, one for each state. These analyses are very similar in structure to the ERGM analyses presented in the paper, with three exceptions. First, the two independent variable that represent "sponsorship activity" and "cosponsorship activity", originally measured as the total number of bills sponsored by the sponsor, and the total number bills cosponsored by the potential cosponsor, are now measured as the sum of the number of bills sponsored by each legislator in the dyad, and the sum of the number of bills cosponsored by each legislator in the dyad. Second, the dependent variable now utilizes all information available, in that it is measured not as a binary variable (which represented "frequent cosponsorship" in the initial set of analyses) but as a count. This is a distinct advantage of the QAP approach. And third, the QAP approach is unable to estimate structural effects such as reciprocity and transitivity. Because of this—and because the omission of such factors arguably introduces specification issues into the QAP models—we present the ERGM results in the main body of the paper, but include Tables A1 through A3, which present the QAP results.

Table A1. QAP Analysis of Cosponsorship, Arizona, California, and Colorado

	Arizona Estimate	Arizona Signif.	California Estimates	California Signif.	Colorado Estimates	Colorado Std. Error
Homophily						
Difference, Ideology	-1.626*	.000	-.344*	.000	-.520*	.000
Both Majority Party	-.439	.120	-.180*	.037	-.287*	.000
Difference, District Education	-.015	.090	-.006*	.004	.002	.211
Difference, District Income	-.004	.362	.002	.168	.004	.136
Difference, District Diversity	.019*	.002	-.001	.183	-.001	.288
District Proximity	.293*	.035	.286*	.000	.325*	.000
Both Male	-.018	.473	-.011	.389	.061	.096
Both White	.328	.150	.018	.354	-.154*	.019
Shared Committee Service	.402*	.001	-.005	.414	.108*	.001
Difference, Seniority	.106*	.040	-.007	.154	-.003	.423
Social Identity						
Both Female	.226	.317	-.021	.400	.158	.075
Both Black	N/A	N/A	.064	.376	N/A	N/A
Both Latino	2.945*	.000	-.076	.181	.082	.305
Both Ideologically Extreme	.880*	.006	.015	.422	.506*	.003
Both Minority Party	1.206*	.009	-.136	.142	-.342*	.001
Female Sponsor, Male Cosponsor	.159	.393	-.141	.080	.028	.405
Black Sponsor, White Cosponsor	N/A	N/A	-.008	.497	N/A	N/A
Latino Sponsor, White Cosponsor	.665	.214	-.163*	.045	-.098	.271
Extreme Sponsor, Moderate Cosponsor	1.638**	.001	-.189*	.004	-.003	.491
Minority Party Sponsor, Majority Party Cosponsor	-.071	.455	-.179*	.027	-.497*	.000
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-1.283*	.013	-.080	.126	-.175	.052
Leadership Differential	.110	.392	-.080*	.047	-.114*	.025
Activity, Distribution of Activity						
Number of Bills Sponsored by Both Sponsor & Cosponsor	.037*	.000	.014*	.000	.050*	.000
Number of Bills Cosponsored by Both Sponsor & Cosponsor	.034*	.000	.008*	.000	.009*	.000
Intercept	-.993		-.077		-.052	
Number of Legislators	58		78		65	
Adjusted R-Squared	.278		.182		.212	

Table A2. QAP Analysis of Cosponsorship, Florida, Illinois, and Maryland

	Florida Estimates	Florida Std. Error	Illinois Estimates	Illinois Std. Error	Maryland Estimates	Maryland Std. Error
Homophily						
Difference, Ideology	-.243*	.001	-.066	.055	-.086	.063
Both Majority Party	-.285*	.003	.087	.116	.035	.262
Difference, District Education	-.001	.192	.002	.153	-.007*	.000
Difference, District Income	-.002	.192	-.001	.434	.001	.392
Difference, District Diversity	-.002*	.018	-.001	.341	-.004*	.000
District Proximity	.211*	.000	.105*	.001	.311*	.000
Both Male	.058*	.033	.016	.184	-.055	.078
Both White	-.011	.406	.014	.331	-.061	.160
Shared Committee Service	.155*	.000	.039*	.013	.256*	.000
Difference, Seniority	.008	.191	.001	.474	.006*	.042
Social Identity						
Both Female	.236*	.000	.167*	.011	.097	.139
Both Black	.277*	.005	-.204*	.044	.264*	.013
Both Latino	.229*	.026	.995*	.004	N/A	N/A
Both Ideologically Extreme	.093	.056	.244*	.014	.330*	.009
Both Minority Party	-.214*	.021	.087	.116	.164	.066
Female Sponsor, Male Cosponsor	.183*	.012	.087	.108	-.046	.316
Black Sponsor, White Cosponsor	-.048	.305	-.326*	.001	-.134	.117
Latino Sponsor, White Cosponsor	.069	.194	N/A	N/A	N/A	N/A
Extreme Sponsor, Moderate Cosponsor	.025	.303	.026	.361	.154	.096
Minority Party Sponsor, Majority Party Cosponsor	-.216*	.001	-.057	.207	-.123	.127
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-.146*	.005	-.104	.155	-.103	.125
Leadership Differential	-.001	.486	-.005	.423	-.079	.051
Activity, Distribution of Activity						
Number of Bills Sponsored by Both Sponsor & Cosponsor	.019*	.000	.003*	.014	.027*	.000
Number of Bills Cosponsored by Both Sponsor & Cosponsor	.005*	.000	.007*	.000	.004*	.000
Intercept	.061		-.414		-.312	
Number of Legislators	118		110		134	
Adjusted R-Squared	.068		.154		.141	

Table A3. QAP Analysis of Cosponsorship, Michigan, South Carolina, and Texas

	Michigan Estimates	Michigan Std. Error	South Carolina Estimates	South Carolina Std. Error	Texas Estimates	Texas Std. Error
Homophily						
Difference, Ideology	-.218*	.030	-.139*	.002	-.135*	.000
Both Majority Party	1.310*	.001	.084*	.042	-.056	.175
Difference, District Education	-.005	.126	-.002	.223	-.001	.351
Difference, District Income	-.004	.219	-.001	.492	.001	.434
Difference, District Diversity	-.006*	.024	-.001	.397	.001	.502
District Proximity	.791*	.000	.475*	.000	.051*	.003
Both Male	.069	.185	.020	.276	-.010	.175
Both White	-.038	.410	.030	.240	.012	.286
Shared Committee Service	.252*	.000	.071*	.000	-.003	.405
Difference, Seniority	-.049	.066	.003	.225	-.001	.352
Social Identity						
Both Female	.394*	.027	.202	.063	.221*	.000
Both Black	1.553*	.000	.135	.165	-.096	.070
Both Latino	N/A	N/A	N/A	N/A	.029	.278
Both Ideologically Extreme	-.126	.238	.237*	.040	.044	.240
Both Minority Party	1.191*	.000	.024	.404	-.056	.175
Female Sponsor, Male Cosponsor	.054	.416	-.053	.374	.153*	.010
Black Sponsor, White Cosponsor	.537*	.028	-.122	.210	-.111*	.038
Latino Sponsor, White Cosponsor	N/A	N/A	N/A	N/A	-.067	.139
Extreme Sponsor, Moderate Cosponsor	-.152	.199	.174	.070	-.006	.471
Minority Party Sponsor, Majority Party Cosponsor	.489*	.021	-.065	.271	-.058	.164
Legislative Roles						
Junior Sponsor, Senior Cosponsor	-.281	.101	-.020	.426	-.081	.140
Leadership Differential	-.074	.236	-.161*	.000	-.043*	.035
Activity, Distribution of Activity						
Number of Bills Sponsored by Both Sponsor & Cosponsor	.032*	.000	.016*	.000	.002*	.003
Number of Bills Cosponsored by Both Sponsor & Cosponsor	.006*	.000	.005*	.000	.005*	.000
Intercept	-1.723		-.240		-.041	
Number of Legislators	105		124		149	
Adjusted R-Square	.215		.136		.074	