



Measurement and theory in legislative networks: The evolving topology of Congressional collaboration

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ARTICLE INFO

Keywords:

Legislative politics
Cosponsorship
Congressional approval
Time series

ABSTRACT

The examination of legislatures as social networks represents a growing area of legislative scholarship. We examine existing treatments of cosponsorship data as constituting legislative networks, with measures aggregated over entire legislative sessions. We point out ways in which the direct application of models from the social networks literature legislative networks aggregated over entire sessions could potentially obscure interesting variation at different levels of measurement. We then present an illustration of an alternative approach, in which we analyze disaggregated, dynamic networks and utilize multiple measures to guard against overly measure-dependent inferences. Our results indicate that the cosponsorship network is a highly responsive network subject to external institutional pressures that more aggregated analyses would overlook.

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1. Introduction

Political science has been slow to embrace social network analysis (SNA). While SNA is not completely absent from the pages of political science journals, over the years since Moreno's sociograms were famously introduced in 1934 (Freeman, 2004), only recently has there been a veritable explosion of interest in the discipline. Given the importance of relational concepts such as power, influence, trust, conflict, collaboration, alliance-formation and coalition-building, to name but a few, it is surprising only that it has taken this long. As others have pointed out, few observations of interest to political science may be convincingly construed as independent from one another (McClurg and Young, 2011).

Beyond the pragmatic use of network tools in addressing the interdependence of cases, a number of political scientists have been making the leap to a genuine network *perspective* in their work. In such investigations, the network becomes more than simply the sum of its parts, more than just a collection of nodes and edges. Consideration of global properties of networks opens up exciting possibilities for the study of political behavior, as we begin to ask questions based not only in the extant theory of our own sub-fields, but also tied to theories developed in the social networks literature and based on broad research programs in human and even animal behavior (Guimera et al., 2005; Faust and Skvoretz, 2002). And yet, as political scientists encountering a wide variety of

measures and theoretical assumptions accumulated over decades of contributions to SNA, we face an embarrassment of riches. In sorting through different frameworks for studying social networks, it is tempting to simply adopt approaches already applied by our colleagues, without further reflection, or instead to reach reflexively for the novel, especially when the metaphors suggested by new tools (e.g., centrality and popularity, small worlds, structural holes) fit so nicely with the stories we are trying to tell.

In the current paper, we confine ourselves to an examination of one particular application of SNA, namely to the study of legislative behavior and more specifically, the use of cosponsorship data as a reflection of intra-chamber cooperation and collaboration. Nevertheless, the exercise of thinking carefully about the measurement and operationalization process has implications for any project involving the study of socio-political networks. We would be well advised to consider that even powerful network theories of political behavior ought to be grounded in the decades of theory already developed about political processes. We take the perspective that, while the implications of network theory may at times run counter to some established traditions in political science or may even allow exploration of previously inconceivable research questions, social network theory and analysis will typically supplement our existing theories and knowledge rather than replace them.

In particular, we begin by reviewing the literature analyzing the U.S. Congress and state legislatures as social networks. We finish Section 2 by briefly considering the nature of the structural construct of interest (legislative collaboration), the choices that must be made in the process of operationalizing this construct using cosponsorship data, the importance of modeling assumptions on

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subsequent measurement options, and the consequences of these decisions. Next, in [Section 3](#), we offer our own contribution to the literature, a theory linking Congressional collaborative patterns to institutional public approval trends. In keeping with the overarching theme of the article, we discuss the reasoning behind different possible measurement and modeling options in [Section 4](#), ascertaining the robustness of results to alternative measurements. We discuss our empirical results in [Section 5](#), before offering some concluding thoughts.

2. Literature on the measurement of legislative networks

Analyzing the social behavior of legislators would seem to presuppose the observation of contact or interaction among them. Observations of true social interactions are often unavailable or incomplete. Legislators guard their social relationships closely, and the social behaviors we do observe (co-attendance at fundraising dinners for example) may constitute strategic choices as well as social interactions. Occasionally, scholars are able to unearth clearer data regarding these social interactions. For example, [Young \(1986\)](#) and [Bogue and Marlaire \(1975\)](#) examine the “boardinghouse effect,” the effect of shared temporary lodging in Washington, on how legislators vote on the floor. Using data on legislators from 1800 to 1828, Young uncovers a positive relationship between legislators’ cohabitation and their common co-voting on bills.¹

Most work on explicitly social connections between legislators has focused on predicting social interactions rather than their implications for legislating. The earliest studies predicting legislative relationships were conducted in the 1950s and 1960s as single chamber analyses of U.S. state legislatures. Focusing on actual social contacts such as advice seeking, trust, and friendship, these in-depth examinations relied upon surveys and interviews to reconstruct legislative networks from self-identified relationships between legislators. [Patterson \(1959\)](#),² [Monsma \(1966\)](#), [Caldeira and Patterson \(1987, 1988\)](#), and [Caldeira et al. \(1993\)](#) all take this approach, providing both the tools for proper relational analysis and unexpected conclusions. For example, [Caldeira et al. \(1993\)](#) note that the predictors of mutual respect between legislators are distinct from the predictors of friendship. These contributions also uncover the importance of cross-party friendships for the spread of information and the diffusion of intra-chamber conflict. Such bridging relationships have been crucial in limiting partisan conflicts and thus avoiding what we now call legislative gridlock.

Recent efforts by scholars have taken up the question of how institutions might influence these dynamics. Particularly, [Sarbaugh-Thompson et al. \(2006\)](#) have found that term limits have amplified legislators’ reliance on similarity in the development of many kinds of relationships and strengthened the influence of chamber leadership relative to the rank-and-file. Term limits have also dramatically weakened the tendency of legislators to form the meaningful cross-party ties that facilitate negotiation and conflict resolution. Thus, using a longitudinal analysis of the Michigan House of Representatives, the authors find that term limits may be having the unintended consequence of exacerbating intra-chamber conflict.

Studying explicit social contact between elites offers a comforting level of measurement validity, but is not without its

shortcomings. Due to the great effort required to observe these sorts of networks, such studies are difficult to replicate across chambers. Additionally, self-reported relationships are known to suffer from misreporting, due to cognitive constraints, biases, and strategic considerations. This may be of little concern if one is interested in respondents’ perceptions and/or self-serving selective memories; still, for objective accounting of interactions, they may be less than ideal ([Bernard and Killworth, 1977](#); [Bernard et al., 1980](#); [Killworth and Bernard, 1980](#); [Bernard et al., 1982](#)). Finally, the conventional survey approach to the measurement of social networks only provides scholars with a single snapshot of the social network of interest. In reality, social and legislative relationships are dynamic phenomena, frequently changing across and even within sessions. Any attempts to generalize findings regarding the formation and evolution of legislative networks over time will be particularly difficult within a survey framework.

In order to analyze networks that are at once easier to replicate and more comparable over time, some scholars have turned to analysis of proxy measures for legislative relationships. The most common of these approaches (and the one we will focus our empirical efforts on) is the study of cosponsorship ([Burkett, 1997](#); [Fowler, 2006a,b](#); [Tam Cho and Fowler, 2010](#); [Gross, 2010](#); [Kirkland, 2011](#)).³ While legislators make cosponsorship choices based to some extent on strategy, those choices are also reflective of the broader relational tapestry of a chamber.⁴ In other words, the act of cosponsorship contains elements of both strategic and interpersonal influences. While these proxies of legislative interaction are necessarily less valid measures of social relationships than direct observation (were it possible) or even survey-based measures, unprecedented access to legislative archives provides scholars with the opportunity to compile proxies such as cosponsorship into networks across many legislatures and many points in time.

While these relational proxies have proven suggestive in uncovering the importance of relationships for legislative outcomes, they have not been employed to test theories of relational formation itself; simply put, cosponsorship has entered into analysis as explanatory rather than response variable. [Fowler \(2006a\)](#) indicates that there is a strong relationship between how “connected” a member of Congress is and the likelihood that he or she will see the bills and amendments he or she sponsors pass. [Kirkland \(2011\)](#) demonstrates that legislators who build the most diffuse network of cosponsors are much more likely to have bills succeed at veto points across eight state legislative chambers and 15 years of Congressional activity. [Waugh et al. \(2009\)](#) also show that the degree of polarization in the cosponsorship network is highly predictive of large changes in the party control of Congress. Finally, [Tam Cho and Fowler \(2010\)](#) have identified an association between what they term the “small world properties” of the Congressional Cosponsorship network and the amount of important legislation that Congress passes. In other words, they argue, the very topology of the cosponsorship network may have something to do with how successful Congress is in passing important legislation.

While operationalizing legislative cooperation or collaboration in terms of cosponsorship seems fairly natural, scholars who have done so have not excelled at convincingly justifying their measurement choices. It is not clear how exactly the cosponsorship relation should be measured; in contrast with structural variables

¹ [Bogue and Marlaire \(1975\)](#) uncover a much weaker relationship than does [Young \(1986\)](#), after controlling for geography.

² [Rouff \(1938\)](#), who wrote of Illinois assemblymen (and politicians more generally) as human relations specialists, seems to have been the first scholar to think about how legislative relationships translate into legislative politics. [Patterson \(1959\)](#) appears to have been the first to apply explicitly sociometric methods and to the study of a legislature.

³ This is not, however, the only approach that has been taken. [Porter et al. \(2005\)](#) use common committee assignments to generate a network between legislators. [Conover et al. \(2011\)](#) and [Sparks et al. \(2011\)](#) both use the social media network Twitter to construct social networks of legislators.

⁴ [Koger \(2003\)](#) notes that legislators cosponsor for explicitly policy-motivated reasons. However, they also cosponsor bills based on the identity of the colleague requesting support.

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