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Power Structures of Policy Networks ⓐ

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Abstract and Keywords

This chapter presents an overview of major theoretical policy network developments, disputes, and alternative models, as well as key research results. Taking a chronological approach, the first section identifies the origins of policy network research in studies of power structures and interlocking directorates. The next section examines theories of policy networks constructed on both sides of the Atlantic in the late twentieth century. The third section looks at recent policy network developments, including the emergence of global networks and applications of new theories and advanced statistical methods to policy network research. The chapter concludes that the field has greatly matured as a multidisciplinary specialty and become more institutionalized in recent years. Although it still lacks cohesion around a core set of innovative ideas that could facilitate greater integration, opportunities await for creative analysts to propose paradigms that could take policy network studies in surprising new directions.

Keywords: advocacy coalition framework, ecology of games, governance network, interlocking directorate, network exchange models, organizational state, policy network, power elite, power structure, social network theory

We trace the origins of policy network analysis to the 1950s, in C. Wright Mills's (1956) depiction of the US national power elite as the interpersonal ties among elite persons occupying the top positions of business, political, and military institutions. Over the following decades, European and North American political sociologists and political scientists theorized and conducted research on policy networks that increasingly integrated numerous features of social network analysis (SNA). Consequently, policy scholars today enjoy a rich gumbo of SNA concepts, propositions, principles, and methodologies that illuminate policymaking structures and power at diverse levels of analysis across a wide range of polities in advanced and developing societies.

This chapter presents an overview of major theoretical policy network developments, disputes and alternative models, and key research results. Taking a chronological approach, the first section identifies the origins of policy network research in studies of power structures and interlocking directorates. The next section examines theories of policy networks constructed on both sides of the Atlantic in the late twentieth century. The third section looks at recent policy network developments, including the emergence of global networks and incorporating new theoretical and methodological paradigms. We conclude that the field has greatly matured as a multidisciplinary specialty and become more institutionalized in recent years. Although it still lacks cohesion around a core set of innovative ideas that could facilitate greater integration, opportunities await for creative analysts to propose paradigms that could take policy network studies in surprising new directions.

The Origins of Power Structure Analysis

Policy networks may be defined as "(more or less) stable patterns of social relations between interdependent actors, which take shape around policy problems and/or policy programmes" (Kickert, Klijn, and Koppenjan, 1997, 6). We accept Max Weber's structural definition of power as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests" (1947, 152). The actual or potential exercise of power involves asymmetric relations between two or more actors, or groups, that may take varied forms. David Knoke (1990, 3–7) theorized about four pure types of power, based on combinations of influence and domination relations: (1) *coercive power*, in which actors dominate others by "threats and applications of negative sanctions"; (2) *authoritative power*, involving "the issuing of a command with the expectation of uncontested obedience by the recipient"; (3) *persuasive power*, whose basis lies in "the informational content of messages, with no ability to invoke sanctions for refusals to comply"; and (4) *egalitarian power*, in which both domination and influence are largely absent. In formally democratic polities, where most policy network research has been conducted, power tends to blend authoritative and persuasive relations in the legislative and executive organizations of government. Consequently, power structure analysts investigated the patterns of network connections among elite political actors and the outcomes of collective decision-making by these political structures.

This section identifies the origins of policy network analysis in studies of power structures and interlocking directorates beginning in the 1950s. Although these scholars

did not draw explicitly on formal SNA principles, they laid the foundation for a subsequent proliferation of such approaches.

Overlapping Circles of the Power Elite

Seven decades ago, American sociologist C. Wright Mills suggested interpreting the social group he called the "power elite" or "ruling class" as highly connected structures with common membership in the power institutions of the political, economic, and military spheres. In *The Power Elite* (1956), he described these densely connected structures, also called "higher circles," as a set of interlocking positions occupied by individuals whose power capacity increases with the number of overlapping positions. Mills's main theoretical claim within the structural approach to studying political groups was that a person's influence on state decision-making increases with an interlocking position during an era of general embeddedness of the political, economic, and military institutional domains.

Although subsequent scholars explored network power structures as horizontal in contrast to hierarchical organizational settings, Mills anticipated the concepts of network hierarchy and power through the interlocks within overlapping elite groups. People who jointly occupy strategic positions in large corporations, political institutions, and armed services constitute the real elite that regularly influences public policymaking. Consequently, large companies might aim to gain access to political authorities to lobby state parliaments or government executives. This basic conceptualization is now widely applied in analyses of the functionality of power elite influences on community power by using network centrality measures. Mills also emphasized that an increasing number of interlocks among economic, political, and military institutions might lead to a reciprocal influence between those actors. Over the next two decades, his concept of overlapping power circles and institutional interlocks was developed and applied in the empirical research discussed in the following subsection.

Interlocking Directorates of Economic Actors and Policymaking

A major theoretical insight of Mills was that overlapping structural positions form interlocks that are more powerful and influential than the broadly defined top positions of separate national institutions. While interlocking positions in Mills's theory were powerful in political, economic, and military spheres—their capacity to provide influence might be higher within one sphere and lower in the other, but they still overlap and can take advantage in all domains—the concepts of "corporate interlocks" and "interlocking directorates" refer only to the sphere of corporate management. According to William

Domhoff (1970), interlocks form when the same top managers (nonowners) sit simultaneously on the boards of several companies, chosen not only because of their professional qualities but also because of their interpersonal connections with one another. Further, the business community believes that interorganizational connection is a principal condition for successful company performance. Domhoff argued that interlocked directors foster information flows among members of corporate networks; moreover, they are often invited to the meetings of state committees and are also embedded with lobbies and interest groups.

The ideas and theoretical claims of Mills and Domhoff were later applied by researchers studying interlocking directorates and their role in corporate performance. Their studies examined diverse issues, from mapping the interlocking structures of national-level or political affiliation of corporate interlocks to forecasting how network members may behave in the future. Michael Allen (1974) and Michael Useem (1984) identified the key interlocked directors connecting corporations, banks, and state institutions. Useem revealed the cohesion among political and economic institutions by defining connections that can be examined as interaction structures: corporate donations to political parties or candidates. Useem's findings regarding the "inner circle" (a broader equivalent of Mills's power elite) in the United Kingdom and the United States provided clues to how corporate contributions in political or policymaking domains (party, union, league, think tank, and others) serve as sources of interdependence of corporate and political behavior of power groups within elite networks.

Large companies in the age of "institutional capitalism," as Useem called it, attained unprecedented influence on parliamentary committees and government agencies. Observed more than three decades ago in the United States and the United Kingdom, similar structures emerged in transitional states—that is, the postsocialist countries in Europe and Asia—and therefore merited examination. Former top state managers could obtain parliamentary seats or top governmental positions after the elections, becoming direct advocates for their companies' market interests. For instance, as Vedres (2000) showed in his study of Hungarian corporate and bank affiliations with political actors during the market transition, embeddedness of economic entities in the political sector provided advantages and privileges to firms. Similar effects occurred when Ukrainian banks took advantage of affiliations with state governmental authorities (Baum et al., 2008). Therefore, the mutual interests of political and business actors are implemented through interlocking structures in the form of densely connected policymaking networks. Political actors receive support, including financial contributions, from corporate entities, while the latter obtain opportunities to affect legislation and regulatory policymaking. The main point within this context is that power groups can be studied using the network

(structural) perspective, which refers to patterns of financial and communication relations among members of the ruling class.

To summarize, interlocking positions and persons are important for the cohesion of two main institutions: politics and economy. The approaches of Mills, Domhoff, Allen, and Useem differ in that Mills's power elite involves primarily personal attributes, while interlocking directorates treat position as a structural feature of importance for investigation. Moreover, personal characteristics might determine a person's chances of occupying an interlocking position. For example, Domhoff argued that women and ethnic minorities become interlocked more often when corporate boards seek to include such representatives despite perceived shortages of such candidates deemed qualified to serve as directors.

Theories of Policy Networks

This section reviews policy network studies that, beginning in the 1980s, drew increasingly on formal theories and methodologies of SNA. (Schneider et al. [2007] compiled a structured bibliography of more than 1,100 publications on political networks.) Our recap proceeds in roughly chronological order, necessarily painted with a very broad brush. Recurrent themes are policy networks as metaphors or actual social structures, policy networks as informal relations versus formal governance mechanisms, and qualitative network observations versus rigorous quantitative methods (graphs and matrices).

The Rhodes Way

In a synthesis of interorganizational, resource-dependence, and corporatist theories to explain central-local intergovernmental interactions in UK policy communities, R. A. W. Rhodes (1981, 1985, 1988, 1990) developed a policy network theory, which he and other British political scientists subsequently applied to UK national and European Union (EU) policymaking (e.g., Wilks and Wright, 1987). (For overviews, see Rhodes and Marsh, 1992; Thatcher, 1998; Rhodes, 2008; Börzel, 1998, 2011.) The key theoretical concepts were policy networks, core executive, and the "hollowing out of the state," that is, the privatization of public services. The latter encompasses "the key issues of: the context of policy networks, explaining change and the role of ideas, the decline of that state, rescuing the core executive, and steering networks" (Rhodes, 2007, 1244). Initial characterizations of policy networks as structures for interest group intermediation

eventually "mutated into the study of governance, and positivism gave way to an interpretive stance." Rhodes succinctly summarized his theory:

> As used in the analysis of British government, the term "policy network" refers to sets of formal and informal institutional linkages between governmental and other actors structured around shared interests in public policymaking and implementation. These institutions are interdependent. Policies emerge from the bargaining between the networks' members … The other actors commonly include the professions, trade unions and big business. Central departments need their cooperation because British government rarely delivers services itself. It uses other bodies. Also, there are too many groups to consult so government must aggregate interests. It needs the "legitimated" spokespeople of that policy area. The groups need the money and legislative authority that only government can provide.
>
> (Rhodes, 2007, 1244)

A core proposition of the "Rhodes model" (Rhodes, 1990; Börzel, 2011) is that "[p]olicy is not made in the electoral arena or in the gladiatorial confrontation of Parliament, but in the netherworld of committees, civil servants, professions, and interest groups" (Marsh and Rhodes, 1992). The scope conditions of the theory—the limited situations to which its claims apply—require inclusion of all governmental and nongovernmental actors capable of bargaining over and influencing the formation of policy proposals, as well as making collective decisions within a specified policy arena. To illustrate such policy network arenas, a collection of empirical case studies in Marsh and Rhodes's *Policy Networks in British Government* (1992) included agriculture, civil nuclear power, youth employment, smoking, heart diseases, food and health, sea defenses, information technology, and exchange rate policy. David Marsh and Martin Smith (2000) applied a dialectical model of interactions among network structures, agents, contexts, and policy outcomes to explain continuity and change in the British agricultural policy network since the 1930s. The model was also applied to genetically modified foods (Toke and Marsh, 2003) and to the Countryside Alliance, an interest group promoting British rural issues, including farming and hunting with hounds (Marsh et al., 2009).

Rhodes (1986, 1990) classified policy networks along two dimensions: (a) the degree to which a network's members are integrated and (b) which groups belong and how resources are distributed among them. The resulting five types ranged from most to least integrative: (1) *policy communities*, networks with highly restrictive memberships, stable relations, vertical interdependence, and "insulation from other networks and invariably to the general public (including Parliament)" (Rhodes, 1990, 304); (2) *professional networks*, dominated by one profession, such as physicians in the National Health

Service; (3) *intergovernmental networks*, "based on the representative organization of local authorities"; (4) *producer networks*, in which public and private sector economic interests dominate policymaking; and (4) *issue networks*, featuring a "large number of participants and their limited degree of interdependence" (1990, 305). Other policy network typologies that deployed multiple dimensions are Wilks and Wright (1987) and Van Waarden (1992).

A major criticism of policy networks theory was its fundamentally metaphorical treatment of networks, promoting primarily descriptive and historical ethnographic research investigations. British political scientists did not apply rigorous SNA concepts and methods, neither in theory construction nor in empirical studies of network structures, processes, and outcomes. Keith Dowding (1995) argued that British political scientists, as well as the US political scientists discussed below, all failed to produce fundamental theories of the policy process because they emphasized the attributes of policy actors. Only formally quantified SNA methods could provide explanations in terms of network properties. "In order to produce a *network* theory, where the properties of the network rather than the properties of its members drives explanation, political science must utilize the sociological network tradition, borrowing and modifying its algebraic methods" (Dowding, 1995, 137). The crucial implication is that network analysts should identify patterns of structural relations among actors occupying key positions in power structures, including their connections within and between governmental institutions. Tanja Börzel (1998, 254) criticized Anglo-Saxon conceptions of policy networks for concentrating on "state/society relations in a given issue area," to the neglect of "the predominantly German understanding of policy networks as an alternative form of governance to hierarchy and market." She subsequently (2011, 49) noted that Rhodes "also pioneered the concept of network governance in the study of British politics," discussed the reflexivity of networks, and advanced the "ethnographic turn" in network studies.

The Organizational State

Around the time that British political scientists were theorizing about policy networks, two American sociologists, Edward O. Laumann and David Knoke, developed an organizational state model of national policy domains that explicitly incorporated numerous theories, concepts, and methodological tools from SNA (Knoke and Laumann, 1982; Laumann, Knoke, and Kim, 1985; Laumann and Knoke, 1987; Knoke, 1998). A policy domain is any subsystem "identified by specifying a substantively defined criterion of mutual relevance or common orientation among a set of consequential actors concerned with formulating, advocating, and selecting courses of action (i.e., policy

options) that are intended to resolve the delimited substantive problems in question" (Knoke and Laumann, 1982, 256). As the model's name implies, the relevant actors are all organizations; people appear only as agents acting on behalf of their organizations, whose interests they represent in policy contests. In policy domains—such as energy, health, and labor—both private and public sector organizations with interests in specific policy issues and policymaking events exchange political resources and form coalitions to collaborate on lobbying campaigns. These actors seek to influence the outcomes of policy events in the decision-making institutions of national governments. Key stipulations (Knoke, 1998, 152–153) of the organizational state model include the following:

- The state is increasingly an organizational state, whose core actors are organizations, not persons.

- The boundaries between public and private sectors are blurred and irrelevant.

- For many events, government organizations are not neutral umpires, but seek to promote their own goals.

- Policy preferences of organizations reflect mainly nonideological organizational imperatives.

- Major structural changes in both substantive and procedural matters (rules of the game) are generally off the agenda.

- Event cleavages reflect the idiosyncratic nature of organizations' interests.

- Most collective decisions involve shifting interorganizational coalitions and influence interactions.

- A crucial dynamic in collective decisions across a series of policy events is the exchange of control resources among actors expressing varied interests in specific policy outcomes.

In contrast to the British policy network emphasis on qualitative research methods, Laumann and Knoke (1987) developed the organizational state model through applications of rigorous social network concepts, empirical measures, and analytic methods to guide their data collection and analyses. Their empirical comparisons of organizational participation in decision-making events in the US health and energy policy domains featured multiplex networks of information exchange, resource transactions, and political support, analyzed with block-modeling, hierarchical clustering, and multidimensional scaling methods. They also applied formal network exchange models, as discussed below. Similar SNA theories and methods were deployed in a comparative analysis of US and West German labor policy domains (Knoke and Pappi, 1991; Pappi and Knoke, 1991) and a three-nation comparison with Japan (Knoke et al., 1996). The

organizational state model is a theory of how actors collectively influence policy-event outcomes, but by examining only legislative decisions, it did not try to explain the subsequent implementation of those decisions. Empirical research projects applying an organizational state perspective demonstrated that rigorous applications of social network measures and analytic methods could yield insights into how coalitions form among organizations with similar policy interests, how opposing blocks mobilize political resources, and how policy domain network structures affect the outcomes of collective decisions. These contributions influenced subsequent research away from metaphorical views of policy networks toward greater analytic precision.

German Policy Networks

Neocorporatist theories of interest intermediation—policy bargaining and negotiation among business, labor, and government—were primary sources for policy network analyses of the Federal Republic of Germany during the 1970s and 1980s (Schmitter and Lehmbruch, 1979). Gerhard Lehmbruch (1984, 1989) described the national government's federated structure as a decentralized, interorganizational network in which the states (Länder) preserved important policy powers in relation to the national government. The result was a process of *corporatist concertation*, involving generalized exchanges of power and influence resources among autonomous interest groups such as political parties, state and federal bureaucracies, and private-sector organizations. Intergroup consultation, bargaining, and negotiation supplanted hierarchical domination in federal decision-making. An economic policy network sought national integration, while regional and state policy networks grew in power and influence. Lehmbruch's key proposition was that political institutions constrain and shape the specific structures and dynamics of policy networks. Another German source was the Max Planck Institute for the Study of Societies in Cologne, where scholars such as Fritz Scharpf and Renate Mayntz sought to integrate rational choice, game theory, formal institutions, and informal networks (see volumes edited by Marin and Mayntz [1991] and Scharpf [1993]). Scharpf (1993, 159) argued that "we need to understand the interaction effects between hierarchies and networks in order to explain the importance of institutional structures for the games that real actors could play." Scharpf's actor-centered institutional approach influenced recent developments in modeling policy networks as an ecology of games, discussed below.

Social network theory was an additional source, nurturing Edward Laumann and Franz Pappi's (1976) excavation of decision-making structures among the political elites of "Altneustadt," a small West German city. Applying a structural-functional framework, they discovered shifting coalitions whose members varied with the collective action

outcomes at stake. Influence within this community's power structure was intimately tied to the key actors' network centralities. However, an explicit focus on individuals' social and political relations obscured the organizational and institutional bases of political power. Subsequent efforts by German scholars extended the social network analytic approach to national policymaking. Patrick Kenis and Volker Schneider provided a succinct definition:

> A policy network is described by its actors, their linkages and its boundary. It includes a relatively stable set of mainly public and private corporate actors. The linkages between the actors serve as channels for communication and for the exchange of information, expertise, trust and other policy resources. The boundary of a given policy network is not in the first place determined by formal institutions but results from a process of mutual recognition dependent on functional relevance and structural embeddedness.
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> (Kenis and Schneider, 1991, 41–42)

The close affinity between the organizational state's national policy domains and Germanic policy network conceptualizations is not surprising, given the frequent research collaborations among American and German policy network scholars.

In contrast to American and British tendencies to view policy networks as primarily informal structures for mediating state-societal relations, German analysts also treated policy networks as a distinctive form of governance: "Policy network should be seen as integrated hybrid structures of political governance. Their integrative logic cannot be reduced to any single logic such as bureaucracy, market, community or corporatist association, but is characterized by the capacity for mixing different combinations of them" (Kenis and Schneider, 1991, 42). From a public administration perspective, policy networks enable coalition members to coordinate their interests, exchange and pool resources, and negotiate collective decision outcomes with public authorities. As mechanisms for resolving policy disputes, the decentralized corporatist bargaining networks allegedly confer governance advantages over both conventional centralized hierarchies and deregulated markets (Börzel, 1998). Although self-coordinating governance by policy networks avoids both the negative externalities of market failures and the zero-sum solutions of centralized hierarchies, it is "also prone to produce sub-optimal outcomes: such bargaining systems tend to be blocked by dissent, preventing the consensus necessary for the realization of common gains" (Börzel, 1998, 261). An empirical example is Volker Schneider's (1986, 1992) research on dangerous chemicals and telecommunications policy networks in Germany and the European Union. He found diverse network governance structures—formal advisory boards, working committees, and informal secretive cabals—that co-opted private-sector organizations in policymaking

processes. In the German reunification during the 1990s, policy network governance structures melding public- and private-sector organizations were crucial for the privatization of former East German shipbuilding and steel enterprises (Oschmann and Raab, 2002; Raab, 2002). Formal institutional constraints on the "Treuhandanstalt" agency shaped the informal, dense horizontal and sparser hierarchical communication ties that emerged during negotiations to privatize or shut down outdated industrial properties.

The increasing reliance on policy network governance, particularly in the EU, reflects emergent trends: growing dispersion of policy resources among private- and public-sector organizations; proliferating policy arenas requiring collective action; and governmental overload, which necessitates dependence on private organizations and hence accommodation to their demands during decision-making and policy implementation (Schneider, 1992). Jörg Raab and Patrick Kenis asserted that a complex transnational system of governance emerged, "based on negotiations between national governments, the European Commission, the European parliament, large companies and national or European associations" (2007, 187). Researchers published numerous studies describing these multiplex policy networks, but Raab and Kenis remained skeptical that they constituted a coherent network theory of policymaking. Still lacking were theoretical explanations of how "certain structural features of the policy arrangement"—the macro-level properties of a complete network, such as its density, centralization, and cohesion—influence the effectiveness and democratic quality of its collective policy decisions and outcomes.

Advocacy Coalition Framework

An American political scientist, Paul Sabatier (1987, 1988), developed the advocacy coalition framework (ACF) to investigate the role of scientific and technical information in policy cycles that span a decade or more. (For overviews of this research program, see Weible et al. [2011] and Jenkins-Smith et al. [2014].) An advocacy coalition is a set of potentially hundreds of people and organizations, drawn from diverse institutions—legislatures, government agencies, interest groups, scientific organizations, news media—whose members share a core set of policy beliefs. Coalitions are mechanisms for aggregating the cognitions and behaviors of similar actors. Coordinated action in a coalition of persons and organizations with similar ideologies or policy preferences is more beneficial for producing new public policies than is acting alone. Members of a coalition "show a non-trivial degree of coordinated activity over time," allying with like-minded participants in efforts to influence policies within a policy subsystem (Sabatier, 1988, 139). A subsystem is an issue-specific network, arising when elected officials assign

policymaking responsibility to government bureaucrats, who then consult with groups interested in that issue. On the demand side, a coalition needs reliable political or strategic information and timely technical data. The coalition relies on actors believed to be especially well-informed—such as professionals, scientific research organizations, and think tanks—who can supply the technical knowledge that justifies the coalition's policy preferences (Sabatier, 1987, 650). Interest groups also share their technical information—about policy designs, causes and consequences, goal priorities—with opponents in efforts to persuade them to adopt the coalition's preference or to dissuade them from opposing it.

The ACF is grounded in theories about the social psychology of personal beliefs. It emphasizes public policy creation through the convergence of coalition members' ideas about the correct solutions to political controversies. People's beliefs vary in their degree of mutability, with "deep core" and "policy core" normative beliefs unlikely to change. In contrast, narrower "secondary aspect" beliefs about the specific features of a policy are more likely to change as participants learn about policy outcomes and their impacts. Beliefs are generators of policy change. Policy learning occurs as coalitions selectively interpret information and deploy data and persuasive arguments to influence policy outcomes. Technical information may be politicized by coalitions for use against their opponents. Policy change results from competition between coalitions and may be shaped by both stable systemic factors and dynamic external events. The theory assumes that policy participants try to translate their beliefs into policy decisions more swiftly than their opponents can, leading to a "devil shift" or distortion of their opponents' power. Rivals are impugned such that "anyone who disagrees with them must be mistaken about the facts, operating from the wrong value premises, or acting from evil motive" (Sabatier, Hunter, and McLaughlin, 1987, 452).

Sabatier and his colleagues initially applied the ACF in empirical case studies of US environmental policy, such as California water policies. Actors sought to form coalitions either with actors that control formal decision-making authority or that have informal access to such decision makers. A study of the California Marine Protected Area Policy found that "in technical, complex policy subsystems with influential organizational affiliations that control resources, actors have to get some advice/information and coordinate somewhat with influential affiliations—irrespective of beliefs" (Weible and Sabatier, 2005, 471). In a recent revision of the ACF (Sabatier and Weible, 2014), coalition opportunity structures mediate between stable system parameters and policy subsystems. It posits a typology of policy-relevant resources that coalitions can use in attempts to influence public policies (public opinion, information, skillful leadership). Two new paths leading to major policy changes are internal shocks and negotiated agreements. The authors recognized that the framework should be modified for application to collaborative institutions and to corporatist regimes, such as European

countries with proportional electoral systems or fewer venues to effect policy changes (e.g., Henry et al., 2014). A key ACF development was empirically linking political similarity of constituents' partisanship and voting behavior to collaboration by local governments in regional planning networks (Henry, 2011; Henry, Lubell, and McCoy, 2011). Political homophily "reduces the political transaction costs of regional collaboration, and network models suggest that political similarity increases the probability of forming network ties" (Gerber et al., 2013, 608). But belief homophily and collaboration do not occur in all collective action situations, so explaining these contingent relationships requires further research comparing diverse contexts.

Exchange Models

Network exchange models treat policy outcomes, such as the passage of legislative bills, as the outcome of resource exchanges among policy actors with varied interests in specific event decisions (for an overview, see Knoke, 2011). The more powerful actors mobilize and deploy their political resources to affect the actions of the less powerful actors, making the latter dependent on the former and thus increasing the powerful actors' ability to achieve their preferred policy outcomes. James Coleman (1973) modeled vote trading as a market in which all legislators possess perfect information about everyone's policy preferences. At market equilibrium, each legislator's power is proportional to his or her control over valued resources for events, that is, the legislator's votes on a set of bills in which the other legislators have high interest. Legislators try to maximize their utilities by exchanging votes, giving up their control of low-interest policy events in return for control over events of greater interest to them.

European policy network analysts elaborated on Coleman's basic exchange model by distinguishing between interest groups and decision-making authorities and assuming that a bargaining process precedes the casting of policy votes. Franz Pappi's institutional access model proposed that interest groups (agents) try to influence decision makers (actors) in the organizational state (Pappi and Kappelhoff, 1984; König, 1993; Pappi, 1993; Pappi, König, and Knoke, 1995). Actor power is derived from gaining access to effective agents. Actors seek to gain control over policy events by deploying their own policy information or by mobilizing the agents' information. A study applying the institutional access model to US, German, and Japanese labor policy domain networks found that an information mobilization process fit the American case, a deployment process fit the German situation, and both models fit the Japanese data (Knoke et al., 1996, 184). In all three countries, the executive and legislative agents became powerful by controlling the policy information sought by interest actors.

Frans Stokman's dynamic access models also posited two-stage decision-making, in which actors try to build winning coalitions by influencing others to support their policy positions (Stokman and Van den Bos, 1992; Stokman and Van Oosten, 1994; Stokman and Zeggelink, 1996). In the first stage, the agent preferences could be influenced by the preferences of actors who have access to them through direct network ties. In the second stage, agents cast their votes based on the set of policy preferences reached during the first stage. In an analysis of ten Amsterdam municipal decisions, a policy maximization model provided the best fit to the observed outcomes (Stokman and Berveling, 1998). Actors unable to access powerful but distant opponents instead tried to influence others who share their policy preferences. This strategy increased their probability of a successful outcome, but avoided having to change their policy preferences when attempting to persuade others to support them.

European Union institutions conduct complex decision-making among member states that are amenable to dynamic access models. Thomson et al. (2006) applied three alternative models of informal bargaining and formal decision-making procedures to EU policy decisions. Interest groups try to influence policy proposals during the European Commission's preparatory stage, or during the subsequent European Council and European Parliament decision-making stage. A simple compromise model made fewer errors in predicting policy adoptions than the more complex challenge model and position exchange model (Arregui et al., 2006, 151). If actors' policy shared interests are higher than their divergent preferences during the informal bargaining stage, some may change their positions due to persuasive information. The policy outcome can then be predicted as a weighted average of the set of actors' most-preferred policies (calculated as the product of actor power times policy salience).

Governance Networks

Some theorists suggested distinguishing between policy networks and governance networks (Blanco, Lowndes, and Pratchett, 2011), while the others tended to consider the latter to be a component of the former (Bevir and Richards, 2009), or just a synonym. For example, Bevir and Richards claimed that "policy networks consist of governmental and societal actors whose interactions with one another give rise to policies" (2009, 3). In their view, policy network analysis focuses on the extent of "continuity in the interactions of interest groups and government departments." Therefore, the governance aspect lies within the policymaking component and is a specific condition for policymaking processes. Moreover, policy networks are a "meso-level concept related to the microlevel of analysis, dealing with the role of interests and government in particular policy decisions, to the macro-level of analysis, dealing with broader questions about the distribution of power" (Bevir and Richards, 2009, 5). The government model is treated as

formal structured institutional boundaries, while policy networks move beyond that constraint to encompass sets of interdependent organizations that must exchange resources to realize their goals (Marsh and Rhodes, 1992, 10–11).

Some subsequent works claimed that policy networks lie at the core of governance (e.g., Rhodes, 1997), because governance is a process of service provision that is efficient only when interorganizational connections exist between private organizations and public agencies. Therefore, policy networks are a means of coordinating and allocating resources based on trust, cooperation, and diplomacy. In other words, networks are treated as a specific structural arrangement for efficient governance and for dealing with particular policy problems. Klijn, Edelenbos, and Steijn (2010, 22) used the term governance network to describe "public policy making and implementation through a web of relationships between government, business and civil society actors." Governance networks involve interdependencies, which may not necessarily be equitable, among public, private, and civil society actors.

Other authors (e.g., Blanco et al., 2011) suggested that the concepts "policy network" and "governance network" as research perspectives should be seen as coexisting, offering distinctive interpretations and research strategies that take into account particular empirical context. Blanco and colleagues contrasted the policy and governance network approaches on eight dimensions. For example, the policy network approach focuses on national and sometimes supranational policy domains (agricultural or industrial economic policy), while the governance network approach is focused on modes of governance and on multilevel networks (i.e., modes representing different sectors—public, private, and "third-sector" nongovernmental organizations). Another distinction between the policy and governance network perspectives lies in their conceptualizations of power and politics. Thus, the policy network approach treats networks as restrictive arrangements, limited to actors who possess crucial resources for a given policy area, while governance network theorists are open to a wider range of actors who potentially can contribute to the decision-making process. At present, the dispute over the distinction between governance and policy networks remains unresolved. Theorists would do well to remember Occam's injunction not to multiply entities unnecessarily.

As Blanco et al. (2011, 304) asserted, the policy network approach more closely resembles an elitist model of concentrated power, while the governance perspective is closer to the pluralist tradition of dispersed power. The balance between the two approaches allows for consideration of the impact of national and transnational elites on state-level and global policymaking, as described in the next section.

Recent Policy Network Developments

Theories of corporate interlock networks and policy domains network developed in the 1970s through 1990s, as previously discussed, focused mainly on analyzing power structures and policymaking processes at the national level. These studies provided the analytical foundation for research on global policy networks launched in the twenty-first century.

Global Policy Networks

Globalization, according to Leslie Sklair, "is changing the structure and dynamics of the capitalist class," and therefore analysts must "explore in addition to capitalist classes in separate countries ... the emergence of a transnational capitalist class" (Sklair, 2001, 12). Transnational refers to "forces, processes, and institutions that cross borders but do not derive their power and authority from the state" (2). Following Domhoff's examination of power networks among corporate interlocks, political actors, and policy-planning specialists, Sklair argued that the global system can also be explored with network concepts such as global power structures consisting of interlocking persons and organizations. His study included analyses of transnational corporations listed as Global 500 by Fortune magazine and how these transnational corporations work effectively through their interaction with bureaucrats in international organizations and politicians in national, or country-level, and international governments. Additional effects of corporate and agenda-setting actors in the global policy network operate through interlocking directorates in the corporate sphere and cross-memberships in such organizations as think tanks, charity foundations, universities, sports, and other nonbusiness entities.

Robinson (2004) presented arguments for a global power class by stressing the distinction between the world economy and global economy—with the formation of globally mobile transnational capital. According to Robinson (2004, 15) "globalization is unifying the world into a single mode of production and a single global system," or global network, to paraphrase this statement. It encompasses international alliances and organizations such as the North American Free Trade Agreement, the Asia Pacific Economic Cooperation regional forum, and the EU, as well as such supranational organizations as the World Trade Organization, the International Monetary Fund, and the World Bank, which foster the integration of national entities into the transnational network and coordinate interactions among countries and corporations (Robinson, 2004, 50, 75). Robinson concluded that politics and policies implemented by the transnational

capitalist class—a network of interlocking and interacting agents comprised of transnational corporations, elites and bureaucrats of supranational agencies, and media conglomerates—is conditioned by a logic of global structure of accumulation and production. The network character of the transnational capitalist class also consists of its connections to subcontracting and outsourcing by firms, government agencies, public universities, and other entities.

The empirical structure of the transnational capitalist class was revealed in recent research by William Carroll, who empirically applied network concepts and tools to analyze the transnational corporate community (Carroll, 2010; Carroll and Sapinski, 2010). By mapping global corporate interlocks as of 1976 and 1996, and then from 1996 to 2006, he demonstrated that the largest corporations became more densely integrated into a transnational network with numerous corporate interlocks during the last decade of the twentieth century. The important sites for creating the transnational capitalist class network are policy groups, including five main ones: World Economic Forum at Davos, World Business Council for Sustainable Development, Trilateral Commission, International Chamber of Commerce, and Bilderberg Conferences. In mapping global corporate interlocks, Carroll emphasized persons who sit in multiple corporate boards in two or more Global 500 Fortune corporations and who also occupy seats on policy group boards. The research indicated a core-periphery structure within the transnational corporate-policy network, with a brokerage role played by policy boards and groups.

A major criticism of global policy network studies is their assumption that the transnational corporate community and for-profit organizations are the main actors in the global arena. The national state and the ruling capitalist class are both reified at the global level, without considering the possibilities for emergent social structures. To transform global and transnational public policymaking, Diane Stone (2008) proposed the concept of global agora as a space shaped by the interactions of its actors within the social and political space. It is a domain of relative disorder and uncertainty, where institutions are underdeveloped and political authority lines are unclear and dispersed among proliferating institutions and networks. Like previous theorists, Stone included international institutions (located in Washington, the Hague, Geneva, and Paris) and global financial entities (headquartered in New York, London, Tokyo, and Davos), as well as transnational executive networks, knowledge networks, and other actors into her analysis of a global agora that provides many diffuse opportunities for multimode network analysis.

Other Advances

Other important developments include theories about the ecology of games and self-organizing networks and applications of advanced statistical methodologies to policy networks. Mark Lubell and colleagues revived and updated Norton Long's (1958) ecology of games framework and integrated it with Fritz Scharpf's (1997) actor-centered institutionalization. A policy game "consists of a set of policy actors participating in a rule-governed collective decision making process called a 'policy institution.'" The set of policy institutions that "exist at a particular time and place combine to define the institutional arrangements of governance" (Lubell, 2013, 538). The ecology of games model sought to generate testable hypotheses about complex adaptive governance systems, to analyze the causes of individual behavior and institutional change, and to understand how different institutional arrangements generate policy outputs and outcomes. Explicitly incorporating policy network components (Lubell et al., 2012), the theorists also synthesized concepts from venue shopping, advocacy coalitions, cultural and institutional evolution, agent-based computational models, and other perspectives on policymaking. Bipartite networks connecting actors and institutions provide a method "to usefully represent the EG framework and test some initial hypotheses about the structure of the system" (Lubell, 2013, 553). Empirical applications of the ecology of games included water policymaking in the San Francisco Bay area (Lubell, Henry, and McCoy, 2010; Lubell, Robins, and Wang, 2014) and climate adaptation in Queensland, Australia (McAllister, McCrea, and Lubell, 2014). For example, the SF Bay project identified a bipartite network of 387 persons and policy institutions and displayed a graph of the most central actors and institutions, those having direct ties to sixteen or more other entities (Lubell et al., 2014).

Related to the ecology of games framework, self-organizing networks occur when actor coordination arises from local interactions in the absence of direction or control by a central authority. As a result, the network is decentralized or distributed across all system components and is typically robust against disruption and able to repair and reproduce itself. Informal communication networks among friends typically exhibit self-organizing characteristics, as does the World Wide Web (e.g., Barabási et al., 2002). Self-organizing networks often emerge around common-pool resources (e.g., public grazing lands, fisheries, aquifers), whose users experience diminished benefits when all individuals try to maximize their own self-interests, resulting in resource depletion. Collective action is typically necessary to prevent overuse of the common-pool resource and achieve sustainable production and consumption. Self-organized actors tend to connect with popular actors, creating network structures for efficiently transmitting information and building trust and cohesion. Self-organizing network research included

studies of US estuaries (Schneider et al., 2003; Berardo and Scholz, 2010; Berardo, 2013), an Argentine river basin (Berardo, 2014), and a rural water supply and sanitation program in Nepal (Shrestha, 2013).

A third important development is the introduction of advanced statistical methods to policy network research. It reflects the field's evolution away from its earlier metaphorical and qualitative case methods toward an increasing application of rigorous statistical theory in SNA. Driving this trend were network methodological contributions by mathematicians, physicists, and biologists (Freeman, 2008) and the proliferation of relational "big data" generated by businesses and governments, whose practitioners sought solutions for their urgent competitive and governance problems. Notable among these advance methods are quadratic assignment procedures, exponential random graph models, stochastic actor-oriented models (e.g., Lubell et al., 2012; Robins, Lewis, and Wang, 2012), and eigenspectrum approaches. We lack space to elaborate their technical details, but a few substantive examples illustrate their potential to transform policy network research. A stochastic actor-oriented model estimated social capital effects in partner selection for longitudinal data on ten estuaries (Berardo and Scholz, 2010). Lubell et al. (2014) estimated exponential random graph parameters for four nested models of the San Francisco Bay area ecology of water management games. Heaney (2014, 66) demonstrated that "multiple roles of confidant, collaborator, and issue advocate affect how group representatives understand the influence of those with whom they are tied" in the US health policy domain. Melamed, Breiger and West (2013) used spectral partitioning to identify communities within a tripartite network of persons, issues, and games around the construction of a sports stadium in Cincinnati, Ohio. Each study exemplified how the inseparable intertwining of network theories, methods, and substantive data can yield new knowledge and understanding in policy network research.

Looking Forward

The historian of SNA, Linton Freeman, argued that four criteria are essential for an organized research paradigm to emerge:

1. Social network analysis is motivated by a structural intuition based on ties linking social actors,

2. It is grounded in systematic empirical data,

3. It draws heavily on graphic imagery, and

4. It relies on the use of mathematical and/or computational models. (Freeman, 2004, 3)

By those standards, policy network analysis has greatly matured as a multidisciplinary specialty. Within the past decade, it has also become more institutionalized. The signal event was a 2008 conference, "Networks in Political Science," at Harvard University with a grant from a National Science Foundation, which drew two hundred scholars to discuss a wide variety of network topics. Eight of the conference papers were published the following year (Heaney and McClurg, 2009). Also in 2009, a political networks section was formed within the American Political Science Association, which sponsors annual POLNET conferences and this handbook. Other evidence for the subfield's maturation includes proliferating college courses and seminars taught regularly in political science, public administration, sociology, and related disciplines. Policy network analysis is a central element in this renaissance.

At present, contemporary policy network analysis embraces a multitude of theories, frameworks, perspectives, concepts, propositions, and methods. But it lacks cohesion around a core set of innovative ideas that could facilitate greater integration among these components. Divergences in approaches between European and North American scholars, not to speak of developing nations, constrain further progress. In its fragmentation, the field is not so different from many other academic specialties. Nevertheless, opportunities await for creative analysts to propose paradigms that could take policy network studies in surprising new directions.

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