The Policy Studies Journal, Vol. 37, No. 1, 2009

Toward a Theory of Collaborative Policy Networks: Identifying Structural Tendencies

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Support for the "democratization of the policy sciences" has led to the development of a number of frameworks and theories to enhance the normative, multidisciplinary approach to policy analysis. However, this approach has been challenged for failing to produce the objective empirical and normative standards implied by its scientific aspirations. One consideration that has been advanced under a variety of rubrics is "participatory policy analysis." This is a methodological proposal that expands the range of actors/stakeholders involved in the making and execution of public policy in a discursive or deliberative mode. While much of the research on policy networks is focused on the management and coordination of such networks (i.e., collaborative management), there is little attention on analysis of networks as a participatory policy analytical approach. We propose a theory of "collaborative policy networks" that examines not only the stakeholder composition of a group or the partnerships between any two stakeholders but also the way these stakeholders are embedded in various degrees of institutionalized structure and the discursive tendencies of exchange among them that leads to policy initiative, implementation, evaluation, and possibly termination. Collaborative policy networks are characterized by discursive properties, specifically reciprocity, representation, equality, participatory decision making, and collaborative leadership. We suggest that the results of such research can identify structural signatures of collaborative policy networks that serve as "stamps" of the common nature of such networks that, if fostered, can inform and improve the attempt of networks of partners to achieve policy goals.

Introduction

Support for the "democratization of the policy sciences" has led to the development of a number of frameworks and theories to enhance the normative, multidisciplinary approach to policy analysis (Dryzek, 1990; Fischer & Forester, 1993; deLeon, 1992, 1997). However, this approach has been challenged for failing to produce the objective empirical and normative standards implied by its scientific aspirations (deLeon & Vogenbeck, 2006). One consideration that has been advanced under a variety of rubrics is "participatory policy analysis" (deLeon, 1990). This is a methodological proposal that expands the range of actors/stakeholders involved in the making and execution of public policy in a discursive or deliberative mode. Succinctly, it requires the inclusion of a greater representation of those who effect,

Published by Wiley Periodicals, Inc., 350 Main Street, Malden, MA 02148, USA, and 9600 Garsington Road, Oxford, OX4 2DQ.

and are affected by, a given policy or, on a more concrete basis, program. The actual mechanism is through an extended series of public discourse with proscribed rules of evidence and argumentation (deLeon, 1992). In this type of networked policy arena, policymaking occurs in an environment in which the stated problems are characterized as "wicked," organizational boundaries are fluid, participation often includes a diverse set of stakeholders, and *ad hoc* structures often emerge (Hajer & Wagenaar, 2003; Innes & Booher, 2003).

Social or policy networks are often cited as the formative structure to achieve a democratic policy science through the emergence of *collaborative policy networks*. We increasingly see interorganizational networks forming to solve major contemporary social and environmental problems facing the public (Brown, 1980; Cooperider & Pasmore, 1991; Gray, 1989; Mandell, 2001; O'Leary, Gerard, & Bingham, 2006; Westley & Vredenburg, 1997). In fact, some argue that certain issues "must be addressed or resolved cooperatively . . . no single organization can act with assurance of predictable outcomes" (Westley & Vredenburg, p. 381). The shift from independent bureaucratic agencies responding individually to public policy needs to the collective action of multiple agencies working together to solve complex public problems draws attention to the need for theory to explain the emergence and evolution of such networks so that they may be modeled as examples for a variety of policy issues.

While much of the research on policy networks is focused on the management and coordination of such networks (i.e., collaborative management) (Agranoff, 2003; McGuire, 2006; O'Leary et al., 2006; O'Toole & Meier, 2001), there is little attention on analysis of networks as a participatory policy analytical approach. We propose a theory of "collaborative policy networks" that examines not only the stakeholder composition of a group or the partnerships between any two stakeholders but also the way these stakeholders are embedded in various degrees of institutionalized structure and the discursive tendencies of exchange among them that leads to policy initiative, implementation, evaluation, and possibly termination (deLeon, 1999). Collaborative policy networks are characterized by discursive properties, specifically reciprocity, representation, equality, participatory decision making, and collaborative leadership. Policy created and implemented within networks of involved stakeholders is found to have better buy-in and community support (Prell, 2003). Further, exchange among members of a policy network may lend themselves to exchange in other policy domains, thereby leveraging social capital developed in one policy domain as a means to improve the benefits of initiating policy networks in other domains.

In this essay, we propose an analytical framework for a theory of "collaborative policy networks" as a mechanism of rigorous empirical analysis. We suggest that the results of such research can identify structural signatures (Monge & Contractor, 2003) of collaborative policy networks that serve as "stamps" of the common nature of such networks that, if fostered, can inform and improve the attempt of networks of partners to achieve policy goals. By structural signatures, we mean the *tendency* for patterns to occur within specific types of networks (Monge & Contractor).

The primary research questions we explore are:

1. Which network properties can be identified within collaborative policy networks?
2. Which of these properties have a high probability of occurring within collaborative policy networks?
3. Can these properties be modeled to inform other types of collaborative policy networks?

This theoretical discussion explores how these emergent networks are formed and sustained, with the expectation that the communication patterns within such networks will be evidence of a more participatory/discursive democracy. We propose a set of hypotheses that can be empirically applied to identify the significant structural signatures of such networks in order to inform the emergence and evolution of collaborative policy networks of a variety of types.

Policy Networks

Although there has been a significant amount of research on policy networks (Hajer & Wagenaar, 2003; Rhodes, 1990), these have been largely focused on the normative characteristics of individuals and their aggregated effect. These analyses, *if* studied at the "whole network" level, are often examined for their descriptive characteristics like key players and levels of cohesion in terms of trust and influence (Provan, 1995). Less research has looked at the structural signatures of exchange among members of policy networks. There are no findings to date to explain the probability of certain network tendencies that may occur in a collaborative policy network. The policy sciences community has yet to embrace a theoretical explanation to explain the emergence and evolution of policy networks by identifying discursive network tendencies that can be generalized to policy networks of various natures. As the scale and scope of policy issues become more global and complex (for example, risk of pandemic influenza, natural disasters, terrorist attacks, and global warming), it is evident that traditional quantitative models of policy development, implementation, and analysis will not alone suffice to effectively explain how to improve and promote democratic problem solving (Dryzek, 1996). The proposed approach seeks to classify the ways in which collaborative policy networks are formed (e.g., spontaneously, through consensus building, legislative fiat, etc.), the structural signatures of these networks (reciprocity, equality, representation, etc.), and the ways that these origins and tendencies can shape the development of the network across time and apply to various types of policy networks.

This article provides two outcomes that lay the foundation for future empirical studies on collaborative policy networks:

1. A review of the theoretical background that has led the call for more rigorous empirical work on collaborative policy networks.
2. A set of testable hypotheses to guide future empirical work.

Review of the Theoretical Background

To examine the participatory policy nature of networks and to understand the dynamics of network ties embedded within horizontally linked members, we briefly review the literature on network theory, social capital, and policy sciences. Networks may be understood as the "structural" elements of collaborative policy networks, documenting such components as reciprocity, equality, and representation, to name a few. Discursive democracy is often operationalized as a form of social capital, defined structurally as "the aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu, 1997, p. 46) and is referred to here as "bridging social capital." To Stone (2001, p. 6), conceptualizing "social relations as networks enable us to identify the structure of social relations (for example, whether people know one another and what the nature of their relationship is) as well as their content (e.g., flows of goods and services between people, as well as norms governing such exchanges)." A focus on network characteristics allows us to take advantage of the explanatory force behind the "bonding, bridging, and linking" typology of social capital and its link to an increase in overall discursive democracy through policy networks.

To Hanf and Scharpf (1978, p. 12), the policy network approach is a tool to evaluate the "large number of public and private actors from different levels and functional areas of government and society." Most forms of policy analysis have tended to focus on the hierarchical process that characterizes the process. The network approach looks at the policy process in terms of the horizontal relationships that define the development of public policies (see Hajer & Wagenaar, 2003). Bensen (1982, p. 148) defines policy networks as "cluster[s] or complexes of organizations connected to each other by resource dependencies and distinguished from other clusters or complexes by breaks in the structure of resource dependencies." Heclo (1978, p. 284) famously noted that ". . . it is through networks of people who regard each other as knowledgeable, or at least needing to be answered, that public policy issues tend to be refined, evidence debated, and alternative options worked out—though rarely in any controlled, well-organized way." These horizontal relationships can include individuals, organizations, lobbyists, legislators, or whoever plays a role in policy development.

The driving assumption of this approach is that "deliberation among stakeholders is considered essential for participatory policy analysis, representing a democratic process for clarifying the particular as well as the collective goals and values as well as the potential impacts of alternative policies" (Pelletier, Kraak, McCullum, Uusitalo, & Rich, 1999, p. 103) However, Habermas noted "the success of deliberative politics depends not on a collectively acting citizenry but on the institutionalization of the corresponding procedures and conditions of communication, as well as on the interplay of institutionalized deliberative processes with informally developed public opinions" (Habermas, 1984, p. 298). Democracy in this manner requires a diverse set of participants,

whose opinions are voiced, considered, and argued, all set within an institutionalized structure (deLeon, 1997). As a result, "a coherent, defensible, and democratic policy science is indeed conceivable, but only to the extent it proceeds hand in hand with communicative rationality and discursive democracy" (Dryzek, 1990, p. 19).

While the benefits of networks are evident, we cannot assume that collaborative policy networks do not have pitfalls that would make them an inappropriate structure for policy development and implementation. The blending of multisectoral interests has the classic elements of public–private partnerships and the potential for failure when the mixing of values, norms, power, trust, and experience might clash and produce undesirable conflict and tension. Indeed, collaborative policy networks do not result unequivocally in better policy outcomes, particularly when one takes into account the difficulties in motivating and sustaining collaboration over time and measuring its outcomes. Collaborative policy networks may in fact hinder effectiveness, because as social exchanges become less rewarding or important to members of a network, checks on accountability and reliability are likely to decrease (Monge & Contractor, 2003). Additionally, although collaborative policy networks purport to flatten the power structure, Krackhardt (1994) points out that the "Iron Law of Oligarchy" (which relates the tendency for groups to organize under the direction of few leaders) applies even within a networked structure. The threat of overembeddedness (when a network member has so many linkages to other actors that have difficulties operating independently) and the "Law of N-Squared" (as network ties increase in number, they run the risk of overwhelming the ability of its members to actively participate in the network) are also potential drawbacks for collaborative management designs (Krackhardt).

However, the value of networks in a limited pool of resources has been increasingly recognized in public policy literature (Olsen, 1971). Historically, the public choice model of human interaction provided the theoretical basis for the use of common pool resources (CPRs), which include natural- and human-constructed resources in which exclusion of beneficiaries through physical and institutional means, is especially costly (difficulty of exclusion) and exploitation by one user reduces resource availability for others (subtractability) (Ostrom, 1999). Elinor Ostrom found that when people work collectively, they can effectively manage resources well (Ostrom & Ostrom, 1977). Her empirical research illustrates how communication between players increases cooperation, leading to higher instances of self-governance and cooperation (Ostrom; Ostrom & Walker, 2002). CPR demonstrates that users who depend on a resource for their livelihood and who have some autonomy to make their own rules are more likely to perceive benefits from restrictions; but without a sense of how their use will affect others within their community, the expectation of benefits is reduced. Users are also interested in the sustainability of the resource so the expected joint benefits will seem to outweigh current costs. In every situation and over time, individual benefits must be viewed as less valuable than the benefits to the community of users; collective-choice rules establish and operate the governance process.

Network Analysis as a Participatory Policy Analysis Approach

The adoption of alternative methods for policy analysis in the latter part of the twentieth century has contributed to the legitimatization and knowledge contributions of the policy sciences. One such notable alternative approach is network analysis, or social network analysis (SNA). Many of the discussed approaches to policy analysis are "characterized by political and administrative jurisdictions that are poorly suited for solving many emerging problems" (Schneider, Scholz, Lubell, Mindruta, & Edwardsen, 2003, p. 143). To understand the relevant stakeholders in the policy arena, the most important issues and manners in which these variables are interrelated represented intractable problems using the traditional approaches to policy analysis. Schneider et al. (2003) and Toonen (1998) recognized that the shift from traditional large-scale government organizations to new regional governmental institutions and nonprofit agencies creates the need to evaluate public policy in terms of influence of the network in which it is based (Hajer & Wagenaar, 2003).

The structure of the network is the central focus of the proposed approach. To visualize the horizontal connections within a social structure allows one to see the strength of relationships, the availability of resources, the possibility of political influences, and access to otherwise hard-to-reach populations. Schneider et al. (2003, pp. 143–44) note that network-based structures are characterized by "high levels of interdependence involving multiple organizations, where formal lines of authority are blurred and where diverse policy actors are knitted together to focus on common problems." The network approach has helped to address the problem of attempting to understand what might otherwise seem to be fragmented networks, can lead to the development of common perspectives on policy issues and norms of cooperation and trust (Lin, 2001), and corresponds neatly with the prevalent theme of democratic governance (Hajer & Wagenaar, 2003). According to Schneider et al. (p. 143), "the resulting formal and informal interactions have the potential to increase policy effectiveness at less cost than authority-based structural changes arrived at through formal reorganization."

A network approach to policy analysis has been developed in a variety of ways (Carlsson, 2000; Heclo, 1978; Hjern & Hull, 1998). For example, in his evaluation of subgovernments, Rhodes (1990, p. 297) defines them as "small groups of political actors, both governmental and non-governmental that specialize in specific issue areas." He takes a network approach to understanding how these subgovernments, each focused around policy issues, create successful public policy development. Policy networks have the ability to increase the likelihood and scope of policy agreements "by increasing available information about potential agreements and enhancing the credibility of commitments to fulfill the agreements" (Schneider et al., 2003, p. 144). This is carried out by spanning organizational boundaries, exploring the details of organizational decision making, and discovering barriers to implementation, thus increasing the likelihood of successful policymaking.

Dowding (1995) argues that the most we can learn from a policy network comes from a formal approach in which properties of the network can be explained, but nothing more. He states that "while it has proven useful for cataloging policy pro-

cedures into different types of networks, it cannot be used to provide a fundamental reassessment of the policy process" (136). However, others state that what is useful for policymaking is the very idea that the structure, and how it is designed, can influence the policy process (Carlsson, 2000; Provan, 1995). Thus, the key to the network approach to policy issues is understanding how certain relationships are formed and which parts of the network are the strongest and most knowledgeable (i.e., the best connections to others).

Not only are the features and structure of networks well explained but also numerous theoretical advancements in terms of social networking have been proposed (Borgatti, 1997; Burt, 1992; Granovetter, 1973). Many researchers have made developments in the theory, going beyond evaluation of the structure of the network alone, and understanding how the placement of actors influences such things as power, knowledge, brokering of information, and resource sharing. For example, policy networks have been found to constitute "communities of practice" in which common understandings of best practices and collective learning can take place (Bland, Starnaman, Harris, Henry, & Hembroff, 2000; Cross, Laseter, Parker, & Velasquez, 2006), and provide structure for promoting system-wide change within communities of stakeholder groups (Foster-Fishman, Berkowitz, & Lounsbury, 2001; Lasker, 2003). Taking this one step further, recent advances in social network methodology allow us to test the probability of certain network characteristics occurring in a network, providing indications of characteristics of network ties that may be significant in other types of policy networks.

Carlsson (2000) suggests that a network approach is useful, but claims that, as of now, it is not a viable policy analysis approach because it lacks "a theoretical scaffold" (e.g., a set of guiding principles by which to test the theory of collaborative policy networks over time) and must find theoretical support from well-defined theories such as collective action theory. Monge & Contractor (2003, p. 45) suggest a similar argument, noting "representing networks as matrices or graphs and measuring properties of the network serve useful descriptive purposes . . . however, explaining the emergence of networks requires an analytic framework that enables inferences to be made on the basis of theories and statistical tests." The approach proposed here seeks to develop just such a "theoretical scaffold" as the archetype of an analytical framework for understanding collaborative policy networks.

Collaborative Policy Network: "Structural Signatures"

In order to develop an analytical framework, a set of measures must be operationalized so that they can be analyzed both descriptively and empirically. In this case, we propose to operationalize a set of network measures to test which structural tendencies have the highest probability of occurring (Monge & Contractor, 2003). Collaborative policy networks are purported to have discursive properties. These include political support, mutuality of goals, reciprocity (shared resources), representation/diversity, flattened power structures, participatory decision making, collaborative leadership, shared experiences and norms, frequent interaction, the requirement of trust, and conflict resolution. While a formal structure of interaction

is often asserted (for example, a formal hierarchical reporting structure), an informal network structure is inevitable. A "structural signature" refers to the *pattern* of interactions that emerge in a network (Monge & Contractor). For example, we might find that in collaborative policy networks, most ties are reciprocated, and if we empirically test this observation, then we may verify that reciprocal ties have a higher probability of occurring in these types of networks. We would therefore assert that such networks have a structural signature of reciprocity. It is *a priori* unclear, however, just what types of structural network signatures collaborative networks model.

The following list is a set of proposed collaborative policy network structural signatures that we suggest to operationalize in this approach. In each hypothesis, we suggest identifying the probability that a certain characteristic has of occurring. Identification of the probability of a structural signature occurring in a network structure requires the use of an SNA methodology. SNA is the study of the structural relationships among interacting network members—individuals, organizations, etc.—and how those relationships produce varying effects. The fundamental property of network analysis is the ability to determine, through mathematical algorithms, whether network members are connected—and to what degree—to one another in terms of a variety of relationships such as communication, resource sharing, or knowledge exchanges. Furthermore, network analytical techniques can quantify the emergence of networks and their dynamic processes (Wasserman & Faust, 1994).

To identify the probability of a structural signature occurring in a network, one would have to gather network data on the network of interest and then run statistical tests to develop the empirical parameters of the likelihood that the types of ties observed in the network data were likely to occur by chance. In other words, similar to Bernoulli distributions, the observed network would be plotted in comparison to an N number of similar (modeled) networks, and their probability of occurring would be identified. Monge and Contractor (2003) provide a simplified example of what we are looking for by applying such statistical techniques:

> Suppose that in our example of 17 individuals, we were interested in assessing whether the observed network exhibited a structural tendency toward reciprocity (or mutuality). In statistical terms, we want to assess the probability that reciprocity in the observed network is more, less, or just as likely to be found from the sample space of all possible network configurations of 17 individuals . . . (p. 51).

In this way, we can begin to identify patterns among different policy networks in an effort to build a theory of collaborative network policy. If a pattern is detected in many types of policy networks, then it may be safe to assert these findings (cumulatively) as a theory from which the field can continue to grow.

Representation/Diversity. The benefits of a multisectoral network include that they (i) reflect the changing roles and relative importance among the network; (ii) pull diverse groups and resources together; and (iii) address issues that no group can

resolve by itself (Dryzek, 1990; Thomson & Perry, 2006). Quite often, the only way that a network can be sufficiently innovative to produce sustainable results is to be diverse (Granovetter, 1982). According to Witte, Reinicke, and Benner (2002), the major strength of networks is diversity, not uniformity. Representation of all parties may be indicated in a network by a match between stakeholders identified as important to the policy needs and those present in the network. This approach is in contrast to the more common network tendency for "homophily"—that is, that people with similar characteristics tend to form ties with other people who share those characteristics. Shumate, Fulk, and Monge (2005, p. 502) assert that "past alliance studies have found that organizations with status similarity tend to form relationships." However, we propose that in a collaborative policy network, network ties will tend to form, regardless of the similarities among the participants; that is, the emergence of ties will be based on the policy topic at hand, with a tendency to draw together a diverse group of stakeholders. To operationalize and empirically test these assumptions, we propose to operationalize and measure structural signatures that serve as patterns of representation/diversity by identifying the amount of homogeneity among members of a network to test the following hypothesis:

> *Hypothesis 1: In collaborative policy networks, heterogeneity among stakeholders has a high probability of occurring.*
>
> 1. Measure: homophily (as attributes of network members).

Reciprocity. Exchanges within the network may include a variety of resources, including tangible and intangible resources. These exchanges ideally occur through reciprocal, trusting, and mutually supportive relationships. Each actor in a network must see that he or she will not only benefit by collaboration but also that the overarching goal will be better achieved by working with other stakeholders. The key to governance in a network structure is the use of resource allocation in an environment that exists not individually, but rather in relation to other units (Burt, 1992). Powell (1990, p. 296) noted an important element of the network: "as networks evolve, it becomes more economically sensible to exercise voice rather than exit . . . benefits and burdens come to be shared." In other words, reciprocity is a means through which parties remain connected to one another, and in turn, enables networks to form and function. Furthermore, Isett and Provan (2005) found that network ties are more reliable in measuring network outcomes when their mutual exchange is reciprocated (confirmed). We employ these structural signatures to identify the mutuality of connections within a collaborative policy network, thus testing the following hypothesis:

> *Hypothesis 2: In collaborative policy networks, reciprocity of ties has a high probability of occurring.*
>
> 1. Measure: reciprocity.

Horizontal Power Structure. In a collaborative policy network, it is likely that the actors prefer that the overall network centralization is low, meaning that few actors

hold highly central positions, hence decreasing bridges and structural holes (indicators of influence and power over a network) (Burt, 1992; Monge et al., 1998). Network centralization refers to how well connected are the members of the network, collectively. Lower centralization scores indicate that fewer network members hold highly central positions; positions of brokerage and information sharing are held/shared by a larger number of members. The greater the decentralization of the network indicates that members are more equally interconnected, which in turn increases their willingness to support the collective good (Marwell & Oliver, 1993; Marwell, Oliver, & Prahl, 1988). In other words, organizations that have equal positioning are more involved in mobilizing efforts (Laumann, Knoke, & Kim, 1985; Laumann & Pappi, 1976). The principles of centralization produce a paradox in cases when a hierarchical governance structure is purported (e.g., disaster-preparedness networks constructed in an incident command structure). Within such a structure, certain members are identified to play a central, coordinating role. However, the *informal* network structure is more likely to contain actors whose position will increase their connectivity because it is common that to "accomplish their organizational goals, the agencies must either develop multiple services on their own or coordinate their existing services with other organizations," thereby creating a joint production function (Isett & Provan, 2005, p. 161) and increasing their bridging social capital. We propose testing tendencies of centralization to identify how power is shared within a collaborative policy network. By operationalizing indices of centralization, we propose to test the following hypothesis:

> *Hypothesis 3: In collaborative policy networks, low centralization of ties has a high probability of occurring.*
>
> 1. Measure: centralization.

Embeddedness. The theory of embeddedness suggests that people will make choices based on past interactions and will be particularly inclined to initiate network connections with those whom they can trust. Collaborative policy networks may work well when stakeholders are familiar with one another along a continuum of relationship dimensions. Granovetter (1985) asserts that transactions are embedded in social networks, and the trust generated by personal interactions is helpful in discouraging malfeasance. In the private sector, contracts are less common than in the public sector, and therefore, a large degree of exchange interactions are derived from lasting (trusted) relationships (Uzzi, 1996, 1997). In collaborative policy networks, it is unclear whether embeddedness will result in repetitive, multirelationships over time, in the context of both formal and informal relationships. However, if this is true, it can inform a theory of collaborative policy networks in terms of how a network, to address one policy issue, can have "spill-over effects" to other types of policy issues. We propose to operationalize embeddedness as "multiplexity"—that is, the occurrence of multiple types of relationships among members of a network—to determine how the presence of relationships on many dimensions affects embeddedess, trust, and the likelihood of future network development. Specifically:

Hypothesis 4: In collaborative policy networks, multiplexity has a high probability of occurring.

1. Measures: multiplexity, length of relationship.

Trust and Formality. Network ties can exhibit varying degrees of formality, including contractual agreements, regulatory guidelines, procedural processes, and informal exchanges. The level of formality of a relationship can influence the amount of trust within collaborative policy networks. Gulati and Singh (1998) found that as trust develops between partners, the level of formality decreases, leading to the assertion that "familiarity breeds trust." Isett and Provan (2005) suggested that this principle did not apply in a "public network" setting, and that instead, formal ties tend to be maintained over time (regardless of varying levels of trust). Although formal ties remained primarily stable in their study, this did not preclude the addition of informal ties to the dyadic relationships. It is unclear in a collaborative policy network whether the formality of ties will digress over time as trust increases. Isett and Provan provide several explanations for why ties remained formal in their networks, including the need to formalize relationships through contracts in order to meet public reporting requirements. In a collaborative policy network, it is unclear whether the use of contracts is more likely to be present and whether the interactions between intersectoral partners increase or decrease the formality of relationships. In addition to measuring trust based on the formality of ties, we propose to include, additionally, measures of trust based on perceptions of trust toward other network members. For example, an index of trust based on reliability, mission congruence, and transparent communication can inform the nature of trust among partners in a network (Varda, Chandra, Stern, & Lurie, 2008). We propose to test the following hypotheses:

Hypothesis 5a: Trust among stakeholders is correlated to informal relationships.
Hypothesis 5b: In collaborative policy networks, high levels of trust have a high probability of occurring.

1. Measures: formality of ties based on the contracts and formality of interaction; trust measured by reliability, congruence of mission, and communication transparency.

Participatory Decision Making. At the heart of the proposed theory is the democratic concept of participatory decision making (deLeon, 1997). We posit, furthermore, that a key element to a participatory democracy is a collaborative decision making process, representing the interests and needs of the multiple stakeholders related to the policy issue. Both the major and minor interests should be represented (Innes & Booher, 2003). Characteristics of such a process require a high level of transparency and equality. To operationalize this area of inquiry, we propose that members of a network that possess decision making roles will correlate with the network members' perception of those decision makers as being transparent and promoting equality (operationalized through cognitive social structures). Cognitive social structures provide information on each network members' perception of how all other members in the

network relate to each other (Krackhardt, 1987). These types of data can help us explore various empirical questions, for example, Are individuals who hold decision-making roles also perceived by others in the network to have transparent attributes? We propose that to test this assumption, data be gathered on the perceptions of each member in regard to others' levels of transparency in terms of mission, goals, and motivations for participation. We propose to test the following hypothesis:

Hypothesis 6: In collaborative policy networks, transparent relationships have a high probability of occurring.

1. Measures: cognitive social structure of transparency, centralization, decision making roles in the network.

Collaborative Leadership. Leadership in a collective action network is often shared and sometimes rotates among stakeholders. In some cases, a very centralized leadership structure is formed, and in others, a variety of leadership positions are created. In a collaborative network, leadership should represent equality and therefore, leadership should be shared by those who are similar in the network. For example, rather than leaders chosen because they have the most financial influence or possess the greatest legitimacy, leaders will be chosen because they are connected to a similar number, and types, of other stakeholders in the network. As a result, stakeholders that are "structurally equivalent" (similar or equal number of ties to others) will hold leadership positions (this represents balance of network ties). We propose to test the following hypothesis:

Hypothesis 7: In collaborative policy networks, leaders who are structurally equivalent have a high probability of occurring.

1. Measures: structural equivalence.

These hypothesized characteristics of collaborative policy networks are illustrated in Figure 1. The patterns and structural signatures that we propose to identify in collaborative policy networks are demonstrated in the second column. An alternative structure (to explain the difference) is demonstrated in the third column. Once a network is realized (that is, data are collected), we can look for these signatures as patterns. Repeated, we can continue to test their probability of occurring and further build a theory of collaborative policy networks.

Broader Impacts Resulting From the Proposed Theory Building

After analyses such as these, we can then answer the final research question, Can these properties be modeled to inform other types of collaborative policy networks? This requires summarizing what kinds of structural signatures of collaborative policy networks are we able to detect, and how these findings can inform the broader discussion, education, and research of discursive platforms for public policy development. Ultimately, we hope to learn, by modeling examples of collaborative policy networks, which types of structural signatures can inform a theory of collaborative

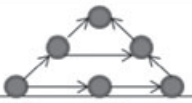
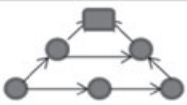
Hypotheses	Assumed Pattern in Collaborative Policy Networks	Alternative Patterns
H_1: Representation/Diversity Shade of ○ = different type of organizations (e.g. public, private, nonprofit)		
H_2: Reciprocity ⟷ = reciprocal tie		
H_3: Horizontal Power Structure		
H_4: Embeddedness Thickness of ⟷ = multiple types of relationships (multiplexity)		
H_5: Trust & Formality	↑ Trust ↑ Formality	↑ Trust ↓ Formality
H_6: Participatory Decision Making	↑ Transparency Throughout Network	↓ Transparency Throughout Network
H_7: Collaborative Leadership Same color ■ = structural equivalent Square ■ = leadership positions		

Figure 1. Illustrated Collaborative Policy Networks' Hypotheses.

policy networks. This theory should lead to knowledge of how to create, maintain, and sustain networks for such purposes (as well as general policy issues) over time to guide future research and practice to further improve discursive dialogue while maintaining its functional purpose (e.g., to prepare for, and respond to, emergencies). Additionally, understanding these types of tendencies can lead to a better understanding of the democratic and discursive nature of collaborative policy networks (e.g., Do they promote equality, representation, etc.?).

Finally, this research will integrate with education, i.e., by promoting teaching, training, and learning by advancing a theory of collaborative policy networks. Not only can students of public policy and discursive democracy learn from the tendencies of emergent policy networks, but also public entrepreneurs and legislators can conceptualize how to nurture and sustain networks of interested stakeholders to get involved in policy issues. In short, then, a theory of collaborative policy networks, if discerningly applied, can both bring a new analytical insight to the world of public policy theory, as well as the world of workaday policy application.

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References

Agranoff, Robert. 2003. *Collaborative Public Management: New Strategies for Local Governance*. Washington, DC: Georgetown University Press.

Bensen, J. K. 1982. "A Framework for Policy Analysis." In *Interorganizational Coordination*, ed. David L. Rogers and David A. Whetten. Ames, IA: Iowa State University Press, 137–276.

Bland, Carol J., Sandra Starnaman, Dona Harris, Rebecca Henry, and Larry Hembroff. 2000. " 'No Fear' Curricular Change: Monitoring Curricular Change in the W. K. Kellogg Foundation's National Initiative on Community Partnerships and Health Professions Education." *Academic Medicine* 75 (6): 623–33.

Borgatti, Steven. 1997. "Structural Holes: Unpacking Burt's Redundancy Measure." *Connections* 20: 35–8.

Bourdieu, Pierre. 1997. *The Forms of Capital. In Education: Culture, Economy, and Society*. Oxford: Oxford University Press.

Brown, L. David. 1980. "Bridging Organizations and Sustainable Development." *Human Relations* 44 (8): 181–203.

Burt, Ron S. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

Carlsson, Lars. 2000. "Policy Networks as Collective Action." *Policy Studies Journal* 28 (3): 502–27.

Cooperider, David, and William Pasmore. 1991. "Global Social Change: A New Agenda for the Social Sciences." *Human Relations* 44 (10): 1037–55.

Cross, Rob, Tim Laseter, Andrew Parker, and Guillermo Velasquez. 2006. "Using Social Network Analysis to Improve Communities of Practice." *California Management Review* 49 (1): 32–8.

deLeon, P. 1990. "Participatory Policy Analysis: Prescriptions and Precautions." *Asian Journal of Public Administration* 12: 29–54.

———. 1992. "The Democratization of the Policy Sciences." *Public Administration Review* 53: 125–29.

———. 1997. *Democracy and the Policy Sciences*. Albany, NY: SUNY.

———. 1999. "The Stages Approach of the Policy Process: What has It Done? Where is It Going?" In *Theories of the Policy Process*, ed. P. A. Sabatier. Boulder, CO: Westview Press, 19–34.

deLeon, P., and D. Vogenbeck. 2006. "Back to Square One: A History and Projection of the Policy Sciences." In *Public Administration: A Handbook*, ed. J. Raben. New York: Marcel Dekker, 3–13.

Dowding, Keith. 1995. "Model or Metaphor? A Critical Review of the Policy Network Approach." *Political Studies* 43 (1): 136–58.

Dryzek, John S. 1990. *Discursive Democracy*. Cambridge: Cambridge University Press.

———. 1996. "Political Inclusion and the Dynamics of Democratization." *American Political Science Review* 90 (1): 475–86.

Fischer, Frank, and John Forester, eds. 1993. *Argumentative Turn in Policy Analysis and Planning*. Durham, NC: Duke University Press.

Foster-Fishman, Pennie G., Shelby L. Berkowitz, and David W. Lounsbury. 2001. "Building Collaborative Capacity in Community Coalitions: A Review and Integrative Framework." *American Journal of Community Psychology* 29 (2): 241–61.

Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78 (6): 1360–80.

———. 1982. *The Strength of Weak Ties. In Social Structure and Network Analysis*. London: Sage.

———. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91: 481–93.

Gray, Barbara. 1989. *Collaborating: Finding Common Ground for Multiparty Problems*. San Francisco, CA: Jossey-Bass.

Gulati, Ranjay, and Harbir Singh. 1998. "The Architecture of Cooperation: Managing Coordination Costs and Appropriation Concerns in Strategic Alliances." *Administrative Science Quarterly* 43 (4): 781–814.

Habermas, Jurgen. 1984. *The Theory of Communicative Action, Volume 1, Reason and the Rationalization of Society*. Boston, MA: Beacon Press.

Hajer, Maarten, and Hendrik Wagenaar. 2003. *Deliberative Policy Analysis: Understanding Governance in the Network Society*. Cambridge: Cambridge University Press.

Hanf, Kenneth, and Fritz Scharpf, eds. 1978. *Interorganizational Policymaking*. London: Sage Modern Political Series.

Heclo, Hugo. 1978. "Issue Networks and the Executive Establishment." In *The New American Political System*, ed. A. King. Washington, DC: American Enterprise Institute, 87–123.

Hjern, Benny, and Christopher Hull. 1998. "Implementation Structures: A New Unit of Administrative Analysis." In *Realizing Social Science Knowledge*, ed. B. Holzner. Vienna: Physica-Verlag, 265–77.

Innes, Judith E., and David E. Booher. 2003. "Collaborative Policymaking: Governance through Dialogue." In *Deliberative Policy Analysis: Understanding Governance in the Network Society*, ed. Maarten Hajer and Hendrik Wagenaar. Cambridge: Cambridge University Press, 33–59.

Isett, K., and K. G. Provan. 2005. "The Evolution of Dyadic Interorganizational Relationships in a Network of Publicly Funded Nonprofit Agencies." *Journal of Public Administration and Theory* 15 (1): 149–65.

Krackhardt, David. 1987. "Cognitive Social Structures." *Social Networks* 9: 104–34.

———. 1994. "Constraints on the Interactive Organization as an Ideal Type." In *The Post-Bureaucratic Organization: New Perspectives on Organizational Change*, ed. C. Heckscher and A. Donnellon. Thousand Oaks, CA: Sage, 211–22.

Lasker, Roz D. 2003. "Broadening Participation in Community Problem Solving: A Multidisciplinary Model to Support Collaborative Practice and Research." *Journal of Urban Health* 80 (1): 14–47.

Laumann, Edward O., David Knoke, and Yong-Hak Kim. 1985. "An Organizational Approach to State Policymaking: A Comparative Study of Energy and Health Domains." *American Sociological Review* 50: 1–19.

Laumann, Edward O., and Franz U. Pappi. 1976. *Networks of Collective Action*. New York: Academic Press.

Lin, N. 2001. *Social Capital: A Theory of Social Structure and Actions*. London and New York: Cambridge University Press.

Mandell, Myrna P. 2001. "Collaboration through Network Structures for Community Building Efforts." *National Civic Review* 90 (3): 279–87.

Marwell, Gerald, and Pamela Oliver. 1993. *The Critical Mass in Collective Action: A Micro-Social Theory*. Cambridge: Cambridge University Press.

Marwell, Gerald, Pamela E. Oliver, and Ralph Prahl. 1988. "Social Networks and Collective Action: A Theory of the Critical Mass, III." *The American Journal of Sociology* 94 (3): 502–34.

McGuire, Mark. 2006. "Collaborative Public Management: Assessing What We Know and How We Know It." *Public Administration Review* 66 (Special Issue): 33–43.

Monge, Peter, Janet Fulk, Michael Kalman, Andrew Flanagin, Claire Parnassa, and Suzanne Rumsey. 1998. "Production of Collective Action in Alliance-Based Interorganizational Communication and Information Systems." *Organization Science* 9 (3): 411–33.

Monge, Peter, and Noshir Contractor. 2003. *Theories of Communication Networks*. New York: Oxford University Press.

O'Leary, Rosemary, Catherine Gerard, and Lisa B. Bingham. 2006. "Introduction to the Symposium on Collaborative Public Management." *Public Administration Review* 66 (1): 6–9.

Olsen, Mancur. 1971. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.

Ostrom, Elinor. 1999. "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework." In *Theories of the Policy Process*, ed. P. A. Sabatier. Boulder, CO: Westview Press, 35–71.

Ostrom, Elinor, and James Walker, eds. 2002. *Trust and Reciprocity*. Thousand Oaks, CA: Russell Sage Foundation.

Ostrom, Vincent, and Elinor Ostrom. 1977. "A Theory for Institutional Analysis of Common Pool Problems." In *Managing the Commons*, ed. Garrett Harden and John Baden. San Francisco, CA: WH Freeman, 157–72.

O'Toole, Lawrence J. J., and Kenneth J. Meier. 2001. "Managing Strategies and Behavior in Networks." *Journal of Public Administration Research and Theory* 11 (3): 271–94.

Pelletier, David, Vivica Kraak, Christine McCullum, Ulla Uusitalo, and Robert Rich. 1999. "The Shaping of Collective Values through Deliberative Democracy: An Empirical Study from New York's North Country." *Policy Sciences* 32: 103–31.

Powell, Walter W. 1990. "Neither Market Nor Hierarchy: Network Forms of Organizations." *Research in Organizational Behavior* 12: 295–336.

Prell, Christine. 2003. "Community Networking and Social Capital: Early Investigations." *Journal of Computer-Mediated Communication* 8 (3): 1–22.

Provan, Keith G. 1995. "A Preliminary Theory of Interorganizational Effectiveness: A Comparative Study of Four Community Mental Health Systems." *Administration Science Quarterly* 40 (1): 1–33.

Rhodes, R. A. W. 1990. "Policy Networks: A British Perspective." *Journal of Theoretical Politics* 2 (3): 293–317.

Schneider, Mark, John Scholz, Mark Lubell, Denisa Mindruta, and Matthew Edwardsen. 2003. "Building Consensual Institutions: Networks and the National Estuary Program." *American Journal of Political Science* 47: 143–58.

Shumate, Michelle, Janet Fulk, and Peter Monge. 2005. "Predictors of the International HIV-AIDS INGO Network Over Time." *Human Communication Research* 31 (4): 482–510.

Stone, Wendy. 2001. "Measuring Social Capital: Towards a Theoretically Informed Measurement Framework for Researching Social Capital in Family and Community Life." Research Paper No. 24. Melbourne: Australian Institute of Family Studies.

Thomson, Anne Marie, and James L. Perry. 2006. "Collaboration Processes: Inside the Black Box." *Public Administration Review* 66 (Special Issue): 20–32.

Toonen, Theo. 1998. "Networks, Management, and Institutions: Public Administration as 'Normal Science'." *Public Administration Review* 76 (2): 229–53.

Uzzi, Brian. 1996. "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations." *American Sociological Review* 61: 674–98.

———. 1997. "Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness." *Administrative Science Quarterly* 42: 35–67.

Varda, Danielle M., Anita Chandra, Stefanie Stern, and Nichole Lurie. 2008. "Core Dimensions of Connectivity in Public Health Collaboratives." *Journal of Public Health Management and Practice* 14 (75): E1–E7.

Wasserman, Stanley, and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Westley, Frances, and Harrie Vredenburg. 1997. "Interorganizational Collaboration and the Preservation of Global Biodiversity." *Organization Science* 8 (4): 381–403.

Witte, Jan Martin, Wolfgang Reinicke, and Thorsten Benner. 2002. "Networked Governance: Developing a Research Agenda." Annual Convention of the International Studies Association Meetings, New Orleans.