Measuring Risks of Organizational Failure in Contract Exchange Structures

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Governmental agencies increasingly contract out service delivery, but have little understanding of the systemic risk associated with dependence on contractors in service delivery networks. In this study, affiliation network concepts are used to develop a structural index of government dependence on actors in service delivery networks without joint service delivery. Networks include direct links to government funders and indirect links among contracted programs based on shared parent organizations. Understanding the structure of governance arrangements has practical implications for governance, in terms of understanding government dependence on a particular contractor and the risk associated with organizational failure of those contractors. Governance structures may also influence individual incentives to perform. This study makes two contributions to the governance literature. First, the study offers conceptualization of contracted programs as networked structures of exchange even where joint production does not occur. Second, an index is proposed to capture the position of individual organizations in complex networks of exchange with government. This index can be used to determine the dependence of government on a specific actor in the service delivery network along with the risk to the network should a particular organization fail. This index can also be incorporated into statistical models of contract performance.

Keywords: contracting, networked exchange, affiliation networks, governance structures.

1. Introduction

Cross sector collaboration is increasingly used as a governance tool to implement public policies, particularly to deliver public services (Ansell & Gash, 2008; Bryson, Crosby, & Stone, 2006; Emerson, Nabatchi, & Balogh, 2012). Governance theories commonly emphasize both management and organization of service delivery can influence performance (Hill & Lynn, 2004; Lynn, Heinrich, & Hill, 2000, 2001; Milward & Provan, 2000). However, the extant literature does not consider how government dependencies on contractors in service delivery networks may place the entire service delivery system at risk for failure (see Carboni & Milward, 2012, for an exception). Instead, scholarship

emphasizes network processes, structure and client outcomes of joint service delivery networks without considering risks for network failures (see Agranoff, 2008; Agranoff & McGuire, 2003; Isett, Mergel, Leroux, Mischen, & Rethemeyer, 2011; Isett & Provan, 2005; Milward & Provan, 2000; Milward, Provan, Fish, Isett, & Huang, 2009; Popp, Milward, MacKean, Casebeer, & Lindstrom, 2014; Provan & Milward 1995). The contract management literature emphasizes contract design and management in dyadic relationships between government funders and principals but fails to account for the larger structure of exchange in which contracts are embedded (Brown & Potoski, 2003; Brown, Potoski & Van Slyke, 2007; Fernandez, 2007; Malatesta & Smith, 2014; Van Slyke, 2007). Scholarship on service delivery networks and contract management are largely independent of each other.

In some cases, networked structures of exchange without joint production arise. These arrangements do not necessitate joint service delivery but exchanges are linked by contracts with a common funder in pursuit of a common public policy goal. A government funder may contract with multiple providers to produce the same service without interacting with each other. This arrangement takes on features of a service delivery network where the interactions between the funder and a particular contractor may influence other interactions in the network. In particular, the presence of substitutable alternative contractors for government in the networked structure of exchange may provide a buffer for government because government can replace them with a similar contractor if necessary. If a governmental agency contracts with a single organization to produce multiple programs for a single client population, the agency increases its dependence on that particular organization. Assigning programs to multiple organizations reduces the dependence of the agency on a single organization. If a contractor the agency depends on fails, clients may be left without services and the functioning of the network may be jeopardized (Carboni & Milward, 2012). For example, if a large social service contractor fails, clients would be left without services if other contractors in the network could not absorb them. This jeopardizes government ability to provide legally mandated services.

To understand the risk of dependence associated with contracting in service delivery networks, we must be able to measure the network structure in a way that captures complex interdependencies among elements of the system, including the direct connections among government funders and contracted programs and interdependencies among contractors that are not directly related to exchange. This might include separate programs for the same funder being administered by the same parent organization, thus creating a connection among programs even though if they are operated separately. This underlying affiliation changes the structure of dependence for governmental agencies. Instead of relying on two autonomous organizations to provide two independent programs, it is reliant on a single organization to provide two independent programs. Relationships among contracted programs may be obscure. For example, a parent organization might run several contracted programs with different names, making it less clear the programs have a connection. Understanding the structure of affiliations in these exchange networks will increase our understanding of government dependence and risks to service production

if organizations fail. For example, if an organization that administers 30 programs fails, there will be greater disruption to service than if an organization responsible for one program fails.

To date, scholars have not proposed a satisfactory way to simultaneously operationalize and measure direct connections and interdependencies among service delivery programs in service delivery networks. The primary contribution of this paper is to develop an index that accounts for both direct and indirect connections among programs in service delivery networks simultaneously. In the next section, I characterize contract arrangements as networked structures of exchange, followed by a discussion of affiliation networks. Affiliation networks are a special type of network that can account for links among multiple types of actors. Then I develop an index that reflects the dependence of governmental agencies on specific organizations in a network. This measure indicates how large the effect of failure would be on the network. I apply the measure to develop an index of risk for a state funded service delivery network and discuss its implications for organizational failure in that service delivery network. Finally, I discuss the implications of this index for governance and along with additional applications of the index. The index sheds light on the structure of dependence among government funders and contractors and can be incorporated into models that predict contract performance.

2. Contracts as Networked Structures of Exchange

Studies in the network and collaboration literature typically focus on collaborative aspects of joint production and use properties of networks as variables of interest (see Agranoff & McGuire, 2003; Ansell & Gash, 2008; Bryson, Crosby, & Stone, 2006; Huang & Provan, 2007; Isett et al., 2011; Isett & Provan, 2005; Milward & Provan, 2000; Milward, Provan, Fish, Isett, & Huang, 2009; Provan, Huang, & Milward, 2009; Provan & Milward, 1995; O'Leary, Gerard, & Bingham, 2006). Conversely, the contract literature emphasizes the management of dyadic interactions to induce contractor performance specific to contracts, but pays little attention to the structure of wider contract arrangements or potential for organizational failure. Because governmental agencies often contract for services in suboptimal situations (e.g. thin markets) and for reasons other than efficiency (Ferris & Graddy, 1991; Smith, 1996; Smith & Smyth, 1996), the contract management literature emphasizes how to design, administer, and manage individual contracts to ensure performance (Brown & Potoski, 2003a, 2003b; Brown, Potoski, & Van Slyke, 2007, 2010; Brudney, Fernandez, Ryu, & Wright, 2005; Fernandez, 2007; Hefetz & Warner, 2004; Hodge, 2000; Romzek & Johnson, 2002, 2005).

When a governmental agency contracts with multiple parties to produce the same service for a client population, it is effectively creating a networked structure of interdependent contract exchanges pursuing the same public policy goal, even if joint service production does not occur. Networks are formally established and goal directed systems of interdependent exchange (Provan, Fish & Sydow, 2007). In service delivery networks, actors (government funders and contractors) are bound to the network by formal contracts; they draw from

the same resource pool and pursue the same public policy goal (e.g. mental health treatment) as the governmental agency. In joint production arrangements, producers collaborate to serve individual clients. In arrangements without joint production, a single program provides the full spectrum of services for a client. In both cases, exchanges are linked by pursuit of a common public policy goal.

In service delivery networks without joint production, governmental agencies rely on multiple contractors that work independently to produce services. In these systems, contractors are able to provide a full spectrum of services independently but compete for government clients. Competition may be active or passive. When government creates networked structures of exchange with multiple producers, the presence of substitutable alternatives creates competitive markets even if actors do not actively compete. Competition reduces the level of dependence on a specific contractor and protects the governmental agency from some risk if a contractor fails because competition creates substitutable alternatives for government. For example, a state government may contract with multiple private prison companies, each providing a full spectrum of services and not interacting with each other. In that case, the failure of a single contractor administering a jail may affect the overall ability of the network to house prisoners. The impact would depend on jail size and availability of alternatives jails to place inmates. The failure of a large jail may leave prisoners without services and prevent the state government from providing legally mandated services especially if other options do not exist.

From an exchange theory perspective, as the number of substitutable producers increases, the dependence of a governmental agency on a single exchange partner decreases (Emerson, 1972; Kelley & Thibaut, 1978). For example, if a governmental agency relies on five programs to administer its foster care programs, it creates substitutable alternatives for itself that may buffer the service delivery network from shocks associated with organizational failure. However, we increasingly see organizations producing multiple programs for government. Common affiliations (e.g., legally owned by same parent organizations) among programs add complexity to networked structure of exchange. For example, Providence Service Corporation, a national human service provider, contracts with the same government funder to produce multiple programs without joint production in the same geographic area. In Maine, two separate Providence Service Corporation subsidiaries receive funding from the same entity, the Maine Department of Health and Human Services, to provide services for the same pool of at-risk youth. This common affiliation between programs with Providence Service Corporation changes the structure of exchange and the number of substitutable alternatives for the Maine Department of Health and Human Services. See Figure 1 for a visual representation of these relationships.

What appear to be two independent service delivery programs are actually two programs administered by the same parent entity, thereby increasing the dependence of Maine on Providence Service Corporation even though the state has established two independent programs. Should Providence Service Corporation fail, Maine would lose both programs even though they are independent of each other.

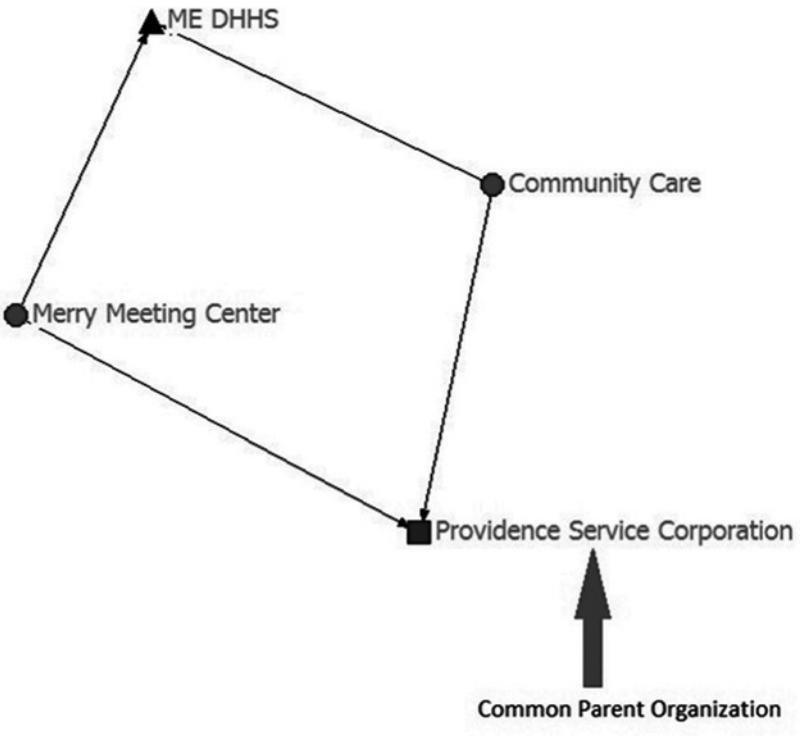


Figure 1. Underlying Common Affiliation of Service Delivery Program.

When service delivery networks are segmented into sub-networks, the complexity of the network is further increased. Sub-networks may be differentiated by a specific need or characteristic in the population served by the contract network, thereby decreasing the number of substitutable alternatives in the network. For example, in juvenile justice programs, a state may fund 100 contracted programs to reduce recidivism through juvenile rehabilitation but these programs may be segmented based on juvenile treatment needs with some programs to specifically treat sex offenders or substance abusers. Contractors directly compete for resources such as juveniles within sub-networks. Contractors do not compete directly for resources among sub-networks and are therefore not substitutable alternatives. For example, specialized programs that are created to treat mentally ill juvenile delinquents would not compete for juveniles with specialized programs created to treat sex offender juvenile delinquents. However, exchanges among sub-networks are indirectly linked by virtue of being attached to the same government funder and pursuit of the same public policy goal to reduce juvenile recidivism. Common affiliations with parent organizations may exist across sub-networks, potentially increasing complexity in the dependence of a government agency on an organization. The failure of an organization with programs in multiple specialties may cause more disruption than the failure of an organization with a program in a single specialty.

In the next section, I use affiliation networks to simultaneously operationalize and measure multiple interdependencies among service delivery programs. Interdependencies include direct links to the government funder through sub-networks and to parent organizations. Accounting for both simultaneously allows us to understand the true nature of government dependence on organizations in the service delivery network. I then apply this measure to an existing contract system to demonstrate that some organizational failures would be more disruptive to a network than others would. For the sake of brevity and clarity, I limit the discussions in this study to service delivery networks that are government monopsonies directly administered by a government funder (i.e. - a direct relationship between funder and contractor).

3. Common Affiliations and the Structure of Exchange in Networks

Affiliation networks are multi-mode networks with two or more distinct types of entities called modes. Modes may be actors, events, or distinct sets of organizations. Connections among actors are established through common connections to another mode (e.g. – parent organization or government funded specialty) rather than a direct tie to another actor in the same mode (e.g. – program to program) as is typical in most network studies. Work on affiliation networks is based on the acknowledgement that actors are members of multiple collectivities, or social circles (Simmel, 1955). The way those social circles intersect has implications for actors' identities and behaviors. In terms of contracts, affiliations may shape dependence of government on a particular organization and vice versa. Affiliations may also shape incentives for contractor performance. Where government is highly dependent on organizations to provide services, those organizations may have with less incentive to perform. Affiliation networks allow researchers to focus on how actors are connected through events, how events are connected through actors or consider multiple modes simultaneously (Breiger, 1974). In contrast, most network analyses involve one-mode networks where structural variables (e.g., network position) are measured on a single mode of actors with actor-to-actor ties (Wasserman & Faust, 1994).

It is critical to examine common affiliations of programs in and among sub-networks in order to understanding the risks individual organizational failures pose to the network For example, Figure 2 depicts a simple service delivery network where there are multiple programs (square nodes) attached to a government funder (square nodes) but not to each other, suggesting that there is a lack of joint production among producers. The structure in this figure does not capture the indirect connections that occur through programs' common affiliation with another mode (e.g., with a parent organization). When programs have a type of common affiliation with each other, the structure changes as shown in Figure 3. In Figure 3, programs (square nodes) are not engaged in joint production but they are indirectly connected to each other through a common affiliation to another mode—a common parent organization (triangle nodes)—indicating that programs

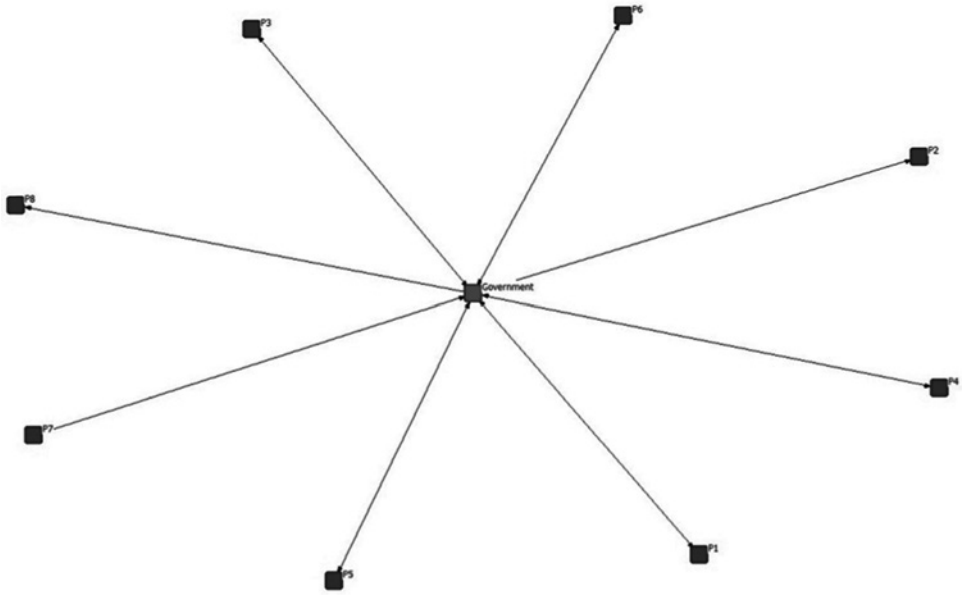


Figure 2. Simple Service Delivery Network.

are not be fully independent of each other. This relationship cannot be characterized as a form of exchange, but it affects the structure of exchange relationships in that it reduces substitutable alternatives. For example, if a service delivery network has eight programs administered by four parent organizations, the number of independent exchange partners is reduced and government choice is more constrained than if it contracted for eight programs administered by eight separate parent organizations. Furthermore, suppose all eight programs are administered by one parent organization. If one parent organization administers all programs, production monopolies are simply shifted to the private sector and competition is nonexistent. An organizational failure (i.e., the failure of the parent organization) in this situation would be catastrophic for the government agency, as it is dependent on one organization and has no other immediate substitutable alternatives. Affiliation networks help us understand these types of interdependencies. Once interdependencies are understood, they can be incorporated into indices. Indices developed from affiliation networks can give us a better understanding of the true nature of governmental agency dependence on a particular organization and the risk of disruption to a system should an organization fail.

In the next section, I discuss the measurement of common affiliations across segmented markets and propose indexes of organizational importance for parent organizations. The affiliation networks considered contain three modes- programs, parent organizations and specialties that segment the market.

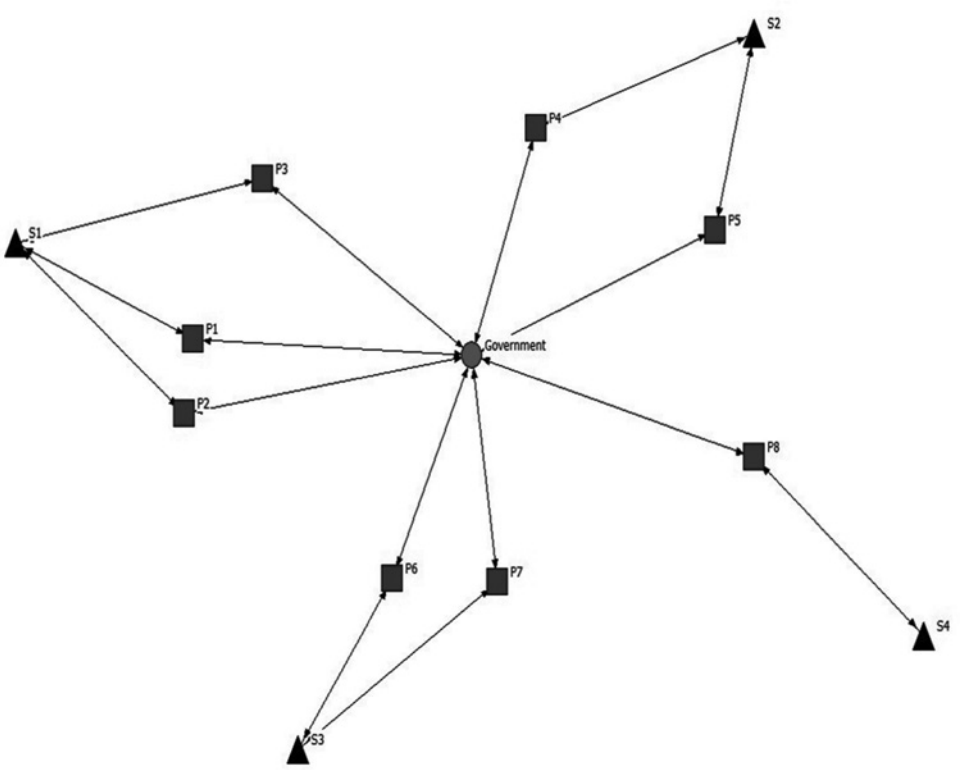


Figure 3. Service Delivery Network with Affiliations.

4. Measurement of Common Affiliations

In the previous section, I described properties of affiliations networks. In this section, I discuss measurement of multi-mode networks and develop an index that reflects how dependent government is on specific organizations in a network. Measuring affiliation multi-mode affiliation networks is more complex than measuring standard one-mode networks. Network measures typically require a square matrix because they are based on the number and/or length of paths between actors. Affiliation networks typically contain two modes. Two-mode matrices can easily be transformed into a one-mode matrix by multiplying the matrix by its inverse. In a three-mode matrix, transforming the matrix is more complex. Simply converting a three-mode matrix to a one-mode matrix through multiplication would require two modes be treated as a single mode (two modes would be represented as columns or rows), obscuring relationships between those modes. For example, in a three-mode matrix with programs, parent organizations and program specialties, programs could represent rows and parent organizations and sub-networks would represent columns. Converting the matrix into a one-mode matrix would treat parent organizations and specialties as a single mode rather than as two distinct modes.

Another option to analyze three modes would be to examine two separate two-mode matrices. For example, one matrix would contain programs and parent organizations while the second matrix would contain programs and specialties. This option is problematic because examining two-mode matrices separately does not represent interdependencies among all three modes; separate two-mode matrices consider service delivery program affiliations with parent organizations and specialties and thus does not accurately capture the true nature of dependence in the networked structure of exchange.

To overcome problems with measuring affiliation networks with more than two types of modes, Fararo and Doreian (1984) present a generalized version of duality (Breiger, 1974) that includes three distinct modes based on the following axioms. In their approach, there are three types of nodes (called modes) and links only exist between modes. Limiting network to ties among modes allows for examination of overlaps and common membership without the "noise" of actor-to-actor relationships within modes and is well suited to service delivery networks without joint production. The tripartite matrix allows the researcher to examine three modes simultaneously, rather than examining separate two-mode matrices. See Figure 4 for a visual representation of a three-mode network. This network includes three type of modes- programs (circles), parent organizations (squares), and

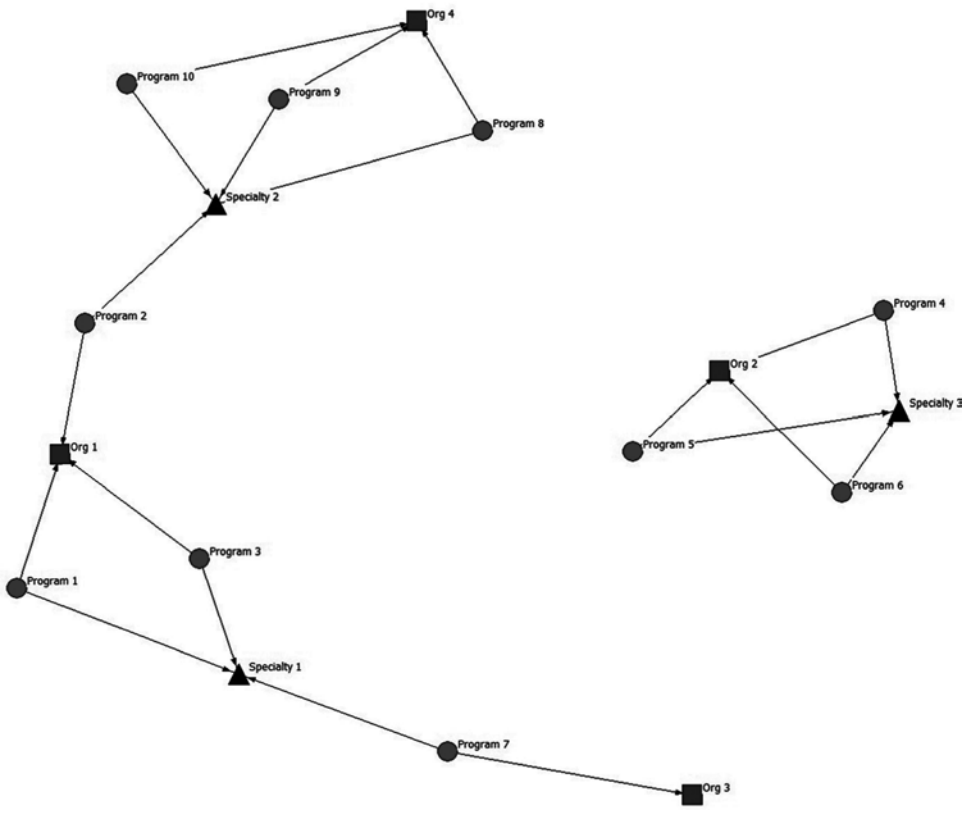


Figure 4. Visual Representation of a Three-Mode Affiliation Network.

government funded specialties (triangles). Links or ties exist among modes but not within modes. There are program to specialty links and program to parent organization links.

Measures for three-mode matrices are rare and largely descriptive (see Cornwell, Curry, & Schwirian, 2003, for a descriptive example). To overcome the problems of using more than two modes without losing analytical leverage of considering three modes simultaneously, I developed a weighted proximity estimate based on a valued two-mode matrix that incorporates all three modes of data. In the valued affiliation matrix, two modes are reflected as columns and rows. The corresponding cell values between rows and columns reflect the number of third-mode actors with attachment to both actors in rows and columns. For example, if two programs were connected to parent organization 1 and specialty 1, there would be a two in the cell that corresponds with organization 1 and specialty 1. See Figure 5 for a visual network representation of a valued two-mode matrix. In Figure 5, parent organizations and program specialties are represented. Links between the modes are based on the number of program affiliated with both. As line thickness increases, the number of common programs among organizations and specialties also increases. Following the example given

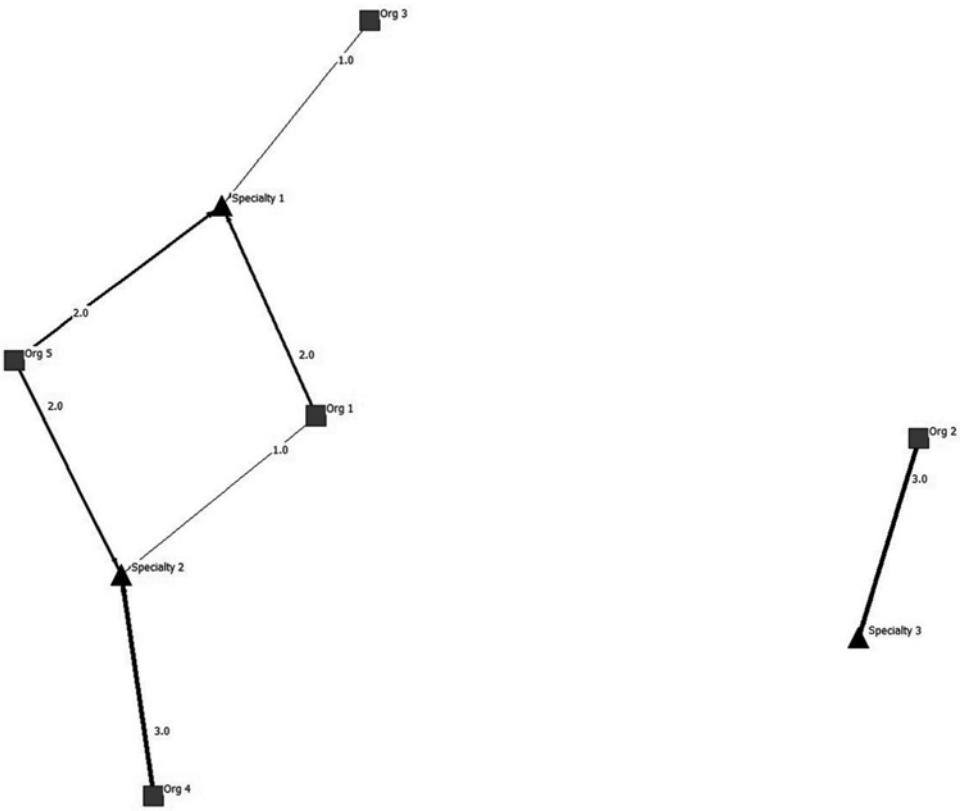


Figure 5. Visual Representation of a Valued Two-Mode Affiliation Network.

above, organization 1 and specialty 1 are linked by 2 common programs. The 2.0 on the line between organization 1 and specialty 1 indicates this affiliation.

Following the creation of the valued two-mode affiliation matrix, I created a one-mode adjacency matrix by multiplying the two-mode matrix by its inverse using the cross products formula in UCINET (Borgatti, Everett, & Freeman 2002). Cross products are derived for each pair of actors represented in the columns and rows by multiplying common participation in events between two actors and summing the result. The resulting adjacency matrix represents a single mode. For example, the adjacency matrix developed from a valued two-mode affiliation matrix with parent organizations and specialties would have either parent organizations or specialties as both rows and columns. In the case of parent organizations as the mode represented in the one-mode adjacency matrix, the cell value represents the breadth and depth of specialties parent organizations have in common. See Figure 6 for a visual representation of the adjacency matrix. In Figure 6, only parent organizations are represented in the figure. Where organizations are connected, it indicates the parent organizations exist within and across the same program specialties. As line thickness increases, the number of common programs specialties also increases. As size of node increases, parent organizations are more central to service delivery network functioning, or government is more dependent on them.

From this one mode matrix, I created an index that reflects dependent government is on individual organizations for service delivery in the network. The index captures the breadth and depth of the organization's presence in the network relative to

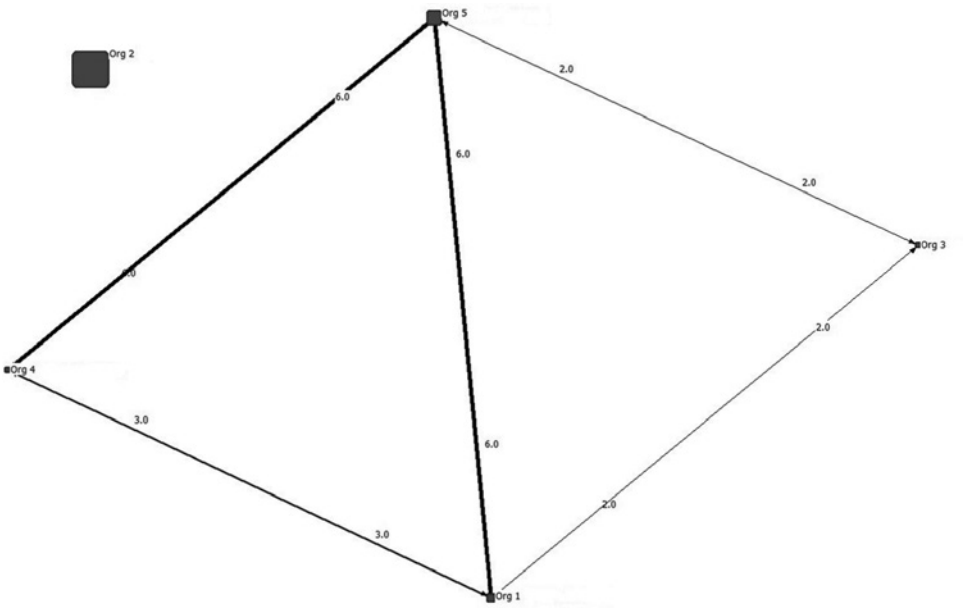


Figure 6. Visual Representation of a One-Mode Adjacency Network.

importance of other organizations. The index contains the row average scores for each organization in the one-mode matrix. This index provides a singular measure that tells us which organizations are most important to the network in terms of their place in the network structure. This measure can be incorporated into multilevel models to assess the effect of government dependence on organizations for some outcome (i.e., performance). In the next section, I apply this index using data from a state funded service delivery network.

5. Application

To demonstrate the utility of this index I apply it to an empirical case: a state funded and managed network of juvenile justice residential treatment programs. The purpose of this application is to demonstrate how the index works and to demonstrate that governmental agencies depend on organizations for public policy implementation in varying degrees.

The data used in application are from a service delivery network of 123 state funded juvenile justice residential services programs for juvenile delinquents in Florida in 2008. Programs are delivered without joint production and were administered by 30 parent organizations and segmented into eight sub-networks based on program treatment specialty and juvenile gender. The program specialties were for: developmentally disabled- male; general population- male; mental health- male; sex offender-male; substance abuser-male; general population- female; mental health-female; and substance abuser-female. Summary data on the distribution of programs across organizations and specialties is included in Table 1. The table includes the number of programs in each specialty by parent organization. A visual representation of this information is given in Figure 7.

Residential services programs provide a continuum of care for juveniles committed to the care and custody of the state. In addition to rehabilitation, programs provide education and vocational services. Programs vary in size and scope but they are likely to be small, group home settings rather than large lock down detention programs. The residential services program network has multiple producers that are not engaged in joint service production and the state is the sole buyer of services. Though programs receive some federal funds, all funding is routed through the State and directly administered to programs by the State. Parent organizations are awarded the right to administer individual programs. The state decides where juveniles are placed. Programs are indirectly linked to each other through common affiliation with parent organizations and through common affiliation with sub-network specialties established by the state. Each program is affiliated with one specialty and one parent organization but specialties and parent organizations do not have direct affiliations. The number of programs per sub-network varies, as does the number of programs administered by each parent organization as demonstrated in Table 1. To recap, in this affiliation network there are three modes: programs, parent organizations, and specialties (sub-network based on program treatment specialty and juvenile gender).

Table 1
Distribution of Programs across Parent Organizations and Specialties.

	Develop-mentally Disabled (male)	General (male)	Mental Health (male)	Sex Offender (male)	Sub-stance Abuse (male)	General (female)	Mental Health (female)	Substance Abuse (female)	Total
Organization 1	0	6	0	0	0	1	0	0	7
Organization 2	0	2	0	0	1	0	0	0	3
Organization 3	1	2	0	0	0	0	0	1	4
Organization 4	0	1	0	0	0	0	0	0	1
Organization 5	0	7	0	0	0	1	0	0	8
Organization 6	0	1	0	0	0	0	0	0	1
Organization 7	0	8	2	2	2	0	0	0	14
Organization 8	0	0	0	0	1	0	0	0	1
Organization 9	0	0	0	0	0	2	0	1	3
Organization 10	0	0	1	0	0	0	0	0	1
Organization 11	0	4	0	0	0	1	0	0	5
Organization 12	0	0	0	0	0	0	1	0	1
Organization 13	0	1	0	0	0	0	0	0	1
Organization 14	0	2	0	0	0	1	0	0	3
Organization 15	0	2	0	0	0	1	0	0	3
Organization 16	0	1	0	0	0	0	0	0	1
Organization 17	0	3	0	0	0	0	0	0	3
Organization 18	0	2	0	0	1	0	0	0	3
Organization 19	0	1	0	0	0	0	0	0	1
Organization 20	0	1	0	0	0	0	0	0	1
Organization 21	0	0	0	0	0	1	0	0	1
Organization 22	0	1	0	0	0	1	0	0	2
Organization 23	0	7	3	1	1	1	3	0	16
Organization 24	0	2	1	1	1	0	1	0	6
Organization 25	0	2	0	0	0	0	0	0	2
Organization 26	0	1	0	4	0	0	0	0	5
Organization 27	1	7	1	0	1	1	0	0	11
Organization 28	0	1	0	1	1	0	2	0	5
Organization 29	0	1	0	0	0	2	0	0	3
Organization 30	0	6	0	0	0	1	0	0	7
Total	2	72	8	9	9	14	7	2	123

See Figure 7 for a visual representation of the three-mode network. In Figure 7, shapes represent the modes (circle=program; square=parent organization; triangle=specialty). The matrix used to derive Figure 7 is included in Table 1. Using affiliations from this three-mode network, a two-mode valued affiliation matrix is derived as described in the previous section.

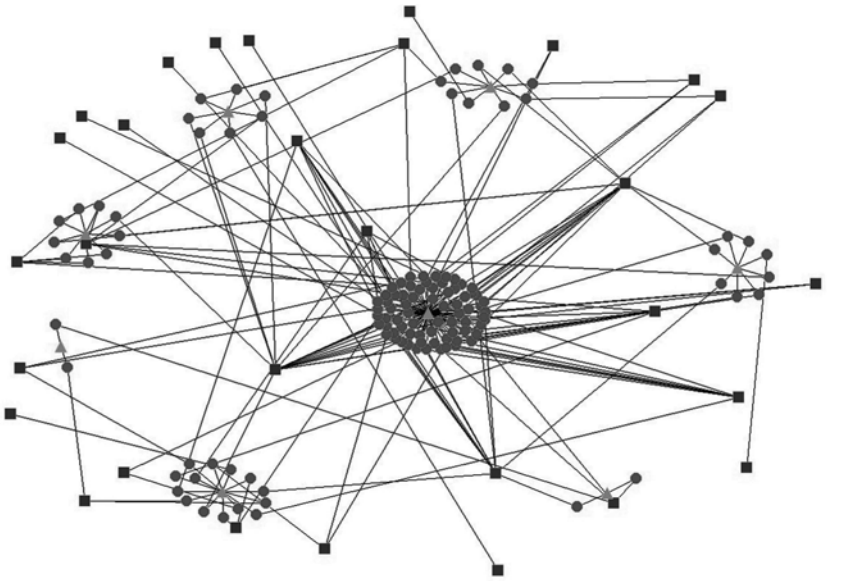


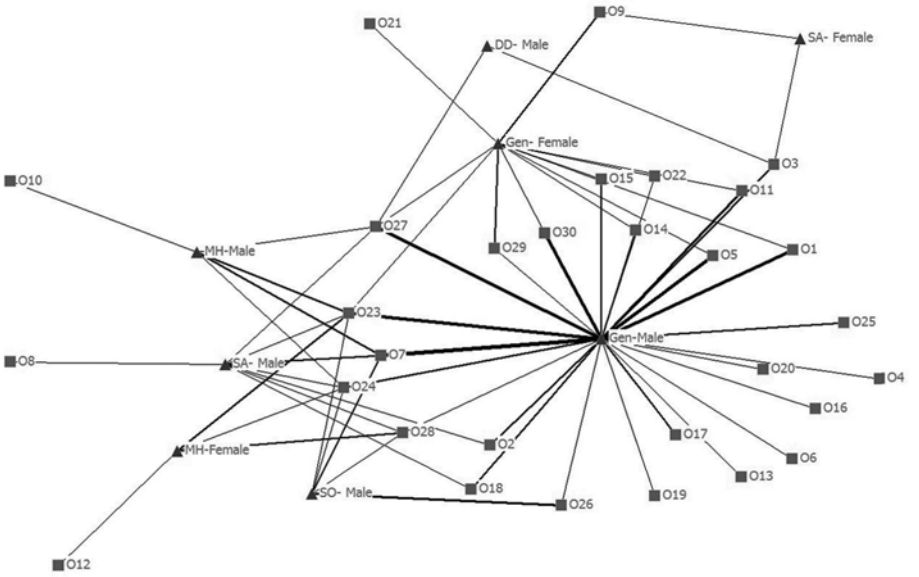
Figure 7. Visual Representation of the Three-Mode Network.

See Figure 8 for a visual representation of the two-mode valued matrix. For the two-mode network map in Figure 8, squares represent specialties and are labeled with the specialty[1]. Circles represent parent organizations and are labeled with their names. The thickness of the line represents the number of programs an organization has in a specialty[2]. The thicker the line is, the more the number of programs a parent organization has in a specialty. Using the two-mode valued affiliation matrix, a one-mode adjacency matrix was derived in UCINET (Borgatti et al., 2002) using the cross products of the rows. Cross products are derived for each pair of actors by multiplying common participation in events between two actors and summing the result. The sum represents the number of specialties and degree of specialties (measured as the number of programs in a specialty) parent organizations have in common.

See Figure 9 for a visual representation of the one-mode adjacency matrix. For the one-mode network maps, circles represent parent organizations. Lines between parent organizations indicate they have programs in the same specialty. Node size represents how important organizations are to the network. As node size increases, government is more dependent on an organization. Nodes are sized according to the dependence index described in the prior section. Once matrices were squared (converted to one-mode), row

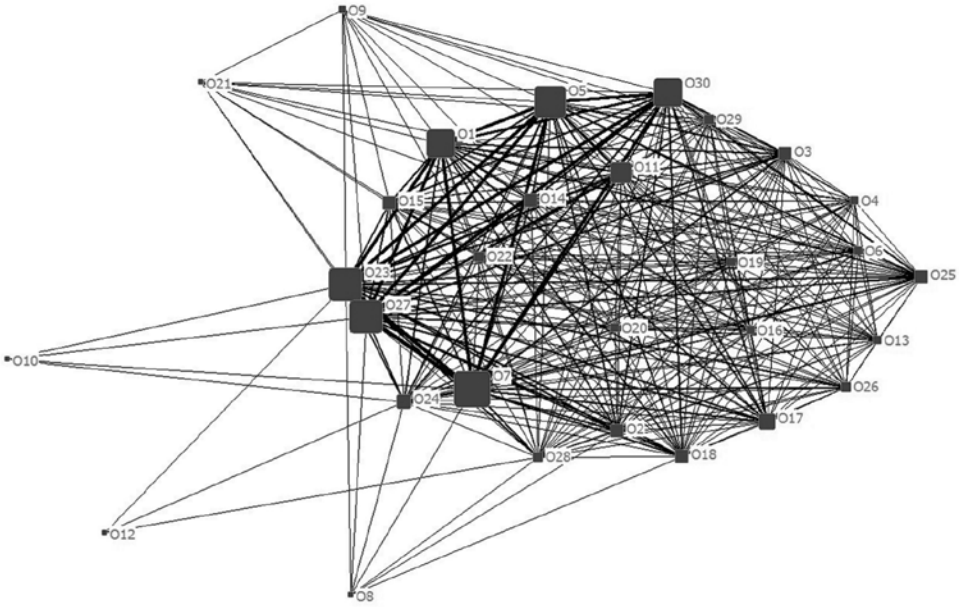
[1] Abbreviations- DD = Developmentally Disabled; Gen = General; MH = Mental Health; SO = Sex Offender; SA = Substance Abuse

[2] Market share must be controlled for in a statistical model. This measure reflects presence of programs within and across specialties.



Key
Color/ Shape = mode (circle = organization; square = specialty)
Line thickness = number of common programs

Figure 8. Visual Representation of the Two-Mode Valued Affiliation Network.



Key
Square = organization
Larger nodes compete more intensely within and across sub-networks

Figure 9. Visual Representation of the One-Mode Adjacency Matrix.

averages were computed for each parent organization. The row average is a measure of direct competition with other parent organizations for each parent organization. This index reflects how dependent government is on each organization. The score in the index accounts for the parent organization's presence within an across sub-networks relative to other parent organizations in the network. As organizations have a greater presence within and across specialties (measured by the number of programs they administer within and across specialties), organizations have a greater score and higher importance to network functioning.

The scores for parent organizations are included in Table 2. As scores get larger, government is more dependent on an organization. The failure of organizations with high scores would have a larger disruption to the network than failure of organizations with lower scores. For example, the State is much more dependent on Organization 7 for service production than on Organization 12. Organization 7 administers 14 separate programs across six specialties, while Organization 12 administers one program in a single specialty. The failure of Organization 7 would be much more disruptive to service delivery in the larger network than the failure of Organization 12. Again, this measure goes beyond the count of programs a parent organization administers or specialties in which it has a presence. Organizations become more important to the entire network as they provide a greater number of programs across more specialties and more important to the specialty as they provide more programs in a specialty. For example, the failure of Organization 7 would be slightly more disruptive to the entire network than that of Organization 23, even though Organization 23 administers more total programs. The distribution of Organization 7's programs across the entire network means its failure would have great impact. It has more than one program across four specialties, while Organization 23 only has more than one program across three specialties. In other cases, a single organization has such a dominant presence in one specialty that the organization's removal would become catastrophic for the network. The index simultaneously captures breadth and depth of parent organization presence in the networked structure of exchange.

6. Conclusions

In many cases, governmental agencies must contract in sub-optimal conditions, which violate assumptions of competitive markets. As government contracting increases, it will become more important to understand how the structure of exchange in networks influences the availability of substitutable alternatives for governmental agencies. The stability of government-created structures is partially dependent on the nature of alternatives for the government and the risk of an organization's failure. Beyond understanding the structure of alternatives, governments should investigate the likelihood that exchange partners might fail, particularly when that exchange partner is critical to service delivery. Disruption to service delivery could be catastrophic if central organizations fail. This is

Table 2
Parent Organization Index Scores (FY08)

Organization	Index Score
Organization 1	13.633
Organization 2	4.933
Organization 3	4.733
Organization 4	2.367
Organization 5	15.600
Organization 6	2.367
Organization 7	18.400
Organization 8	0.267
Organization 9	0.833
Organization 10	0.233
Organization 11	9.500
Organization 12	0.200
Organization 13	2.367
Organization 14	5.100
Organization 15	5.100
Organization 16	2.367
Organization 17	6.900
Organization 18	4.933
Organization 19	2.367
Organization 20	2.367
Organization 21	0.433
Organization 22	2.800
Organization 23	17.033
Organization 24	5.633
Organization 25	4.667
Organization 26	3.033
Organization 27	16.133
Organization 28	3.233
Organization 29	3.167
Organization 30	13.633

particularly true where existing programs do not have the capacity to absorb clients immediately. In juvenile justice or prison settings, governments cannot wait for new programs to get up and running due to legal obligations to maintain incarceration. Even in less restrictive situations, the failure of an important organization has the potential to disrupt service production for the entire network.

In addition to having implications for system stability, the structure of exchange and the embeddedness of actors within service delivery networks may influence network performance. By choosing to exchange with multiple actors, government funders may be able to leverage their dependence on exchange partners and decrease the risks associated organizational failures. Incentives to perform are likely to be influenced by how actors are embedded in a particular exchange structure. Competition among providers, rather than privatization, produces benefits for government (Domberger, 1994; Donahue, 1989). As government increases the number of substitutable alternatives, individual contractors will have more incentive to perform well to maintain the flow of resources to their program. It is likely that as government increases dependence on a single organization, that organization will have less incentive to perform beyond contractually mandated goals. According to exchange theory, when contractors are replaceable, they may be more likely to perform according to the terms of their exchange partner, the government funder, for fear of not being selected or of being replaced (Emerson, 1972). Measuring dependence and performance over time would shed light on this issue.

In this paper, I emphasized the organization of governance arrangements and the potential effect of organization on governance outcomes, a topic not widely considered. At a broad level, this study follows the recent tradition of examining the changing role of government and its increasing use of private agents to produce goods and services traditionally produced by government with two contributions. First, I developed the idea that contracts are embedded in larger networked system of exchange even if joint production does not occur. Understanding the structures of these networks has the potential to influence contract performance incentives that are independent of contract management practices. Second, I offered a way to measure the complex networks of exchange with direct links to a government funder and common affiliations among contractors. I demonstrated the networked structure of providers is more complex than a simple count of programs or parent organizations, particularly where networks are segmented by client types. The index developed here may be used to understand how important individual actors are for network functioning. It can also be incorporated into statistical models on contract performance. Incorporating structural measures into statistical models will improve ability to predict individual contract performance and understand risks associated with organizational failure in service delivery networks.

Finally, while I focused on networks without joint production, the index I propose may be extended to consider government contracting across multiple networks with different resource bases and networks with joint production. Incorporating structural variables into contract performance models may shed light on the interplay or complementarity between structural predictors of performance and management predictors of performance. Previous studies suggest that structure and management are important governance tools, but using both may be redundant (Rowley, Behrens, & Krackhardt, 2000). Understanding the conditions under which each is likely to work will provide managers with additional tools in deciding where to employ additional time and resource intensive relational strategies and where to rely more heavily on structure to induce performance. For example, when

contractors are likely to perform because of their structural position, it may be unnecessary to spend additional resources developing relationships. Where contractors are more likely to underperform because of their position (e.g. - governmental agency is dependent on them), developing more resource intensive relationships may promote desired performance.

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