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The Influence of Shared Participant Governance on the Integration of Service Networks: A Comparative Social Network Analysis

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Abstract

We investigate how networks among service organizations are integrated through a shared participant type of governance. Shared participant governance is a non-brokered type of network coordination where a network is governed by its members without a separate governance entity. We study the integrative capacity of this type of governance by measuring the effect of participation in a shared participant governance on tie formation in networks among service organizations. We analyze three networks of service organizations in three districts of Antwerp, Belgium. In each of these districts, the networks are governed by welfare meetings, defined as a shared participant type of governance. We use Exponential Random Graph models. The results show that a shared participant type of governance has a positive effect on tie formation. We also find that the

positive effect on tie formation is dependent on the active participation of centralized actors in the welfare meetings.

INTRODUCTION

In recent decades, research interest in networks among human service organizations has increased exponentially (Isett et al. 2011). The importance of networks among service organizations has been well documented. Service organizations engage in networks to address the wicked problems of their clients (Provan and Milward 1995; O'Toole 1997; Provan and Milward 2001). Provan and Milward (2001) define these networks as 'service delivery vehicles' providing value to a population confronted with varying needs, in ways that could not be achieved by a single organization. Consequently, not the single organizations, but the network of organizations as a provider providing welfare services becomes the focus of study here.

Fruitful efforts to study inter-organizational service networks are contributed by Provan and Milward (1995) and Rosenheck et al. (1998) in which in particular the role of network integration is emphasized. Their main concern is to what extent the level and type of integration influences the effectiveness of the provision of services. Integration implies that clients gain better access to a broad range of services and thus the network is better able to produce better client outcomes (Rosenheck et al. 1998). In a highly integrated network, all organizations are connected and the resource exchange among network actors is guaranteed. In these networks, service organizations can draw on the resources available in the network through the exchange of information, referral of clients

and case coordination. More specifically, network integration is defined as a structural property of the network (Provan and Milward 1995; Rosenheck et al. 1998; Lemieux-Charles et al. 2005). Social network analysis measures such as density and centrality are used to measure network integration. Provan and Milward (1995), for example, show that the most effective networks are highly centralized and have a low degree of density.

Network governance has recently been introduced and studied as a possible integration mechanism for multi-organization networks (Provan and Kenis 2008; Kenis and Provan 2009). Provan and Kenis (2008) identified three different forms of network governance: *lead-organization governance*; *network administrative organization (NAO)*; and *a shared participant governance*. Research studying these forms of governance has primarily concentrated on the lead or NAO type of governance. (Morrissey et al. 1984; Provan and Milward 1995; Provan and Sebastian 1998; Human and Provan 2000; Lemieux-Charles et al. 2005; Graddy and Chen 2006; Span et al. 2012). In this study, we investigate the impact of a shared governance form on network integration among service organizations.

In the literature, shared governance forms are often considered to have difficulty achieving a high-level performance given that an explicit integration mechanism is absent. In a shared participant type of governance, network integration is established by the network members themselves with no separate and unique governance entity such as a lead organization or an NAO, and no attempts to formalize ties at the network level (Provan and Kenis 2008). We argue, however, that a deeper analysis of the integrative capacities of shared participant governance is necessary. By doing so, we address a

suggestion of Isett et al. (2011)—that more research is necessary on informal networks among service organizations. According to these authors, there has been little advancement in understanding this pervasive mechanism of governance. This paper provides an attempt to address a gap in public administration literature by focusing on the integrative capacities of a shared participant governance. However, we argue that an analysis of a shared participant type of governance must take two important concerns into account. The first concern refers to the level of analysis. Networks can be investigated from the individual, dyad and system levels of analysis (Borgatti and Foster 2003; Mizruchi and Marquis 2006; Provan and Kenis 2008). Most of the work on shared participant types of governance focuses on the egocentric (Foster-Fishman et al. 2001) or system-level of analysis (Provan et al. 2003). We follow Mizruchi and Marquis (2006) in stating that the level of analysis that must be adopted is dependent on the aim of the research. We already argued that we analyze the influence of shared participant governance on network integration. Here, integration refers to the connections among actors in the network. The level of tie formation among service organizations thus stands central. We therefore develop a dyadic approach where the integrative influence of shared participant governance is measured by the extent to which this type of network governance is able to influence tie formation among service organizations in the network. We more specifically analyze the integrative capacity of a shared participant governance by measuring the extent to which service organizations that participate in a shared participant governance have a higher chance of exchanging information on clients, referring clients or engaging in case coordination in comparison with organizations that do not participate. Second, we notice that studies do not isolate the effect of governance

from other factors that could influence tie formation in a network. It is widely acknowledged that ties among organizations are shaped by both endogenous and exogenous variables (Monge & Contractor, 2003). The endogenous variables refer to the structural network characteristics (Gulati 1998), while exogenous variables refer to the homophily effect stating that tie formation can be explained by similarity among two organizations. We therefore argue that to provide scientific evidence on the integrative capacities of shared participant governance, we need to provide an analysis where the effect of governance on tie formation is controlled for both exogenous and endogenous influences.

In our article, we have included the above considerations. More specifically, we use Exponential Random Graph Models (ERGMs) to predict the effect of shared participant governance on tie formation among service organizations. We estimate the chance that organizations that participate in shared participant governance have a higher chance to develop a tie in comparison with organizations that do not participate, even when we take the influence of other variables into account. With this approach, we believe we make a significant contribution to earlier studies that did not control for such possible effects. By using Exponential Random Graph Modeling we follow yet another suggestion by Isett et al. (2011)—that public administration scholars need to foster closer ties with technical disciplines that are developing new methods and measures, especially in the field of Social Network Analysis (SNA).

The empirical setting of our study is three networks in Antwerp, Belgium. Each network consists of a set of organizations providing services to social assistance clients within a district of the city.

In the networks studied, “*welfare meetings*” involve the participants sharing information about their activities and discussing new projects and problems in their district. These welfare meetings contribute to tie formation and resource exchanges among the participating service organizations. The meetings are similar to what Provan and Kenis (2008) define as a shared participant type of network governance because they are governed by the network actors themselves (*see also*, Cristofoli, Markovic, and Meneguzzo 2014; Lindencrona, Ekblad, and Axelsson 2009; Foster-Fishman et al. 2001). There is no lead organization or network administrative organization that coordinates the network. Our article is structured as follows. We first elaborate on the theoretical framework. We develop our main hypothesis and discuss our methodology. Then, our results are presented and we end with a discussion of our main findings.

Theoretical Framework And Hypothesis

In this section we focus on the theoretical underpinnings of our study. We first elaborate on the role of network governance for network integration. In the second paragraph we discuss and hypothesize the effect of network governance on the integration of networks among service organizations. We develop our hypothesis on the ability of a shared participant type of governance to influence tie formation among service organizations.

Network Integration And Governance

An important challenge for service networks is to integrate the joined efforts of a wide variety of service organizations. This is a necessary precondition for a network to provide an integrative approach to the multiple problems of its target group. The theoretical challenge is common to what Lorsch & Lawrence formulated in 1967. They introduced differentiation and integration as the key challenges for the functioning of modern organizations. In their seminal article, they were concerned with the question of how the structure of an organization affects organizational effectiveness. They argue that to be effective, an organization should differentiate its functions in a manner that corresponds to its internal and external differentiation. Even more importantly, the authors emphasize that the more differentiated (and consequently complex) an organization is, the more integrated, or coordinated, its parts must be to perform effectively. This is very similar to the challenges with which networks of organizations are confronted (Provan and Milward 1995). As argued above, the networks we study presuppose a differentiated set of organizations to collaborate to achieve results and thus need to '*achieve unity in effort*' (Lawrence and Lorsch 1967; Buck et al. 2011). A very interesting attempt to investigate the integration of a network among service organizations is developed by Provan & Milward and used in other research (Provan and Sebastian 1998; Rosenheck et al. 1998; Lemieux-Charles et al. 2005). In their seminal article, Provan and Milward (1995) use social network analysis to assess the integration of networks among service organizations. They map the ties among a pre-defined set of organizations to analyze the configuration of ties at the network level. This analysis is used as a way to investigate the extent to which the organizations reach an integrated network. In their analysis two very

relevant characteristics of network integration are used, density and centralization.

Network integration can be established by a very dense network in which all actors are connected or a centralized network in which one central organization serves as a broker that connects the various parts of the network (Provan and Sebastian 1998; Lemieux-Charles et al. 2005). However, we argue that the ultimate success of network governance should be judged in terms of the impact it has on outcomes related to client well-being or other client-related outcomes, such as in the work of Provan and Milward (1995). In this article we concentrate instead on the short term effects and demonstrate the possible effect of a shared participant governance on tie formation in a network among service organizations. This idea has also been emphasized in Provan et al. (2003, 648): *“In the short term, however, it seems reasonable to measure the effectiveness of attempts to build community capacity by the extent to which collaboration efforts have actually been achieved.”*

To improve the level of integration, a form of network governance must be developed. Provan and Kenis (2008) were the first to specify three different forms of network governance: lead-organization governance; network administrative organization (NAO) governance; and shared participant governance.

Lead-organization governed networks are coordinated through and by one of the members, acting as a lead organization. The lead organization provides administration for the network and/or facilitates the activities of member organizations in their networks to achieve network goals. A second type of network governance is the **network**

administrative organization (NAO). The basic idea of the NAO governance model is that a separate administrative entity is set up specifically to manage and coordinate the network and its activities. Like the lead-organization model, the NAO plays a key role in coordinating and sustaining the network. Unlike the lead-organization model, however, the NAO is not another network member, providing its own set of services or production tasks. Instead, the NAO is established with the exclusive purpose of network governance. In the literature, researchers most often describe or investigate cases with a centralized type of network governance, such as lead-organization governed networks and network administrative organizations (Morrissey et al. 1984; Provan and Milward 1995; Provan and Sebastian 1998; Human and Provan 2000; Lemieux-Charles et al. 2005; Graddy and Chen 2006; Span et al. 2012). According to Isett et al. (2011), these studies tend to focus on ‘formal networks’ that are officially set up by a convening body where membership may either be coerced or have some compelling or resource incentives to participate. In these networks, the integration among service organizations and the formalizing of ties among service actors in the network is mainly established by the lead-organization or NAO.

To date, few studies have focused on **shared participant governed networks**. These networks depend exclusively on the involvement and commitment of all, or a significant subset of, the organizations that comprise the network. Network participants are themselves responsible for managing internal network relationships and operations as well as external relations. In theory, the network acts collectively, and no single entity represents the network as a whole. Governance in this form can be accomplished through

regular meetings of designated organizational representatives. These types of networks depend exclusively on the involvement of all or a significant subset of the organizations in the network. This type of network is often defined as a task force, a coalition, or as an ad hoc committee sharing the common goal of information sharing, capacity building, problem solving and service delivery (Agranoff 2007). These networks are considered to be instruments for building ‘community capacity’ (Chaskin 2001; Foster-Fishman et al. 2001; Provan et al. 2003). Here, we specifically concentrate on how community capacity is created by the shared participant type of governance enabling tie formation among organizations in the network. We demonstrate that a shared participant type of governance can have positive effects in terms of network integration. As already stated, we more specifically measure the extent to which service organizations that participate in a shared participant governance have a higher chance of forming a tie in comparison with organizations that do not participate.

The Integrative Effect Of Shared Participant Governance

The integrative capacity of a shared participant type of governance can be investigated from different perspectives. Foster-Fishman et al. (2001) examine the advantages of inter-organizational coalitions at the organizational level. These coalitions are similar to what we call shared participant types of governance. According to Foster-Fishman et al. (2001), these meetings seem to fulfill two functions. First, organizations gain more information on what type of services are delivered by the organizations that participate in the meetings. Second, representatives have opportunities to talk and seek advice from other members concerning complex client cases. Foster-Fishman et al.

(2001) show that participation in such coalitions is associated with a higher quantity of ties and broader inter-organizational exchange networks spanning different service domains. Foster-Fishman et al. (2001) conclude that organizations involved in a form of shared governance network were more likely to be included in client information and other types of resources exchanges. They emphasize that coalitions, which we define as shared participant governance, are crucial for creating a more integrated service system. This finding is supported by Lindencrona, Ekblad, and Axelsson (2009). They investigate networks for refugee resettlement support in Sweden, which operate under a shared participant governance model. The study finds that networks with group modes of interaction such as network meetings tend to have better results in terms of network performance than those that were not coordinated by network meetings.

Provan et al. (2003) show the effect of ‘collaborative initiatives’ at the network level. They conduct a longitudinal study of a network at two points in time, before and after the implementation of a collaborative initiative. They show a positive effect on network density, focusing on different network ties such as shared information, client referral and a measure of network multiplexity.¹

As discussed above, to examine the role of a shared participant type of governance more deeply, one must control for other factors that potentially can influence tie formation. This is especially the case when focusing on a network where ties among organizations are mainly voluntary or serendipitous. In a shared participant type of governance, the integration mainly results from the exchange of information and improvement of the

‘capacity’ of the network in terms of tie formation in the network. This means that ties among organizations are mainly voluntary and do not rely on formalized agreements among organizations, such as contracts, memoranda of understanding or joint agreements (Isett et al. 2011). Tie formation in these networks is thus driven by the individual needs of organizations, resulting in serendipitous network trajectories. In these trajectories individual actors (such as service organizations) make choices to connect based on their own interest (Kilduff and Tsai 2003). However, when any governance mechanism is lacking in the network, these serendipitous trajectories have a tendency to end up in a highly fragmented, weakly integrated and loosely coupled network structure (Kilduff and Tsai 2003).

Consequently, the integrative capacities of a shared participant type of governance can only be evaluated by taking into account the mechanisms that can explain tie formation among service organizations. To take into account these ‘serendipitous’ effects we rely on Monge and Contractor (2003) emphasizing that ties among organizations are the result of both endogenous and exogenous variables. The endogenous variables refer to the structural characteristics. Here we take into account both “triangulation” and “centralization.”

The effect of triangulation is emphasized in Gulati (1998) and Gulati and Gargiulo (1999). They have stated that if two organizations have a successful collaboration, it is likely a third organization that collaborates with one of the first two will also collaborate with the other. A second structural variable refers to the

centralization or the ‘embeddedness’ of certain actors in the network. It seems that actors highly embedded in the network have a very influential position in the network; they, therefore, influence tie formation in the network. The advantageous position of organizations situated in a central position in a network has been extensively discussed by Marsden and Lin (1982) and Burt (1976, 2002). The central actor acts as a “broker” connecting different parts of a network. The central actor gains power because they offer a unique resource to other actors. They have the ability to connect with many more actors in the network and facilitate transactions among other actors who lack access to or do not trust one another. Following these studies we argue that central organizations are able to influence the integration of the network. We therefore have to control the influence of shared participant governance on tie formation for the effect of central organizations.

Next, we also control for exogenous variables related to attributes of the organization in the network. One particularly important exogenous effect is known as the homophily effect. This effect is related to the argument that tie formation is more likely to occur between service organizations having one or more characteristics in common. Brass (1995), for example, notes that similarity eases communication and fosters trust and reciprocity.

Taking both endogenous and exogenous network variables into account we formulate the main hypothesis of this research:

H1: Controlling for both endogenous and exogenous characteristics, the participation of two organizations in a shared participant type of governance results, in comparison

with organizations that do not participate in a shared participant governance, in an increased chance of tie formation.

Our hypothesis assumes a relationship between shared participant governance and network integration. We follow Reiss (2009), emphasizing the concept of pluralistic causality. This means that there are different types of evidence for the causal relationship between governance and the outcome of network integration. Where some authors focus on the ego-level of the organization (Foster-Fishman et al. 2001), others show an effect at the structural level (Provan et al. 2003). As already stated, we examine the integrative influence of shared participant governance at the dyadic level.

We are, however, aware that we must tackle some issues concerning the causal interpretation of our results. In the method section we examine these concerns. In the next section, we argue why welfare meetings must be considered as a relevant case to analyze the integrative capacities of shared participant governance.

Welfare Meetings As Shared Participant Governance

As stated earlier, this study is conducted in the city of Antwerp, Belgium. Antwerp is divided into different districts, each with some political authority on issues such as elder and youth affairs related to culture and sports. The city government is responsible for all topics related to social policy.

In Antwerp, a large variety of service organizations are active in the different districts. As a result of this differentiation, in the 1990s, social workers, managers and

local policy representatives started to notice that the efforts of the various service organizations were insufficient to provide an answer to the multiple problems of their clients. Therefore, a highly integrated network combining the expertise of various service organizations was considered a necessary step to improve service delivery to vulnerable target groups. To improve collaboration, service organizations started to organize welfare meetings at the district-level. These meetings were organized by a steering group that consisted of four to five representatives from key organizations in the districts. The steering group seeks a location, sets the agenda in close collaboration with the participants, and sends invitations to the participating organizations.

In terms of Provan and Milward (2001) these welfare meetings should be defined as a shared participant type of governance. No leading organization or NAO appears. Welfare meetings are governed by the network members themselves with no separate and unique governance entity, but through regular meetings of designated organizational representatives. These networks depend exclusively on the involvement and commitment of all, and the participants in the welfare meetings are themselves responsible for managing internal network relations and operations (Provan and Kenis 2008). The participation of members in the welfare meetings is voluntary (Kenis and Provan 2009). Organizations are not obliged to participate. They choose when to attend. Some organizations send a representative to every meeting; others only attend when the agenda includes topics that are interesting for their organization.

The main goal of these welfare meetings is to stimulate collaboration by the exchange of information by the participating organizations (Foster-Fishman et al. 2001) and discussion of specific problems in the districts. Therefore, these welfare meetings can be analyzed as informational networks (Agranoff 2007) aiming to improve the integration of the network. Our aim is to analyze whether participation of organizations at the governance level will lead to tie formation among organizations at the client level in terms of informational exchange, client referral and case coordination.

METHODOLOGY

First, we discuss the way we define our network boundaries. Second, we present how the network data have been collected. Finally, we elaborate on the use of Exponential Random Graph Models (ERGM) in testing our hypothesis.

Network Boundaries

Our research examines patterns of interactions among human services organizations in Antwerp. In the study of networks, boundary specification is a crucial issue. In this research, we follow the widely used approach developed by Laumann, Galaskiewicz, and Marsden (1978) and restrict our analysis to three networks according to a set of pre-defined criteria used to define network boundaries. More specifically, we use a geographical, a functional and a relational criterion. In this study, the organizational field-net (Kenis and Knoke 2002) is shaped by networks of organizations that exchange ties and share a common geographic boundary and target group of clients. Within this

field-net, we can assume that organizations may experience many advantages of an integrative network.

Geographical Criterion

The ***geographical criterion*** refers to the geographic boundaries we use to define our networks. We focus on three districts in Antwerp where the relevant service organizations are confronted with a poor population. This includes a significant number of foreigners, single-parent families, elderly and a high number of persons receiving social assistance.

Functional Criterion

In addition to a geographical criterion, we also use a ***functional criterion***. We follow the example of Provan and Milward (1995) and Rosenheck et al. (1998) and select organizations that provide services to a particular target group. We focus on networks among human services organizations that provide services to persons receiving financial support from the Public Centers of Social Welfare (PCSW's). In Belgium, the law on the right to social integration (2002) is installed for people in need of financial assistance but not entitled to social security benefits such as unemployment insurance, pension or disability benefits. For this target group, the law provides a guaranteed subsistence income based on relatively well-defined conditions, such as nationality, age, family situation, residence, the willingness to work, and need (Raeymaeckers and Dierckx 2013). The group of persons receiving social assistance has different problems and needs. Our analysis will show the extent to which shared participant governance is able to

influence the integration of the network, which will increase the responsiveness of service providers to the multiple problems of this target group (Provan and Milward 1995).

Relational Criterion

This research studies service delivery ties. We distinguish between informational exchange, client referral and case coordination (Provan and Milward 1995; Provan and Sebastian 1998; Lemieux-Charles et al. 2005).

The first tie refers to the exchange of information among organizations concerning crucial client details involving their specific context or administrative situation. Client referral among service organizations occurs when a client is sent from one organization to the other. Case coordination occurs when organizations join forces to solve the multiple problems of one case. These three types of ties are combined to gain a deeper insight into the network structure among the organizations. We emphasize that these ties are defined at the client-level. We again emphasize that these ties are conceptually different than participation at welfare meetings. The ties we use to construct our networks involve the exchange of clients or client information. In the welfare meetings no information or problems relating to individual client cases are discussed.

DATA COLLECTION

About Causality Issues

As stated earlier, this article aims to explore the relation between shared participant governance and network integration. We emphasize the concept of pluralistic causality (Reiss 2009), which means that different evidence can be used to provide proof for the causal relationship between shared participant governance and network integration. In this article we choose to measure the effect of participation in shared participant governance on tie formation in terms of informational exchange, client referral or case coordination. This effect will be controlled for by other variables that could explain tie formation among service organizations. One can, however, argue that the ultimate proof of causality between shared participant governance and network integration must be provided by using longitudinal data. However, we have no access to longitudinal data of tie formation among service organizations in the selected network. To overcome this problem, we follow Wunsch, Russo, and Mouchart, (2010). They emphasize that the argument according to which longitudinal quantitative studies are the only way to gain causal interpretations is ill-founded. Causal interpretations can be made by using cross-sectional data when some very important guidelines are kept in mind.

More specifically, Wunsch, Russo, and Mouchart, (2010) argue that to establish causal relations, background knowledge on the causal mechanism can be added to the cross-sectional analysis. This background knowledge could include information on other variables that influence the dependent variable or historical or time information instead of the time series data that is typically used for longitudinal analyses.

We seek to meet their claim in two ways. First, background variables are used to control the effect of shared participant governance on tie formation. We assume that tie formation among service organizations could be initiated by other endogenous or exogenous factors. We are, however, aware that a multivariate analysis merely shows an association between two variables, controlling for other background variables. Therefore, we include a second research strategy to overcome the problems of causality and cross-sectional data. We triangulate our quantitative data with qualitative data. We follow Howe (2012) and Small (2011) and state that using evidence from qualitative data in combination with our main quantitative analysis could provide more evidence and more information on the causal relation we try to explore. We use interviews with key respondents who participated in and/or initiated the first welfare meetings in the 1990s. These interviews shed light on the reason why these welfare meetings were organized and the lack of integration that existed in the selected districts before the first welfare meetings were organized.

By doing so, we are able to provide evidence on the effect of shared participant governance on the integration of the service network of our study.

Fieldwork

Our fieldwork started by exploring the three networks in the three districts by questioning key respondents in all organizations. First, these interviews were used to gain more information on the organization of the welfare meetings. We questioned the respondents who were present at or initiated the first welfare meetings in the 1990s. We

gained more evidence on the history of the welfare meetings and why they were organized. Second, the interviews were used to identify the relevant organizations according to our functional criterion. The researcher listed and contacted all organizations that are situated or work in each of the three selected districts. Only those organizations that provide services to social assistance clients were selected. In every district, a list of organizations was produced. Respondents were asked to identify the organizations on the list with which they or their colleagues were in contact. In a following step, respondents had to fill in the extent to which they or their colleagues had received or sent information on clients to/from the selected organizations. Next, we also asked the respondent with which organization they participated in a case coordination meeting. The respondents had to fill in the frequency of contact. We used a six-point scale: (1) very frequently; (2) frequently; (3) occasionally; (4) rarely; (5) very rarely; and (6) never. We reached an overall response rate of 90%. For every district, we constructed three networks: exchange of information; exchange of clients; and participation in case coordination. Then, we combined these networks and constructed a complete network or an ‘any links’ network where a tie among actors referred to one of three ties (informational exchange, client referral or case coordination). This “any links” network was used in our further analyses. We follow Provan and Milward (1995), who also use an ‘any links’ network. In line with other research, we used confirmed relations only. In the literature, the use of confirmed relations is widely acknowledged as a way to increase the accuracy of the analysis (Wasserman and Faust 2004). Therefore, we end up with a very accurate ‘any links’ network for districts A, B and C.

DATA ANALYSIS

A Descriptive Analysis

We first use descriptive measures to examine the level of density and centralization. In this article, we focus on density and centrality measures such as betweenness and degree centrality (Wasserman and Faust 2004). **Density** describes the general level of connection within a network, and centralization refers to the extent to which the ties are organized around a particular focal organization in the network. Density is calculated by the number of all ties that occur in a network divided by the maximum possible exchanges. **Betweenness** centrality views an actor as being in a favored position to the extent to which the actor falls on the paths between other pairs of actors in the network. **Degree** refers to the idea that actors who have more direct ties to other actors may occupy advantaged positions in the network. We calculate these measures at the level of the complete network (Freeman 1978). We also identify the three most central organizations in each network. For this aim, we calculate the betweenness and degree measures at the organizational level. These measures are normalized.

The Effect Of Shared Participant Governance: An Exponential Random Graph Model (ERGM)

When measuring the effect of a range of independent variables on tie formation among nodes in a network, a traditional regression analysis is inadequate (Lusher, Koskinen, and Robins 2013). Regression analysis assumes that the observations are independent, which is not the case for ties in a network (Snijders, et al. 2006; Lusher, Koskinen, and Robins 2013). ERGM provides the opportunity to analyze data on tie

formation, without the assumption that interdependence of observations is necessary (Snijders, et al. 2006; Lusher, Koskinen and Robins 2013).

Exponential Random Graph Models (ERGMs) have three important advantages for our research. First, ERGMs are developed to estimate stochastic models explaining tie formation patterns among nodes in a network. ERGMs allow the researcher to compare the observed network with its random distribution, which means that ERGMs can be used when assessing whether certain attributes contribute more to tie formation among nodes than might be expected by chance alone (Robins and Morris 2007; Lusher, Koskinen, and Robins 2013). In this research, we use ERGM to estimate the probability that organizations that do participate in shared participant governance have a higher chance of developing a tie in comparison with organizations that do not.

Furthermore, ERGMs can be used to explain tie formation at the whole network-level (Lusher, Koskinen, and Robins 2013). When we find a positive and significant estimate of participation and shared governance on tie formation, we have evidence that shared governance will influence dyadic tie formation among service organizations at the level of the whole network.

Finally, ERGMs address the concern that ties in a network are nested in different configurations that can be explained by various attributes (Lusher, Koskinen, and Robins 2013). ERGMs allow the researcher to include endogenous and exogenous variables that could interfere with the effect of shared participant governance on network integration.

An ERGM is based on the selection of parameters that the researcher wants to include in the analysis. A positive and significant effect refers to a high probability of tie formation when a selected characteristic is present in the network. A negative and significant effect has the reverse interpretation. Additionally, odds ratios can be calculated to assess the effect size (Lusher, Koskinen, and Robins 2013). We will use PNET² (Wang, Robins, and Pattison 2009) to perform this analysis.

The fitting of the estimation is executed following Harrigan (2007). We ran the estimation until it met the criteria for an adequate fit for the observed data. According to Harrigan (2007), an adequate fit is generally defined as where the parameter estimates are within the bounds of a reasonable model with the t-statistics for all the configurations in the model at less than 0.1.

In the Tables, we present the parameter estimates of the variables in our model and the standard errors. We include an asterisk (*) where the parameter is at least 1.96 standard errors from zero. This asterisk indicates whether there is a 0.05% chance that the effect can be explained by random chance or error. We also report the odds ratios to provide information about the effect size.

Independent Variable: Participation At Welfare Meetings

Our first independent variable is participation in welfare meetings. We looked at the reports of every meeting in the period 2009-2012. Organizations that participate received a score of '1' others a score of '0'. An organization receives a score of '1' when the

reports show that a representative of that organization was present at three or more meetings during the period 2009 -2012. The meetings are organized four to five times each year.

In the table below, we provide the number of participating organizations for each network. The results show that, proportionally, network A and network C show the highest percentage of organizations participating at the meetings. However, the difference from network B is very small. We therefore conclude that in the three networks, a similar number of organizations is engaged.

We test the effect of participation in welfare meetings on tie formation at the dyadic level. We use the interaction parameter of Pnet (a program for the simulation and estimation of p^* exponential random graph models). This extension allows us to test the effect of welfare meetings at the dyadic level, focusing on the interaction among service organizations participating (or not participating) in welfare meetings rather than on the individual ties of a node. More specifically, we test the chance that two organizations that participate in the meetings form a tie, in comparison with two organizations that do not. A tie is defined as informational exchange (on specific clients), client referral or case coordination. As already stated, we provide more evidence on the integrative capacities of shared governance when we control this effect by adding both endogenous and exogenous variables to our model.

Endogenous Control Variables

As far as the endogenous or structural properties of the network are concerned, we assume that tie formation is dependent on the overall structure of the network. We use the model of Snijders et al. (2006), using four structural variables as an indicator for the latter three structural characteristics. Snijders et al. (2006) make a distinction between Arc/edge, alternating k-star, alternating k- triangle and alternating 2-independent path. The Arc/edge parameter is a density/cohesion statistic that indicates the probability of a tie being observed between two actors. The alternating K-star refers to the extent to which the network is shaped by a star pattern. This measure controls for centrality or embeddedness of certain actors in the network, which can be an important attribute defining tie formation patterns in the network (Gulati 1998). The alternating k-triangle parameter of Snijders et al. (2006) is an indicator of clustering and strength (Malm, Bichler, and Van De Walle 2010). More specifically we add this indicator as it controls for the triangulation effect of ties among service organizations. This alternating k-triangle variable is interpreted as the tendency for triangles to form together in the observed network. If high, the network suggests regions of high triangulation (Snijders et al. 2006) or clustering. Alternating 2-independent path (A2P) is a measure of flexibility. This parameter should be interpreted in combination with the AKT parameter. If this statistic is negative and the alternating k-triangle variable is positive, the network shows a high level of fragmentation. A low level of network closure exists when the network is fragmented in different clusters of nodes. If the A2P parameter is positive and the AKT parameter is also positive, we conclude a high level of “network closure” among ties of service organizations exists (Snijders et al. 2006).

Exogenous Control Variables

Furthermore, we control for exogenous network variables. More specifically, we want to analyze the extent to which participation at welfare meetings will stimulate tie formation when controlling for different homophily effects. We assume that organizations sharing the same characteristics are more likely to develop a tie. Therefore, we control for three variables: membership of the same association; service domain; and size (Atouba and Shumate 2010). A first homophily variable refers to the membership of organizations of the *same association*. In Antwerp, many organizations are affiliated with the same association. These associations comprise different local organizations and are mostly founded and subsidized by large umbrella organizations. Some of these associations are ideological and embody a Christian, liberal or socialist ideology. Other associations are the Centres of General Welfare and the Public Centres of Social Welfare.

We assume that organizations belonging to the same association show a higher tendency to group together and thus are likely to develop more ties among each other (Atouba and Shumate 2010). In the Table below, we provide figures on the percentage of organizations in each of our networks that share the same association.

In addition we also control for the fact that some organizations share the same service domain. We assume these organizations are likely to develop ties because they are interested in improving the well-being of the same target group or the same type of client problems. We distinguish the following service domains: employment and education; housing; children; youth and families; health care; community centers;

financial and/or material services; people with foreign background and “other.” In Table 3, we present the number of organizations identified in each service domain.

Finally, we included the number of social workers working for the organization as an indicator of organization size. We assume that organizations of the same size tend to collaborate more amongst each other than organizations of different sizes (Atouba and Shumate 2010). In the following Table we present the distribution of organizations according to their size.

Goodness Of Fit

In a final step we assess the goodness of fit of our model. We follow Snijders et al. (2006) and Lusher, Koskinen, and Robins (2013) and analyze the goodness of fit by measuring the extent to which our model is able to explain parameters that are not included in the model. We will evaluate the goodness of the variables presented in Table 5. Here we follow Snijders et al. (2006); when the t-statistic of the variables are below 2.0, the observed model shows a good fit and is able to explain the variation of the dependent variable.

RESULTS

In the following paragraphs we discuss our results. We present descriptive statistics and the results of the ERGMs. We start with an analysis of when and why the welfare meetings in the three selected districts were initiated.

Welfare Meetings In Three Districts

In District A, social workers from a local neighborhood center initiated the welfare meetings. According to these social workers, the first meetings were organized in that district in the 1990s. The neighborhood center was confronted with very complex target groups of poor clients suffering from very complex problems such as a lack of quality housing, lack of money and health problems. To overcome these “wicked problems” social workers began building a network to improve collaboration. They believed that when collaboration, in terms of informational exchange, client referral and case coordination, improves, the network will provide better services to address the problems with which their clients are confronted.. This situation was also described by other respondents in District B and District C. These social workers emphasized that the welfare meetings started from the need to “sit together” and to “improve collaboration.” In network C, for example, the meetings started in 1985 as a small set of organizations discussing health related topics. However, the participants realized that they had to focus on other welfare related topics, such as housing, financial problems, homelessness, vandalism and child support. Additionally, the respondents who initiated the meeting stated that informational exchange, client referral and case coordination must improve.

One respondent states:

“Yes, our main aim was opening up the services from other organizations, to make them more responsive towards the needs of the most vulnerable target groups. This means that organizations think more in terms of collaboration. That when they meet a client they are unable to help, that they send them to the right organizations, that they give information

etc... Welfare meetings are aimed at getting to know the other organizations, and to gain more information on how the other organizations work and how clients must be referred, just (...) to sit together and talk, to exchange information.”

This statement is representative of the other interviews we did with the key respondents in networks A, B & C. We conclude that the welfare meetings in all selected districts were initiated to improve collaboration in the district. Social workers, managers, volunteers and other key representatives felt that at the time of the first welfare meetings more collaboration was necessary and that organizations must be “educated” to gain a culture of collaboration. Some of them stress that the service organizations had been “living on isolated islands.” However, we must stress that although welfare meetings in the early 1990s were initiated by one or two service organizations, these organizations merely had a facilitating role. The discussion, agenda, and topics were determined by all of the members of the meeting. After some years, a steering group took on the main responsibility for organizing the meetings.

In the next section, we discuss our quantitative analysis conducted to test our hypothesis on the integrative capacities of a shared participant governance.

Descriptive Results

In this section we present the descriptive findings of the social network analysis we conducted in three networks. The figure below presents the three networks using Netdraw 2.090. We noticed that in the three networks, ties are centralized around a core

of nodes. This observation is supported in Table 6, where the density and centrality measures are presented.

Density is measured as the ratio of ties to the number of possible ties. Interestingly, we find that three networks are characterized by a low density. In the networks, approximately 12 to 14% of possible ties are present. Next, we calculate the centralization measures at the level of the whole network. We focus on the degree and betweenness. Overall network measures can be interpreted as the level of inequality in centrality among nodes in the network Freeman (1978). The three networks have a relatively high level of centrality. This means that most of the ties among service organizations are concentrated among a single node or a core group of organizations. The degree shows large differences between A on one hand and B and C on the other. The degree of network A is much lower than the degree of networks B and C. The betweenness shows high differences among networks A and C. The betweenness scores of networks A and B are comparable, with a slightly higher score for the latter district. At this point we conclude that network A is less centralized than networks B and C. Network C has the highest centralization score. This means that the ties of service organizations are more centralized among one or few nodes in the core of the network.

We conclude that in the three networks a set of organizations with very advantageous network positions can be identified. We state that a non-brokered governance regime does not automatically imply a flat network structure (Provan and Kenis 2008). We argue that when focusing on service delivery ties, central organizations

are very influential when they offer crucial resources to the other organizations of the network. However, we cannot state that these central organizations act as a leading governing actor in the network. In the Table below, we present the most central organizations for each of our networks. Due to limited space, we are not able to provide the full results. We only identify the three most central organizations. We use the betweenness and degree measures. In the three districts the public centers of social welfare are very central. These centers provide a guaranteed subsistence income to people in poverty. We also notice that community centers have a very advantageous position in network A and C. These centers provide all sorts of leisure activities. They refer clients with multiple problems to different organizations in the districts. We also notice that the community center of network C has a very high centrality degree and betweenness score. This organization has an advantageous position in this network. Next we show that in network B a street corner worker and in network A an employment agency are very centralized.

Ergm Results

In a second step we estimate the ERGMs. We estimate the effects of the structural and node attribute variables on the formation of a tie among two service organizations. A “tie” can refer to informational exchange, client referral or case coordination. The results of our analyses are presented in Table 8. We estimate three models to explain the formation of a tie among service organizations. In the first model, we include the four structural variables. We report the estimate, odds ratio (effect size) and p-value. An asterisk refers to a level of statistical significance of $p < 0,05$.

The variable “edge” is negative and significant in all three networks. The AKS parameter is non-significant. This result means that no significant star structure exist in the three networks. Interestingly, we find a positive and significant effect of the Alternating k-triangle variable. This result indicates that in the three networks the ties among service organizations are shaped in a cluster-like pattern of “clumps” of triangles (Robins and Morris 2007). This finding must be interpreted according to the descriptive findings. The descriptive analysis concluded that the three networks show relative high scores for betweenness and degree. The ERGM analysis shows that the three networks are also characterized by a high level of clustering. We therefore conclude that the clustering among service organizations is situated in the centralized core of the networks, showing a core-periphery network structure.

Moreover, we interpret the estimation of the AKT-parameter in accordance with the alternating independent k-2 path variable. This parameter is positive and significant in networks A and C. In these networks we find a high level of “network closure,” which is an indication that the service organizations in these networks are more highly connected compared to network B. In the next model in Table 8 we add three more variables to our model: the domain of the service organization; the size of the organization; and its membership in associations. We test whether organizations that share the same domain, size or association tend to show a higher possibility of forming ties. The model shows that in the three networks the variable service domain has a positive and significant effect. The variable “size of organization” shows a very small coefficient in case A and is negative in case B and C. This seems to imply that big organizations collaborate with

small organizations. There is no evidence that organizations with equal sizes have a higher possibility to form a tie. The variable “participation in the same association” is not significant.

In the third model we add the effect of “participation in welfare meetings.” Here, we test the hypothesis that organizations that participate regularly in welfare meetings have a higher possibility of forming a tie in comparison with organizations that do not participate.

Model 3 in Table 8 shows that for networks A and B, our hypothesis is supported. In both networks, the parameter shows a positive and significant effect. The odds ratio (OR) can be interpreted as a measure for effect size. In network A, the OR for “participation in welfare meetings” is 2.23. This results indicates that organizations that participate in shared participant governance have, in comparison with organizations that do not participate, a 2.23 higher chance to exchange information, refer clients or engage in case coordination meetings. In network B, organizations that participate have, in comparison with organizations that do not participate, a 1.63 higher chance to form a tie. In network C the effect of “participation in welfare meetings” is not statistically significant. Therefore, we find support for H1 in network A and B. In both networks, service organizations that participate in the welfare meetings have a statistically significant higher chance to form a tie in comparison with service organizations that do not participate.

We thus confirm the findings of Lindencrona, Ekblad, and Axelsson (2009) and Foster-Fishman et al. (2001), arguing that a shared participant type of governance creates a culture of participation among service organizations and therefore is able to increase the integration of the network. We notice that in two out of three networks that shared a participant type of governance can explain a significant amount of tie formation in the network. This implies that welfare meetings can play an important role for resource exchange among service organizations (Foster-Fishman et al. 2001).

However, we notice that the estimate of “participation in welfare meetings” in network C is not significant. This result seems puzzling. We have already noted that the three networks are highly centralized. This means that a core set of organizations is situated in the center of the network. This result is confirmed by the very strong and positive significant effect of the alternating K-triangle in network C. We could assume that the absence of a positive and significant coefficient of shared participant governance in network C can be explained by the fact that the central organizations do not participate in the welfare meetings. To analyze this assumption, we identified the most central organizations and assessed whether they participate in the welfare meetings. The results are shown in Table 9.

In networks A and B, all of the actors in the core of the network actively participate in the welfare meetings. In network C, however, there is one actor with a very central position in the network, and that actor does not participate in the welfare meetings regularly. This community work service actor has a very central position in the network.

It refers clients to a wide range of organizations in the district and provides information to different service organizations. Although this actor seems to be very important for network C, it appears not to participate actively in the welfare meetings. We argue that this finding contributes to the non-significant effect of shared participant governance on tie formation in network C. These results indicate that the effect of a shared participant type of governance should be nuanced. We could hypothesize that a shared participant type of governance can only have a positive effect when very central actors participate and share their expertise and resources with others in the network. This is in line with studies emphasizing the important role of centrality in the network (Benson 1975). The advantageous position of central organizations is already explained by Marsden and Lin (1982) and Burt (1976, 2002). Following their arguments, we argue that in a shared participant type of governance, central service organizations are able to contribute actively to tie formation among service organizations. They are able to share the “richness” of the information they gather based on their very advantageous position. The participation of very central actors in a shared participant type of governance is crucial because they offer very useful information to other organizations in the network. They make connections among actors and they provide the network with different and very necessary resources. Therefore, we assume that when these brokers do not participate, the integrative capacity of the network governance will diminish.

As a last test of our models, we take a look at the goodness of fit measures. As we already stated above, goodness of fit is evaluated by analyzing the extent to which the model also explains parameters that are not included in the model. Table 10 below shows

that the models explain most of the non-observed network characteristics. When we take a look at the goodness of fit measures of model 3, where we add the effect of “participation in welfare meetings,” we see that for networks A and B all characteristics are explained. Moreover, we notice that after adding the variable “participation in welfare meeting” in model 3 the goodness of fit of the models for networks A and B improves in comparison with the goodness of fit in model 2. For network A, the t-statistics of the standard degree distribution shows a value below 2.0 in model 3 and a value higher than 2.0 in model 2. For network B, the t-statistic of 3-Stars lowers from 2.488 in model 2 to 0.319 in model 3.

Only for network C the t-statistics do not show a good fit of our model.

CONCLUSION

In this article we argue that a shared participant type of governance has a positive impact on the integration of networks among service organizations (Provan and Kenis 2008). This type of inter-organizational coordination mechanism is common among networks of service organizations (Foster-Fishman et al. 2001; Provan and Kenis 2008; Lindencrona, Ekblad, and Axelsson 2009). As service organizations are confronted with heterogeneous target groups suffering from multiple problems, shared participant types of governance are indispensable for facilitating integration among service organizations. In well-integrated networks, service organizations easily gain resources from other network partners by exchanging information, referring clients or engaging in case coordination meetings. As a result, the responsiveness of the complete network towards a complex and

common target group increases. Whereas most studies mainly focus on formal types of network governance and the integrative role of leading organizations and NAO's, we follow the suggestion made by Isett et al. (2011) by taking informal types of network governance into account. Our second contribution is that we use advanced network analysis methods to explore whether tie formation can be influenced by network governance, controlling for both structural and homophily variables. Research shows that different variables have an effect on tie formation among organizations (Gulati 1998). These serendipitous network trajectories mostly result in poorly integrated and decentralized networks (Kilduff and Tsai 2003). The Exponential Random Graph Models offer the opportunity to assess the extent to which governance can influence tie formation, despite the serendipitous effects of both structural and homophily variables.

We conclude that our results show mixed support for the integrative capacity of a shared participant type of governance. The results show that in networks A and B shared participant governance has a positive effect on tie formation, controlling for both endogenous and exogenous variables. Here we support earlier findings that active network governance is critical to network performance (Provan and Milward 1995; Lindencrona, Ekblad, and Axelsson 2009). Without an active type of governance, the integrative forces in the network may be weak. This may result in limited gains for network members or even negative effects for network performance.

In network C, the welfare meetings have no effect on tie formation. We hypothesize that the lack of an integrative governance mechanism in this network must be explained by

the absence of central actors. Central actors were not willing to participate in the welfare meetings. In the literature, the role of central actors has been extensively illustrated (Benson 1975; Burt 1976, 2002; Provan and Milward 1995). The central actors act as a “broker” connecting different parts of a network. They connect organizations in the network and offer unique and necessary resources to other actors.

We assume that in the case of network C, the network actors are less satisfied with the welfare meetings, and therefore that some of the most central actors do not participate. Following the work of Benson (1975); Marsden and Lin (1982) and Burt (1976, 2002) we argue that the advantageous position of central organizations allows them to contribute actively to the integration of service organizations in a network. We hypothesize that the integrative capacity of a shared participant governance is largely dependent on the extent to which governance is able to convince central service organizations to participate. We note four limitations of our research. First, we have not included the perspective of individual social workers and network managers in our research. Following Torenvlied and Akkerman (2012) we assume that in local networks managers and social workers experience a certain “degree of freedom” when representing their organization in the network. We can assume that the individual preferences and capabilities of participating individuals have a profound influence on the way ties among organizations are developed. Therefore, further efforts must focus on the extent to which the integrative capacities of shared participant governance are mediated by the network capabilities of different organizational representatives.

Next, we have not included other types of network governance into our analysis. In this article we measured the extent to which organizations that do participate in welfare meetings show a higher chance of developing a tie in comparison with organizations that do not participate. We are, however, unable to make a statement on the extent to which shared participant governance has more or less integrative capacities in comparison with an NAO or lead-organization governance. We emphasize that more comparative work must be conducted to provide these types of results. Earlier studies have only focused on NAO or lead-organization types of governance. However, in this article, we show that shared participant governance is able to reach results in terms of network integration, which means that this type of governance needs attention in future comparative research studies on network governance.

Furthermore, one may question the use of cross-sectional data when exploring a causal relations. Starting from the notion of pluralistic causality (Reiss 2009), and by including more background information (Wunsch, Russo, and Mouchart 2010) and qualitative data (Howe 2012), we believe we have made a significant contribution to the exploration of the causal effect of shared participant governance on network integration. However, we argue that additional evidence on the relation between governance and network integration can be delivered by a longitudinal analysis. We suggest that further research must gather data before and after a shared participant governance is initiated. By using this method, additional evidence can be gathered on the integrative capacities of shared participant governance. However, we emphasize that in the case of a longitudinal analysis

background variables must be taken into account when measuring the effect of governance on the integration of a network among service organizations.

Finally, the client perspective is absent in our analysis. Following the integration hypothesis of Rosenheck et al. (1998) and the work of Provan and Milward (1995) we could assume that the more integrated the network of service delivery ties, the more the network is able to respond to the wicked problems of vulnerable target groups. Further analyses must investigate the extent to which a shared participant governance that is able to positively influence network integration among service organization will produce a positive impact at the client-level.

Despite these shortcomings, we emphasize that this article provides a starting point for further research on ways to improve collaboration among service organizations. By using ERGMs and focusing on cases where a shared participant type of governance is used to build an integrated network, we make a significant contribution to public administration literature. Thus, we gain more insight on how policy makers and service providers can combine their efforts to establish an effective integration of services that are able to help service organizations to deal with the “wicked problems” with which their target group is confronted.

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NOTES

¹ Multiplexity means that organizations are tied with more than one type of tie (informational exchange and client referral).

² PNEt (Wang, Robins, and Pattison 2009) is a program for the simulation and estimation of exponential random graph models (ERGMs) for social networks.

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Table 1. Number of organizations participating in welfare meetings

	Number of organizations participating in welfare meetings	Number of participants/total amount of organizations in the network (%)
A	21	42%
B	28	38%
C	30	42%

Table 2. Participation in the same association

	% of organizations sharing the same association
Network A	70%
Network B	48%
Network C	56%

Table 3. Amount of organizations per service domain in the network

Service domain	A	B	C
<i>Employment and education (employment counseling)</i>	8	11	9
<i>Housing (e.g. social housing)</i>	3	6	3
<i>Children, youth and their families (Parental counseling, childcare)</i>	6	10	16
<i>Health care</i>	20	18	17
<i>Community centers (leisure activities and volunteering work)</i>	4	2	1
<i>Financial and material services</i>	3	5	8
<i>Service to people with foreign background (leisure and group activities)</i>	0	16	4
<i>Services to people addicted to drugs</i>	0	0	5
<i>Other</i>	7	4	8
<i>Totaal</i>	49	72	71

Table 4. Size of the organization

Number of social workers	A	C	D
1	26	17	21
1-5	9	36	17
>5	14	19	33
Total	49	72	71

Table 5. Goodness of fit measures

2-star
3-star
4-star
5-star
triangles
3Path
4Cycle
Std Dev degree dist
Skew degree dist
Local clustering
Global clustering

Table 6. Descriptive analysis

	N	Density	Degree	Betweenness
Complete network A	49	14%	28.72%	14.27%
Complete network B	72	12%	41.68%	19.67%
Complete network C	71	13%	41.57%	26.82%

Table 7. Central organizations in three networks according to betweenness and degree

Name of network	Name of organizations	description	Betweenness	Degree
A	Public center of social welfare	Financial and material services to social assistance clients	0.167	0.417
	Employment agency	Employment counselling	0.123	0.123
	Community center	Leisure and volunteering activities for people in poverty	0.143	0.143
B	Public center of social welfare	Financial and material services to social assistance clients	0.213	0.479
	Public center of social welfare	Provides financial and material services to social assistance clients	0.104	0.423
	Street corner worker	Street corner work for drug addicts	0.104	0.211
C	Community center	Leisure and volunteering activities for people in poverty	0.282	0.535
	Public center of social welfare	Financial and material services to social assistance clients	0.153	0.535
	Public center of social welfare	Financial and material services to social assistance clients	0.081	0.081

Table 8. ERG-Models

	Model 1						Model 2						Model 3					
	A		B		C		A		B		C		A		B		C	
	Est.	OR	Est.	OR	Est.	OR	Est.	OR	Est.	OR	Est.	OR	Est.	OR	Est.	OR	Est.	OR
Edge	-3,93	0,02	-3,87	0,02	-4,00	0,02	-4,19	0,02	-2,96	0,05	-3,99	0,02	-3,39	0,03	-4,32	0,01	-4,05	0,02
	(1.18)*		(0.73)*		(0.84)*		(1.18)*		(0.85)*		(0.84)*		(1.38)*		(0.99)*		(0.97)*	
Alternating k-star	0,10	1,11	0,16	1,17	-0,24	0,79	0,19	1,21	-0,12	0,87	-0,24	0,79	-0,06	0,94	0,25	1,28	-0,24	0,79
	(0.10)		(0.31)		(0.24)		(0.33)		(0.33)		(0.28)		(0.38)		(0.27)		(0.27)	
Alternating k-triangle	0,54	1,72	0,45	1,57	1,26	3,53	0,44	1,55	0,41	1,51	1,26	3,53	0,40	1,49	0,59	1,80	1,27	3,56
	(0,13)*		(0,11)*		(0,13)*		(0,12)*		(0,12)*		(0,73)*		(0,12)*		(0,09)*		(0,12)*	
Alternating independent k-2 path	0,08	1,08	0,02	1,02	0,03	1,03	0,86	2,36	0,09	1,09	0,03	1,03	0,08	1,08	0,01	1,01	0,03	1,03
	(0,02)*		(0,06)		(0,01)*		(0,03)		(0,06)		(0,06)*		(0,04)*		(0,03)		(0,01)	
Domain							0,78	2,18	1,26	3,53	0,22	1,25	0,71	2,03	1,04	2,83	0,23	1,26
							(0,09)*		(0,18)*		(0,09)*		(0,19)*		(0,12)*		(0,10)*	
Size of the							0,02	1,02	-0,43	0,65	-0,06	0,94	-0,12	0,89	-0,43	0,65	-0,04	0,96

organizati on																		
							(0.20)		(0.18)*		(0.14)		(0.16)		(0.11)*		(0.14)	
Participation in the same association							-0,20	0,82	-0,32	0,73	0,29	1,34	0,14	1,15	-0,19	0,83	0,29	1,34
							(0.18)		(0.20)		(0.19)		(0.20)		(0.12)		(0.17)	
Participation in welfare meetings													0,8	2,23	0,49	1,63	0,08	1,08
													(0.19)*		(0.13)*		(0.10)	

Est: estimate

OR: Odds Ratio

()*: $p < 0.05$

Table 9. Central organizations and participation in welfare meetings

Name of network	Name of organizations	description	Participation at welfare meetings
A	Public center of social welfare	Financial and material services to social assistance clients	Yes
	Employment agency	Employment counselling	Yes
	Community center	Leisure and volunteering activities for people in poverty	Yes
B	Public center of social welfare	Financial and material services to social assistance clients	Yes
	Public center of social welfare	Provides financial and material services to social assistance clients	Yes
	Street corner worker	Street corner work for drug addicts	yes
C	Public center of social welfare	Financial and material services to social assistance clients	Yes
	Public center of social welfare	Financial and material services to social assistance clients	Yes
	Community center	Leisure and volunteering activities for people in poverty	No

Table 10. Goodness of fit

		Model 1			Model 2			Model 3	
	A	B	C	A	B	C	A	B	C
Edge	-0.059	-0.058	-0.064	-0.076	-0.160	0.074	-0.059	-0.034	0.224
2-star	0.478	0.687	1.197	0.450	1.070	1.151	0.461	0.163	1.371
3-star	0.848	2.081	2.570	0.839	2.488	3.087	0.797	0.319	1.815
4-star	0.474	4.572	1.813	0.642	1.832	6.291	0.705	0.357	0.877
5-star	0.123	8.722	1.033	0.274	1.051	1.1092	0.427	0.325	0.340
triangles	0.576	1.697	2.642	0.462	2.543	2.435	0.262	-0.018	2.824
4Cycle	1.703	2.665	4.370	1.510	-0.999	4.248	1.306	0.897	4.638
Alternating k- star	-0.058	-0.060	-0.069	-0.080	-0.096	-0.163	-0.061	-0.031	0.224
Alternating k- triangle	-0.058	-0.011	-0.064	-0.080	-0.096	-0.163	-0.061	-0.031	0.224
Alternating k-2 independent path	0.050	-0.060	0.026	0.001	-0.071	-0.158	-0.068	-0.032	0.217
Std. Degree distribution	2.258	5.536	5.224	2.021	0.707	4.337	1.571	0.699	2.233
Skewness degree distribution	0.338	4.175	0.697	0.373	0.973	0.712	0.393	0.717	0.180
Global	0.669	5.105	5.788	0.367	-0.085	6.251	-0.163	-0.154	5.122

clustering									
Local Clustering	1.515	1.895	2.800	1.558	1.789	2.954	1.257	1.902	2.185
Service domain				-0.011	-0.086	-0.152	-0.024	-0.032	0.145
Same association				-0.015	-0.008	-0.188	0.013	0.006	0.236
Size of the organization				-0.078	0.005	-0.148	-0.013	0.035	0.195
Participation in welfare meetings							-0.060	-0.071	0.242

Figure 1. Three networks

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