



## Coordination Networks among Local Human Service Organizations: Insights into Super-Connectors and Barriers

Wonhyung Lee , Charalampos Chelmiss & Kirsten DiNicola

To cite this article: Wonhyung Lee , Charalampos Chelmiss & Kirsten DiNicola (2020): Coordination Networks among Local Human Service Organizations: Insights into Super-Connectors and Barriers, Journal of Social Service Research, DOI: [10.1080/01488376.2020.1792028](https://doi.org/10.1080/01488376.2020.1792028)

To link to this article: <https://doi.org/10.1080/01488376.2020.1792028>



Published online: 04 Aug 2020.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

# Coordination Networks among Local Human Service Organizations: Insights into Super-Connectors and Barriers

Wonhyung Lee<sup>a</sup> , Charalampos Chelmis<sup>b</sup> , and Kirsten DiNicola<sup>a</sup> 

<sup>a</sup>School of Social Welfare, University at Albany, State University of New York, Albany, New York, USA; <sup>b</sup>Department of Computer Science, University at Albany, State University of New York, Albany, New York, USA

## ABSTRACT

This article examines service coordination patterns across various service areas in Albany, the capital city of the New York State. Based on 42 in-person interviews with executive directors at various human service agencies, inter-organizational network was constructed and analyzed. The network displayed sparse and multipolar connectivity, suggesting that organizations operate in silos, with few organizations holding key positions of structural importance in the network architecture (so-called “super-connectors”). In addition, content analysis drew qualitative insights into perceived challenges to coordinate services. Several factors, both external (e.g., lack of trust or centralized communication system) and internal (e.g., lack of resources or knowledge) might have contributed to the observed structural properties. This finding suggests further examining the role of super-connectors in future research to better understand why these hubs exist and how they can work with other organizations in a cooperative and mutually beneficial manner.

## KEYWORDS

Human service organizations; service coordination; network analysis; super-connectors; barriers; elite power structures

## Introduction

Coordination of services has been a long quest in the human service profession. Since the 1970s, welfare policies in the United States have emphasized coordination as a solution to reform the inefficiencies experienced in service delivery and funding use (Jennings & Krane, 1994; Press, 2019). At the same time, there has been an increased need of coordination among service providers as health and other service systems moved in the direction of community-based and in-home care settings rather than the institutionalized setting (Simmons, 1994). More recently, care coordination continues to be encouraged under the Affordable Care Act as part of promoting a comprehensive, person-centered, preventive care model as opposed to an acute, disease-focused, reactive care model (Golden, 2011).

Despite the political encouragements, however, human service organizations (HSOs) operating in the same local area often face the dual pressure to compete as well as work with one another

(Bunger, 2013; Guo & Acar, 2005; Provan et al., 2005). In fact, it has long been suspected that HSOs may be operating in a relatively self-contained manner, leading to a potentially redundant, confusing, or incoherent configuration of services (Fredericksen & London, 2000; Horvitz-Lennon et al., 2006). As part of attempts to decipher the local working relationships among HSOs, scholars have recently adopted network analysis as an effective method for structural and visual understanding. More specifically, several studies examined rural mental health services for farmers (Fuller et al., 2007) and human services for children (Bunger & Huang, 2019; Colvin et al., 2018; Leroux et al., 2019) using network analysis.

Considering that the previous studies focused on service coordination within a single area of service (e.g., mental health, childcare), this study aims to expand the scope to multiple areas of service. For example, would a childcare agency coordinate services with a homeless service agency? Would they share an overlapping service

hub? In such an open environment, which and what kind of organizations would play a central role in connecting others? And what potential challenges exist for organizations to coordinate services? This research aims to examine these questions using empirical data from local HSOs. The next section provides an overall context for human service coordination and its relation to interorganizational network.

### Literature review on coordination networks

Coordination implies two or more organizations working together for their common interest or benefit. For example, Bunker (2010, p.386) suggested a definition of coordination as “a joint process of taking action whereby organizations adjust in response to one another to accomplish shared tasks or goals.” In comparison to related concepts such as collaboration or cooperation, coordination implies that there are more concrete actions or tasks involved such as services, programs, or events. Scholars in fact have discussed specific resources that might be exchanged among organizations in the context of coordination, some involving service delivery resources (e.g., client referrals, information exchange regarding specific clients) and others involving administrative resources (e.g., money, staff) (Bolland & Wilson, 1994).

In the context of direct practice, coordination of services has been particularly integrated in certain fields. For example, Dunst and Bruder (2006) discussed that the term *case management* was changed to *service coordination* as part of the reauthorization of the Individuals with Disabilities Education Act in 1990 and that since then service coordination was mandated in the field of early intervention. In addition, *care coordination* implies an effort to facilitate service delivery in the health care field. Summarizing more than 40 distinct definitions of care coordination, scholars proposed a working definition of care coordination as, “the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services.” (McDonald et al., 2007, para. 9). Albeit limited to the context of health

care, the systematic review of care coordination revealed that coordination can be measured through instruments such as “transfer information,” “communicate,” “assess needs and goals,” and “establish accountability or negotiate responsibility,” which are also applicable to the overall function of coordination in other contexts (Schultz et al., 2013).

Considering that coordination involves concrete actions (e.g., share, transfer, exchange, communicate) among multiple participants, interorganizational network has been recognized as an important indicator of coordination (Nowell, 2009; Rivard & Morrissey, 2003). Bolland and Wilson (1994) particularly argued that the degree of structural integration of an interorganizational system is positively correlated with the degree of coordination. In this regard, network analysis is an insightful methodology for examining the current links among organizations and for identifying room for coordination opportunities (Provan et al., 2007). In fact, this goal is aligned with the major premise in network analysis that “the structure of relations among actors and the location of individual actors in the network have important behavioral, perceptual, and attitudinal consequences both for the individual units and for the system as a whole.” (Knoke & Kuklinski, 1982, p. 13).

The examination of networks among organizations dates back to as early as the 1930s, but the formal development of network analysis in analyzing social structure began maturing in the 1970s (Nohria & Eccles, 1992). Since then, networks have been examined in various organizational environments, including entrepreneurship, natural resource management, and healthcare (e.g., Guo & Acar, 2005; Krackhardt, 1990; Wang et al., 2014), offering critical insights into how organizations relate to one another on a basis of power and influence, as well as how organizations create collaborations to manage competition or resource interdependencies. More recently, network analysis was adopted in examining the relationships among service organizations at a local level, mainly focusing on rural mental health services for farmers (Fuller et al., 2007; Provan & Sebastian, 1998) and human services for children (Bunker & Huang, 2019; Colvin

et al., 2018; Leroux et al., 2019). Specifically, Fuller et al. (2007) investigated connections among farming families and rural agricultural support workers (i.e., financial or drought specialists who have trusted relationships with the families) to identify relationships and innovative ways to address mental health gaps in rural and remote areas. Bunger and Huang (2019) was able to explore the relationships of coordinated provider organizations or “organizational cliques” for children’s services within a community and examine the way funding increases impact change in clique structure and alliances. Another study utilized network analysis to inform what the landscape of child maltreatment services looked like and provided transparency in gaps and areas for opportunities in growth and collaboration among agencies (Colvin et al., 2018). Leroux et al. (2019) focused on accountability in networked service delivery and demonstrated that front-line workers play an important role in contributing to informal accountability structures, especially in the prevention of breakdown in formal accountability.

Overall, the research on organizational network of human services is fairly recent. This study fills in a knowledge gap primarily in two ways. First, this study observes organizational relationships across various areas of human services. While existing studies examined networks within a specific service area (e.g., mental health, childcare), research on networks spanning multiple service areas is lacking. Second, our study has a specific focus on the aspect of service coordination, as opposed to other broader concepts such as collaboration or partnership. By asking HSOs with whom and how they coordinate services, this study aims to reveal cross-service coordination patterns and the challenges associated with them.

## Method

This study collected data through in-person interviews with HSOs in Albany, the capital city of the New York State, to understand the patterns and challenges involved with their service coordination. The collected data was then analyzed using mixed-methods. First, network analysis was

conducted to examine the attributes of the relationships among HSOs. In addition, content analysis was conducted to draw qualitative insights into the challenges of coordinating services. Below the process of data collection and analysis is described more in detail.

## Sample

The information on local nonprofit service organizations was first collected from a number of online databases, such as Great Nonprofit, GuideStar, and the National Center for Charitable Statistics, which served as a cross reference to one another. The dataset was limited to human services and community improvement organizations in Albany, New York.<sup>1</sup> These procedures identified 757 organizations. For manageability of the recruitment process, the original sample was scaled down by approximately 1/10 in a way that it would represent organizations at various service and technological capacities. To do so, stratified sampling was applied using available information on such as budget size, scope of services, and usability of website. As a result, 70 HSOs remained in the list for initial recruitment.

In the first phase, 32 organizations responded positively and participated in the interviews with a response rate of 45%. Using a snowball sampling method, 33 additional organizations were recommended by the initial interviewees. From this second phase of recruitment, 11 organizations responded positively and participated in the interviews with a response rate of 33%. As a result, 42 in-person interviews were conducted with respondents who were predominantly executive directors, if not assistant directors, program directors, or founders of an organization. The majority (35 out of 42) of organizations identified themselves as nonprofits, including 6 religious and 28 nonreligious nonprofits along with 1 social enterprise, 5 government programs, and 2 “other” types of organizations, which included “a local chapter of a national organization” and “a non-profit with a for-profit arm.” The size of the organizations also varied: in terms of the size of employees, approximately 55% had 1-25 employees, 16% had 26-49 employees, and 18% had more than 50 employees.

## Instruments

The interview included both closed and open-ended questions. Closed questions focused on organizational characteristics and scale questions that assess the level of preference, easiness, or difficulties, such as “How easy is it for you to find other organizations that would coordinate services with you?” “How easy is it for you to actually coordinate services with those organizations?” “What are the top 5 organizations that your organization works most closely with in terms of service coordination?” Open-ended questions included “At the moment, what do you think is the biggest issue for multiple organizations to coordinate services in Albany?”

## Procedure

The research plan was approved by the Institutional Review Board of the authors' university. The identification of organizations, sampling, recruitment, and interviews were conducted from the fall of 2017 to the spring of 2018. Interviews ranged from 30 minutes to 1.5 hour and were audio recorded upon permission. The answers to the open-ended questions were transcribed. The interview data was analyzed between the fall of 2018 and the summer of 2019.

## Data analysis

### Network analysis

Based on the question, “what are the top 5 organizations that your organization works most closely with in terms of service coordination,” organizational network was analyzed in three aspects: sparsity, centrality, and multipolarity. The descriptive characteristics of the networks revealed how sparsely organizations were connected within and across service areas. A variance of relative diameter was calculated by using as edge length between two nodes and the shortest path between such nodes.

Second, the degree of centrality was examined to identify organizations important both for the connectivity of the network and information flow over it. To identify nodes that create shortcuts and hubs that connect otherwise distant nodes, the closeness, eigenvector, and betweenness

centrality scores (Borgatti et al., 1998) were computed for all nodes in the network. In addition, the rich-club phenomenon (Zhou & Mondragón, 2004) was tested to examine the extent to which well-connected nodes also connect to each other.

Third, community detection was performed, which refers to the problem of partitioning a network into clusters (i.e., groups of nodes), with many edges joining vertices of the same cluster and comparatively few edges joining vertices of different clusters. A large number of methods have thus far been proposed to address this problem (Fortunato, 2010). The quality of the partitions resulting from such methods is often quantified as a scalar value between  $-1$  and  $1$  that measures the density of links inside communities as compared to links between communities. Formally, modularity is defined as:

$Q = \frac{1}{2|E|} \sum_{i,j} \left[ A_{ij} - \frac{d_i d_j}{2|E|} \right] \delta(c_i, c_j)$ , where  $A_{ij}$  indicates the existence of an edge between nodes  $i$  and  $j$ ,  $d_i = \sum_j A_{ij}$  is the number of edges attached to node  $i$ ,  $|E|$  is the total number of edges in the network  $c_i$  is the community node  $i$  is assigned, and function  $\delta(x, y)$  is 1 if  $x=y$  (i.e., if nodes  $i$  and  $j$  are assigned to the same community) and 0 otherwise. Apart from an evaluation measure, modularity has been extensively used as an objective function to optimize so as to obtain reasonably good partitions (Fortunato 2010). The node  $i$  is then placed in the community for which this gain is maximum (in case of a tie, a breaking rule was used), but only if this gain is positive. If no positive gain is possible,  $i$  stays in its original community. This process is applied repeatedly and sequentially for all nodes until no further improvement can be achieved and the first phase is then complete (Blondel et al., 2008).

To quantify the structural importance of such groups and therefore understand their role in the architecture of the HSO network, the Gini coefficient (Atkinson, 1970) was calculated, a summary statistic of the Lorenz curve, which is in turn used to visually assess how far a distribution is from the uniform distribution. Specifically, the Gini coefficient was computed as  $G$  as follows:  $G$  is computed as the ratio between the area enclosed by the main diagonal (often called the



“line of equality”) and the Lorenz curve, and the total triangular area under the line of equality. It varies between 0 and 1, with 0 indicating perfect equality. Formally, given a set of ordered values

$$x_1 < x_2 \dots < x_n \text{ with mean } \mu, \quad G = \frac{\sum_i \sum_j |x_i - x_j|}{2n^2 \mu}.$$

In our case, values  $x$  are the average PageRank scores.

Gephi, an open-source and free network analysis and visualization software package was used for visualization purposes, whereas all network analysis was conducted using Python and NetworkX (<https://networkx.github.io/>), a Python library for the study of the structure, dynamics, and functions of complex networks.

### Content analysis

The qualitative content of the interviews was analyzed using NVivo software. The first and third authors worked independently to review participants' responses to the open-ended interview questions and coded repeated or meaningful concepts, phrases, and key words. Next, the researchers compared their respective codes and organized them into themes through an interactive process. The themes then were categorized into the two dimensions of an organization's environment (i.e., external and internal) because the themes identified as the challenging factors for service coordination were distinctively affecting either the outside- or the within-dynamics of an organization.<sup>2</sup> After analyzing the themes, the concepts that appeared to be interrelated were mapped into a causal loop diagram to gain insight about how those concepts are associated with one another and in relation to service coordination. Causal loops are useful for operationalizing concepts into variables and establishing links among related variables (Cavana & Mares, 2004). Each link indicates the direction of causality using arrows and “+/-” notation, which mean the same and opposite direction, respectively.

## Results

### Network analysis results

#### Sparsity

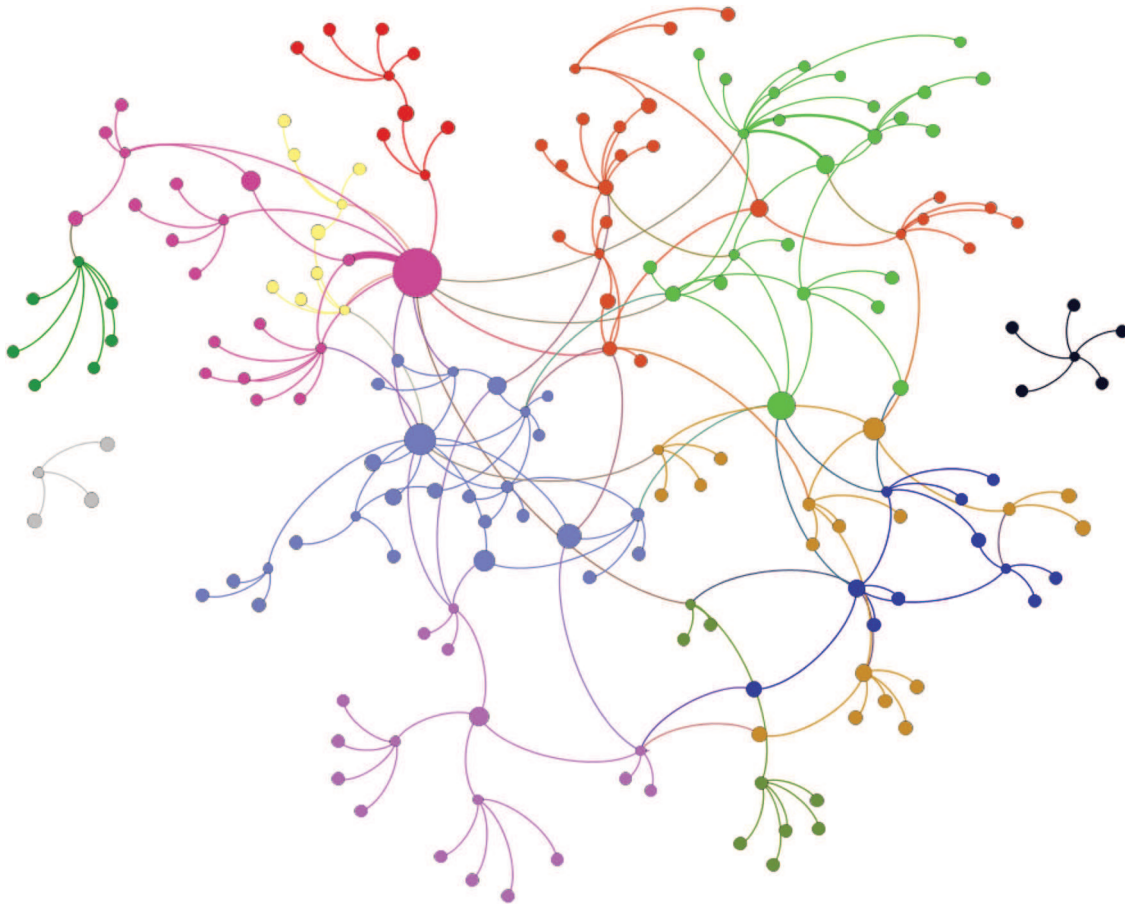
The descriptive characteristics (Figure 1) showed that the network exhibits an extreme level of

sparsity, demonstrated by the ratio of the total number of edges to the number of nodes being close to 1. Out of all possible bidirectional edges, only three appeared in the network, resulting in only 1.38% symmetric links. This is significantly lower than values reported for other complex networks (Mislove et al. 2007). In addition, the network comprises two connected components, the largest of which encompasses 97.8% of the network.

The low connectivity between organizations was further quantified by measuring (a) the clustering coefficient (i.e., the degree of how densely the neighborhood of a node is connected) and (b) the network diameter (i.e., the longest shortest path between any two organizations in the network), which were 0.018 and 11, respectively. For comparison, in a random network with the same number of nodes and average degree, the expected diameter is 0.172, whereas the average path length on the Web, if it were to be treated as an undirected graph, is 7 (Broder et al. 2000). By comparison, the network of Fortune 800 firms in the 1970s, although comparable in size (i.e., number of organizations), was shown to have a much smaller diameter (Levine, 1977). The existence of long paths indicates the limited coordination of human service providers in the studied region.

#### Centrality

A small number of nodes emerged as super-connectors, i.e., organizations that are connected to a large number of other organizations in the network. The Department of Social Services (DSS), two large multi-service organizations, and one homeless-serving agency ranked consistently high across these metrics. Considering that these entities cater multiple programs in various service areas (e.g., childcare, mental health, disabilities, food, shelter, to name a few), it is understandable that these organizations show high centrality scores. The organizations identified with high centrality scores also play a role of hub for connecting resources and information as they connect among nonprofits, government, and other HSOs (such as schools, hospitals, community development corporations, voluntary groups, and faith-based community).



**Figure 1.** Descriptive network structure of human service providers (better seen in color). Edges are colored to highlight the different communities (i.e., groups of nodes) to which organizations have been computationally assigned based on their connectivity to other organizations (c.f. Multipolarity).

The rich-club coefficient is shown in Figure 2. The coefficient increases as a function of  $k$ -core, indicating that nodes with high degree (i.e., super-connectors) are more likely to connect to other high-degree nodes. This result indicates that a small number of organizations, which hold multiple resources and information, are almost exclusively connected to one another, but not necessarily with other smaller organizations that provide more specialized services.

### **Multipolarity**

Our community detection analysis identified 13 structurally independent communities, a precondition for multipolarity. For each community (i.e., cluster of nodes), the average degree and PageRank score of nodes assigned to the community are computed as indicators of its structural importance (Table 1). According to the Gini coefficient (0.025) and the Lorenz Curve (Figure 3), which show that the distribution of average

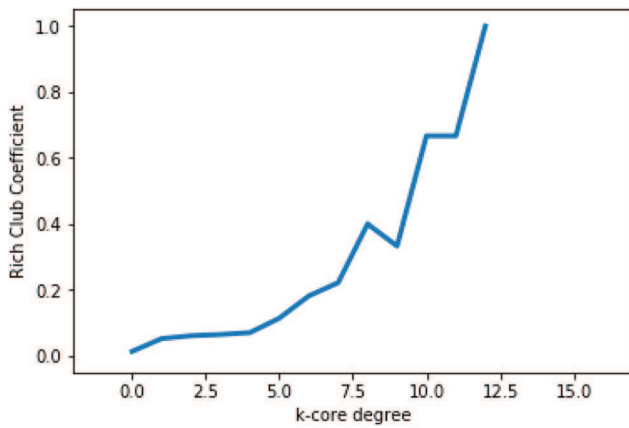
degree values is not far off from the uniform distribution, communities appear to be almost evenly important. These results suggest that the network of human services is a fundamentally multipolar structure, where communities have roughly equal levels of structural importance.

### **Qualitative insights**

The qualitative analysis revealed that HSOs experience several challenges to coordinate services with other organizations. The findings are discussed in terms of two—external and internal—dimensions.

#### **External factors**

Several themes emerged regarding the external environment of the organization, particularly associated with the situations where organizations rely on the same funding streams. Numerous interviewees pointed out that many organizations



**Figure 2.** Rich-club coefficient.

compete for the same source of funding, which could negatively affect organizations' willingness to trust and share with others. The following quotes reflect such challenges:

We have certain agencies that literally pick up the phone and say "Hey, did you get that grant?" and there's some that we would never reveal that we didn't get that grant because we don't want to show our cards.

Funding sources make the environment competitive and present barriers for organizations to work together in certain capacities. I believe a lot of organizations are more territorial and not as open and easy enough to look at a big picture and what benefit that it will help an organization to coordinate and share. [...] Funding is so competitive that people are trying to hold onto the dollars that they have. Letting another organization in can jeopardize that or expose it.

Regarding the funding factor, one organization also pointed out that the restrictions that come with funding can be an obstacle for service coordination. For example, some government mandates restrict funds to be used only for certain types of programing use. "The more restrictive your contract is, the less collaboration you can do with that," said one interviewee.

Another external factor that emerged was associated with the technological dimension of the environment, concerning the lack of "a centralized system," "technology," "good service coordination system." The interviewees described the system that they envision in various forms, such as "a central registry type of software where it would track, not only the organizations that clients have gone to but the types of services that

**Table 1.** Average degree and PageRank score of nodes assigned to each community.

| Community | Size | Average In-/Out- degree | PageRank          |
|-----------|------|-------------------------|-------------------|
| 1         | 17   | 1.12 ± 0.94/2.12 ± 2.67 | 0.005792 ± 0.0016 |
| 2         | 28   | 1.36 ± 1.37/1.61 ± 3.03 | 0.005499 ± 0.0007 |
| 3         | 9    | 0.67 ± 0.5/1.56 ± 2.35  | 0.005733 ± 0.0010 |
| 4         | 17   | 0.88 ± 0.6/1.18 ± 2.38  | 0.006218 ± 0.0029 |
| 5         | 27   | 1.41 ± 1.72/1.11 ± 2.49 | 0.005506 ± 0.0006 |
| 6         | 17   | 1.76 ± 2.95/1 ± 2.24    | 0.005586 ± 0.0012 |
| 7         | 18   | 1.16 ± 0.79/0.78 ± 1.80 | 0.005639 ± 0.0009 |
| 8         | 11   | 1.18 ± 1.08/0.91 ± 2.02 | 0.005169 ± 0.0006 |
| 9         | 7    | 1 ± 0/0 ± 0             | 0.005269 ± 0.0005 |
| 10        | 9    | 1.11 ± 0.60/2 ± 3.12    | 0.005250 ± 0.0002 |
| 11        | 9    | 0.78 ± 0.44/1 ± 2       | 0.005414 ± 0.0005 |
| 12        | 6    | 1 ± 0/0 ± 0             | 0.005540 ± 0.0004 |
| 13        | 4    | 2 ± 1.41/1.25 ± 2.5     | 0.005546 ± 0.0003 |

they've already received," "a centralized system that could include data or care management or coordination system," or "technology to coordinate care for one individual with multiple providers." The main idea is that there is no one place where organizations can access information on various types of services and coordinate services for clients over time to provide follow-up and after care. The quotes below discuss the challenges with the disconnections that exist on the technological dimension.

As it is now, every time our employment coordinator sits down with somebody, he has to go through the whole process, 'Where have you been, what have you done?' and that's just time-consuming.

Technology in data sharing is a big issue. There are a lot of agencies including us who use the technology but we don't use the same platforms of technology. Our systems don't speak to each other: we use different products.

The lack of centralized system was discussed not only in terms of the availability of technology but also in terms of the overall structure and culture of service provision. One interviewer said, "everybody kind of works in silos and has their own areas (of service)." Another interviewer also pointed out that organizations focus on their own specialized roles without having an "overarching plan" to deal with client's multiple needs, which is reflected in the following quote:

If there was a plan that said, 'This is how you move someone out of poverty,' and then every nonprofit said they could have a piece and say 'This is my piece, and this is your piece.' [...] (If there were) someone that could identify everything a person needs, that would be great. We have sought that everywhere and have not seen it.



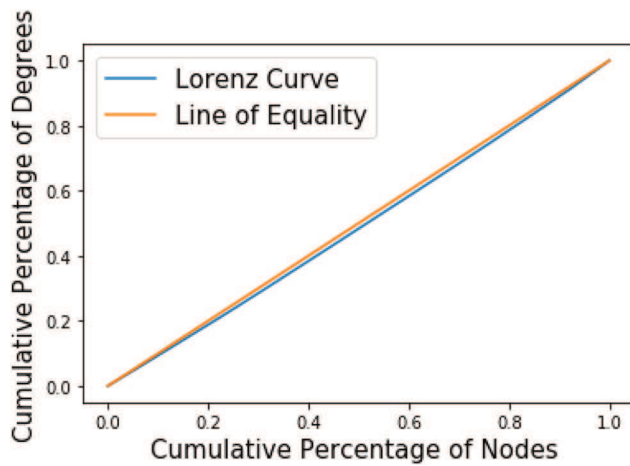


Figure 3. Lorenz Curve.

In all, the discussion suggests that both the funding streams and the service provision structure have a territorial aspect, possibly mirroring the characteristics of one another.

#### Internal factors

The common themes emerged for the internal organizational factors were related to lack of resources, summarized by one interviewee as “people, money, and time.” Many interviewees mentioned these three components as if they were linked to one another. For example, one of the repeated messages was that everybody is short-staffed due to lack of funding and that the resources and time are stretched due to limited staff. Interviewees shared the sentiment that such deficit makes coordination burdensome. Furthermore, there is overall issue with the lack of incentive for coordination. Some interviewees mentioned:

You know the whole irony is like everybody wants you to coordinate services because it is a better bang for their (funders’) buck, but you know it’s not always easier said than done.

It’s probably just the time it takes to do that (i.e., coordinate with other organizations). You’re doing your own work, and it’s not necessarily a time saver to do a lot of collaboration.

One interviewer particularly commented on the pressure to coordinate services could be extra burdensome for a small organization.

Part of the worry about resource guides or referrals are in a number of cases we’ve been afraid of. We’re

going to get overwhelmed. A lot of bigger organizations want us to become involved, be somebody on referral. Twenty (20) or 30 people to them is not a lot, 20 or 30 people to us is a lot. It is huge. So it’s a scale thing, also.

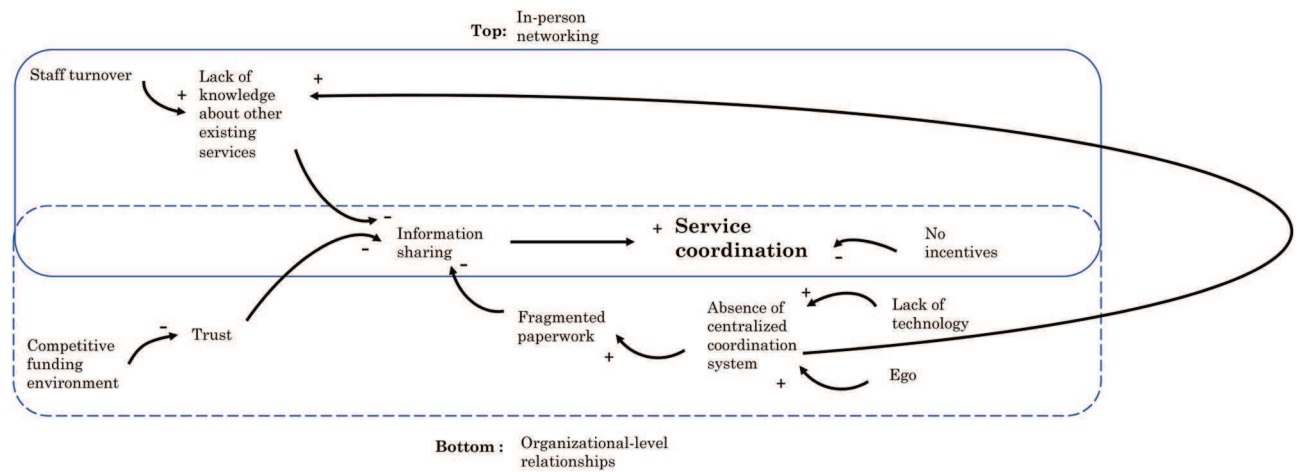
Another theme emerged was related to challenges with networking. Interviewees shared concerns about not knowing other organizations or programs, summarized well by this quote, “Some agencies don’t realize we exist, and sometimes we don’t realize other agencies exist, so there needs to be greater awareness.” Frequent staff turnover is also as a challenge because newer staff members are not always aware of what services are available in the community and how to effectively coordinate. Along the same lines, interviewees felt that there were no networking opportunities among organizations where professionals could come together to exchange information about one another, which then makes information sharing difficult.

Furthermore, interviewees also brought up challenges with forming an organized form of interactions among organizations that can meet clients’ needs. Some organizations particularly commented “egos” as a main barrier to working with other organizations. One interviewee specifically commented:

The trust, or putting egos aside, is the number one thing, and admitting that someone else might do it better. Just get out of the way and let them do it and help them. That’s my opinion, the number one problem.

The same interviewee also discussed that not all organizations need the notoriety as long as a capable moderator or a leader of the community can help other organizations accomplish their missions better.

Other issues surfaced regarding the lack of coordinated communication among agencies. One respondent indicated “The biggest issue is, yes, an easy way to do the intake process,” describing that the process is time consuming and overwhelming for both the employee and client. Many interviewees acknowledged that clients have complex needs and often with trauma, but they are on their own navigating one agency after another, dealing with repetitive and inefficient documentation processes. One interviewee said,



**Figure 4.** A causal loop diagram based on qualitative insights.

It's not very easy. You know, there is a mountain of paperwork. A lot of clients have transportation issues. A lot of times what you'll find is clients will tell you the story that, 'I started at this organization, they told me oh you don't have this, you don't have that, you gotta go here and get that.' So, what should be a one-or-two day process usually turns into a two-to-three week process and as you can imagine people get frustrated very quickly, and what happens is some people just say, 'To heck with it.' You know, it's just too much time, it's just too much hassle. I don't think the system is set up very well.

Along with these challenges, some organizations also commented that under the current system, follow-through or after care is even more challenging and almost impossible to complete.

#### **A causal loop diagram**

Figure 4 presents the diagram that connects the keywords identified from the analyses above. While several factors can affect service coordination directly, information sharing can be conceptualized as a critical step toward service coordination. Many interviewees associated information sharing with service coordination, suggesting that without having the environment (e.g., funding, technological tool) to share information efficiently, it is challenging for them to coordinate services. Information sharing can be conceptualized as a process that occurs at both the individual and organizational levels, such as interpersonal knowledge transfer or interorganizational intake process. These two levels of communication are also affected by the absence of a centralized service coordination tool: individual

frontline workers do not know about other existing services, and organizations maintain fragmented intake processes and paperwork independently. The lack of technology or incentives can affect the individual- and organizational- motivation to coordinate services in general. Compared to the diagrams drawn on the related topic (Bunger 2010), this research revealed more factors related to technology and systems, and fewer factors related to personal relationships, such as conflict and personal referral.

#### **Discussion**

Our findings revealed some unique characteristics of the service coordination network among HSOs, for the first time demonstrated in more than one area of human services. This research discovered that unlike the typical structure often observed in other complex networks, the network of human services exhibited a multipolar structure with few organizations playing the role of super-connectors. To some degree, it is intuitive that most of those identified were super-connectors as they were either a key government agency such as DSS or multi-service organizations that provide services in various service areas (e.g., across housing, family support, etc.). At the same time, it is noteworthy that not all multi-service organizations were super-connectors and that the overall network structure showed a high level of sparsity, which suggests that HSOs observed in our study lack connectivity in general and

potentially operate in silos regardless of the breadth of services they provide (Horvitz-Lennon et al., 2006). The sparse, multi-polar structure resonates with the observations made by Knoke (1993) that “most elite power structures are decentralized bargaining systems, rather than hierarchical systems controlled by a central economic elite (41).” Some of these insights resonate with the chronic challenges identified in the human service sector, which concerns the redundant, incoherent configuration of services even when organizations share similar goals (Corbett & Noyes, 2007).

The content analysis further identified several factors that might have contributed to the sparse, multi-polar structure. In terms of external factors, some participants in this study signaled that the financially competitive environment negatively impacts the trust and transparency between organizations. Despite its potential association, it is important to remember that competition does not automatically lead to fragmentation (Bunger, 2013). If not competition itself, what else specifically affects trustworthy relationships among HSOs is an important question to examine in future research. Internally, it is noteworthy that service providers may not regard service coordination positively when they lack resources such as staff, money, and time. Regardless of its symbolic appeal, service coordination could impose extra burden onto organizations as shown in a recent study that revealed the importance of having human resource capacity for small HSOs’ collaboration (Kim & Peng, 2018; Press, 2019). Therefore, articulating the purpose of coordination and creating an environment where the staff could taste the benefit of coordination will be a key to motivate workers to seek coordination willingly.

The discussion on the absence of a centralized coordination system also shed light on the importance of acknowledging the worth of each organization when trying to create such a system. In this study, some interviewees implied that there are a few candidates who can play a central role in creating such a system, and yet there is an “ego” problem that impedes other organizations to join forces. In this regard, the absence of a centralized system can be interpreted not only as a lack of technology but also as a lack of a cooperative spirit in the community. Considering

that organizations pursue their own prestige, power, and autonomy (Bolland & Wilson, 1994; Knoke, 1993), organizational egos sound natural to some extent. But when it comes to the potential concerns with power disparity, for example, the situations where some organizations do not want others to excel or take control of something that they do not own, the community practitioners will need to discuss how the centralized system can benefit every organization equitably and communicate that in a transparent manner.

Moving forward, it will be helpful for community practitioners to continue to identify specific roadblocks to developing and/or utilizing a centralized technological tool for service coordination. Based on the discussion above, relevant concepts such as competition, power, influence, or dominance can be further investigated to decipher the ego issue. This research also suggests the role of super-connectors be examined in depth, regarding what they coordinate (e.g., events, schedule, services, information, etc.) and what factors motivate other organizations to utilize these hubs (e.g., resources, history, personality, marketing, etc.). These insights will help identifying important qualities desired for organizations to serve as hubs, which then will help nurturing more organizations to play such a role when needed.

The design of future studies should also take the limitations of this study into account. First of all, the interviews conducted in this research were mostly with the executive directors. Future research can expand the scope of coordination to frontline workers as the viewpoints and type of information that managers hold may differ from those who operate programs on a micro level. Furthermore, the information on service coordination was self-reported. For a firmer distinction between the third-person and first-person perspectives, it would be ideal to collect additional information on organization’s service coordination dynamics through a survey of service referrals or through a web-crawler that will collect relevant information online. In addition, given that this study focused on HSOs in one city, the findings are not generalizable to other regions and service delivery systems while some insights could still be applicable in terms of the general operational challenges that hinder coordination. Lastly, this

research did not focus on cliques that may exist in the network. A clique, a dense and overlapping network among small subgroups of organizations, plays important roles for effective service coordination (Bunger & Huang, 2019). Future research can investigate the existence of and characteristics of cliques at the levels of network and service area to further illuminate the meaning of multipolarity and sparsity identified in this research.

## Notes

1. According to the National Taxonomy of Exempt Entities Classification System, the organizations correspond to all major groups (I, J, K, L, M, N, O, and P) under category "V. Human Services," and one major group (S) under category "VII. Public, Societal Benefit." To make the primary focus of the study on independent HSOs, government offices and sub department or programs that belong to colleges or universities were removed.
2. This research used the definition suggested by Duncan (1972) for our analysis of the external and internal environment of an organization. The external environment of an organization includes factors which exist outside of an agency's control, either within the community or another organization, and interact with the responding agency. The internal environment of an organization includes factors which exist within an organization and are governed by the agency's authority, control, and management practices. These factors either structurally, administratively or procedurally, for example, set the tone and process for coordination with other agencies.

## Acknowledgments

The authors thank those who shared their time and insights as study participants and as the graduate students who assisted with parts of this project.

## Funding

This project was funded by the National Science Foundation under Grant No. ECCS-1737443.

## ORCID

Wonhyung Lee  <http://orcid.org/0000-0001-9367-4255>  
Charalampos Chelmiss  <http://orcid.org/0000-0002-5920-1451>

Kirsten DiNicola  <http://orcid.org/0000-0002-8915-8490>

## References

- Atkinson, A. B. (1970). On the measurement of inequality. *Journal of Economic Theory*, 2(3), 244–263. [https://doi.org/10.1016/0022-0531\(70\)90039-6](https://doi.org/10.1016/0022-0531(70)90039-6)
- Blondel, V. D., Guillaume, J. L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment*, 2008(10), P10008. <https://doi.org/10.1088/1742-5468/2008/10/P10008>
- Broder, A., Kumar, R., Maghoul, F., Raghavan, P., Rajagopalan, S., Stata, R., Tomkins, A., & Wiener, J. (2000). Graph structure in the web. *Computer networks*, 33(1–6), 309–320.
- Bolland, J. M., & Wilson, J. V. (1994). Three faces of integrative coordination: A model of interorganizational relations in community-based health and human services. *Health Services Research*, 29(3), 341–366.
- Borgatti, S. P., Jones, C., & Everett, M. G. (1998). Network measures of social capital. *Connections*, 21(2), 27–36.
- Bunger, A. C. (2010). Defining service coordination: A social work perspective. *Journal of Social Service Research*, 36(5), 385–401. <https://doi.org/10.1080/01488376.2010.510931>
- Bunger, A. C. (2013). Administrative coordination in non-profit human service delivery networks: The role of competition and trust. *Nonprofit and Voluntary Sector Quarterly*, 42(6), 1155–1175. <https://doi.org/10.1177/0899764012451369>
- Bunger, A., & Huang, K. (2019). Change in collaborative ties in a children's mental health services network: A clique perspective. *Human Service Organizations: Management, Leadership & Governance*, 43(2), 74–91. <https://doi.org/10.1080/23303131.2019.1606871>
- Cavana, R. Y., & Mares, E. D. (2004). Integrating critical thinking and systems thinking: From premises to causal loops. *System Dynamics Review*, 20(3), 223–235. <https://doi.org/10.1002/sdr.294>
- Colvin, M. L., Thompson, H., & Miller, S. E. (2018). Comparing child maltreatment prevention and service delivery at the community level of practice: A mixed-methods network analysis. *Human Service Organizations: Management, Leadership & Governance*, 42(3), 327–344.
- Corbett, T., & Noyes, J. L. (2007). *Human services systems integration: A conceptual framework*. WI.
- Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17(3), 313–327. <https://doi.org/10.2307/2392145>
- Dunst, C. J., & Bruder, M. B. (2006). Early intervention service coordination models and service coordinator practices. *Journal of Early Intervention*, 28(3), 155–165. <https://doi.org/10.1177/105381510602800301>



- Fortunato, S. (2010). Community detection in graphs. *Physics Reports*, 486(3-5), 75–174. <https://doi.org/10.1016/j.physrep.2009.11.002>
- Fredericksen, P., & London, R. (2000). *Disconnect in the hollow state: The pivotal role of organizational capacity in community-based development organizations*. *Public Administration Review*, 60(3), 230–239.
- Fuller, J., Kelly, B., Sartore, G., Fragar, L., Tonna, A., Pollard, G., & Hazell, T. (2007). Use of social network analysis to describe service links for farmers' mental health. *The Australian Journal of Rural Health*, 15(2), 99–106. <https://doi.org/10.1111/j.1440-1584.2007.00861.x>
- Golden, R. L. (2011). Coordination, integration, and collaboration: A clear path for social work in health care reform. *Health & Social Work*, 36(3), 227–228. <https://doi.org/10.1093/hsw/36.3.227>
- Guo, C., & Acar, M. (2005). Understanding collaboration among nonprofit organizations: Combining resource dependency, institutional, and network perspectives. *Nonprofit and Voluntary Sector Quarterly*, 34(3), 340–361. <https://doi.org/10.1177/0899764005275411>
- Horvitz-Lennon, M., Kilbourne, A. M., & Pincus, H. A. (2006). From silos to bridges: meeting the general health care needs of adults with severe mental illnesses. *Health Affairs (Project Hope)*, 25(3), 659–669. <https://doi.org/10.1377/hlthaff.25.3.659>
- Jennings, E. T., Jr., & Krane, D. (1994). Coordination and welfare reform: The quest for the philosopher's stone. *Public Administration Review*, 54(4), 341–348. <https://doi.org/10.2307/977381>
- Kim, M., & Peng, S. (2018). The dilemma for small human service nonprofits: Engaging in collaborations with limited human resource capacity. *Nonprofit Management and Leadership*, 29(1), 83–103. <https://doi.org/10.1002/nml.21314>
- Knoke, D. (1993). Networks of elite structure and decision making. *Sociological Methods & Research*, 22(1), 23–45.
- Knoke, D., & Kuklinski, J. H. (1982). *Network analysis*. Sage Publications.
- Krackhardt, D. (1990). Assessing the political landscape: Structure, cognition, and power in organizations. *Administrative Science Quarterly*, 35(2), 342–369. <https://doi.org/10.2307/2393394>
- LeRoux, K., Piatak, J., Romzek, B., & Johnston, J. (2019). Informal accountability in children's service networks: The role of frontline workers. *Human Service Organizations: Management, Leadership & Governance*, 43(3), 188–204.
- Levine, J. H. (1977). *The network of corporate interlocks in the United States: An overview* [Paper presentation]. American Sociological Association Annual Meeting.
- McDonald, K. M., Sundaram, V., Bravata, D. M., Lewis, R., Lin, N., Kraft, S. A., McKinnon, M., Paguntalan, H., & Owens, D. K. (2007). *Closing the quality gap: A critical analysis of quality improvement strategies* (Vol. 7: Care Coordination). <https://www.ncbi.nlm.nih.gov/books/NBK44012/>
- Mislove, A., Marcon, M., Gummadi, K. P., Druschel, P., & Bhattacharjee, B. (2007, October). Measurement and analysis of online social networks. In *Proceedings of the 7th ACM SIGCOMM conference on Internet measurement* (pp. 29–42).
- Nohria, N., & Eccles, R. (1992). Is a network perspective a useful way of studying organizations. In G. R. Hickman (Ed.), *Leading Organizations: Perspectives for A New Era* (pp. 287–301). SAGE Publications.
- Nowell, B. (2009). Profiling capacity for coordination and systems change: The relative contribution of stakeholder relationships in interorganizational collaboratives. *American Journal of Community Psychology*, 44(3-4), 196–212. <https://doi.org/10.1007/s10464-009-9276-2>
- Press, C. (2019). Substance vs. symbol in administrative reform: The case of human services coordination. *Policy Analysis*, 7(1), 21–45.
- Provan, K. G., Fish, A., & Sydow, J. (2007). Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management*, 33(3), 479–516. <https://doi.org/10.1177/0149206307302554>
- Provan, K. G., & Sebastian, J. G. (1998). Networks within networks: Service link overlap, organizational cliques, and network effectiveness. *Academy of Management Journal*, 41(4), 453–463. <https://doi.org/10.2307/257084>
- Provan, K. G., Veazie, M. A., Staten, L. K., & Teufel-Shone, N. I. (2005). The use of network analysis to strengthen community partnerships. *Public Administration Review*, 65(5), 603–613. <https://doi.org/10.1111/j.1540-6210.2005.00487.x>
- Rivard, J. C., & Morrissey, J. P. (2003). Factors associated with interagency coordination in a child mental health service system demonstration. *Administration and Policy in Mental Health*, 30(5), 397–415. <https://doi.org/10.1023/A:1024641630430>
- Schultz, E. M., Pineda, N., Lonhart, J., Davies, S. M., & McDonald, K. M. (2013). A systematic review of the care coordination measurement landscape. *BMC Health Services Research*, 13(1), 119–130. <https://doi.org/10.1186/1472-6963-13-119>
- Simmons, J. (1994). Community based care: The new health social work paradigm. *Social Work in Health Care*, 20(1), 35–46. [https://doi.org/10.1300/J010v20n01\\_06](https://doi.org/10.1300/J010v20n01_06)
- Wang, F., Srinivasan, U., Uddin, S., & Chawla, S. (2014). *Application of network analysis on healthcare*. ASONAM (pp. 596–603).
- Zhou, S., & Mondragón, R. J. (2004). The rich-club phenomenon in the Internet topology. *IEEE Communications Letters*, 8(3), 180–182. <https://doi.org/10.1109/LCOMM.2004.823426>