Examining the Structure of Organizational Relationships Using Social Network Analysis

By Stephen Nuñez and Audrey Yu

This post is one in a series highlighting MDRC’s methodological work. Contributors discuss the refinement and practical use of research methods being employed across our organization.

MEASURING COMMUNITY CAPACITY

The New Communities Program, implemented by the Local Initiatives Support Corporation of Chicago and funded by The John D. and Catherine T. MacArthur Foundation, aims to make neighborhoods safer, improve schools, and preserve affordable housing. Such community initiatives have long emphasized the importance of building good relationships between participating organizations; as practitioners and policymakers are aware, the quality of these relationships matters for carrying out local work. Therefore, along with their focus on promoting community-wide outcomes such as public safety and education, initiatives like the New Communities Program often attempt to build “community capacity,” defined as the systems of relationships that promote collective problem solving and community well-being more broadly.

For the Chicago Community Networks Study, also funded by MacArthur, MDRC worked to characterize and measure the structure of relationships in Chicago neighborhoods that were and were not participating in the New Communities Program to understand how these structures contributed to organization-level and community-level outcomes. To do this, the research team applied the methodology of social network analysis (SNA) to data from a specially designed two-wave survey administered to organizations conducting community development activities in nine Chicago neighborhoods.

WHAT IS SOCIAL NETWORK ANALYSIS?

Social network analysis models the structure of relationships using “nodes” (also called vertices) and “edges” (also called ties). Observational units such as organizations, individuals, web pages, or even brain cells are the nodes of a network; their relationships to each other, whether contracts, friendships, hyperlinks, or synapses, are its edges. The nodes and edges of SNA lend themselves naturally to data visualization. Indeed, static and interactive plots of the “web” of relationships in a network are among SNA’s most popular and useful features.

At the most basic level, SNA examines whether edges exist between two or more nodes. It can further characterize the “strength” of underlying relationships, for example the frequency or intensity of interaction, by attaching numerical weights to each edge. It can also be used to examine the coexistence of multiple relationship types, such as “friend,” “business partner,” and “neighbor,” or what researchers call “multiplexity,” between each pair of nodes.

But SNA provides tools to do more than simply catalogue the presence, absence, or individual quality of edges between node pairs. Among other things, it allows for an analysis of positional power. In aggregate, the relationships between actors in a network create a larger structure that can shape, facilitate, or constrain action. Using SNA, researchers can quantify “centrality,” a measure of the power of the position a node occupies, and explore the association between a node’s centrality and its outcomes. For example, each organization in a community network occupies a position that may determine, in part, the information it has access to and the ability it has to distribute resources to its partners or broker relationships between disparate parties. And this, in turn, may determine whether its initiatives are successfully implemented or, indeed, whether it survives in an uncertain funding environment. There are several measures of centrality that capture different types of posi-
tional power, including “eigenvector centrality,” a measure of how well connected a node is to other well-connected nodes, and “betweenness centrality,” a measure of how often a node is part of the most direct path between other nodes.

Just as the centrality of a node may influence its outcomes, the “centralization” or distribution of power across few or many nodes may influence outcomes at the network level. In the case of a community development initiative, the centralization of its interorganizational network could influence the overall success of efforts to improve outcomes such as community-wide safety or educational attainment.

**SOCIAL NETWORK ANALYSIS IN THE CHICAGO COMMUNITY NETWORKS STUDY**

Collecting the data necessary for SNA required construction and fielding of surveys unlike those typically used in social scientific research. The Chicago Community Networks Study survey included not only a battery of questions on organizational characteristics, but also a roster of organizations identified by the research team and by locals as contributing to community development work in each organization’s neighborhood. Respondents were asked to indicate relationships with the listed organizations (edges), characterize the intensity and quality of those relationships (strength), and detail the different domains (for example, education, housing, or public safety) they worked on together (multiplexity). They were also encouraged to write in the names of organizations they believed should be included in the survey and characterize their relationships with them. In some instances, this led to the survey sample being expanded to include those organizations. Overall, almost 400 organizations in nine neighborhoods participated in the survey, yielding what is perhaps the most detailed data on organizational networks ever collected.

The Chicago Community Networks survey data allowed for the construction of numerous networks filtered on domain of work, as well as on edge characteristics (strength, reciprocation) and node characteristics (type of organization, size, local or nonlocal). This in turn produced insights into how differences in network structure and in the identity of central actors across neighborhoods appeared to factor into differences in the success of efforts to influence elected officials and quickly mobilize in the face of challenges such as school closings and budget cuts.

**LEARN MORE**

Findings from the first wave of the survey can be found in the report *Network Effectiveness in Neighborhood Collaborations*. The research team has also created several web features that provide more detail on the terms and techniques of SNA and present the results of the analysis using interactive visualizations:

- **“Introduction: Understanding Community Collaborations Through Social Network Analysis”** covers basic network terms and shows how social network theory can be used to explore the relationships between community organizations in a deeper way.

- **“Power in Community Networks”** provides visualizations of different types of centrality and centralization and takes the reader through step-by-step stories of how networks with different distributions of positional power have responded to local challenges.

- **“Comprehensiveness in Community Partnerships”** defines multiplexity in the context of the Chicago Community Networks Study and illustrates how coexisting multiple relationships between community organizations may have evolved.

In late 2018, MDRC will release a report on findings from the second wave of the Chicago Community Networks survey. The focus will be on network change, including organizations that entered or exited the network, and relationships that formed, persisted, or dissolved between fielding periods.

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1 Analysis of network data was carried out in R using the igraph package.