Defining Neighborhoods for Research and Policy

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Introduction

The neighborhood is a social and geographic concept that plays an increasingly important role in research, policymaking decisions, and practice that address disparities in the well-being of urban populations. Research on neighborhood effects is burgeoning, with an increasing number of policies being directed at reducing disparities through place-based initiatives. Most studies of neighborhoods and community initiatives geared toward neighborhood improvement, however, make simplifying assumptions about boundaries. Most studies rely on census geography or political jurisdictions to operationalize the neighborhood units. Conversely, theories about the interactions between residents and their neighborhoods are seldom simple. Among the many pathways of influence, it is often assumed that social and psychological processes are at work within a place. The effect these processes have on one another occurs when residents interact with their surrounding context or environment to give the place meaning (Sampson, Morenoff, and Gannon-Rowley, 2002; Shinn and Toohey, 2003). To the degree that neighborhood influence is predicated on residents' experience in, exposure to, or perceptions of the place in which they live, critical examination of the appropriate delineation of the space designated as the neighborhood unit is important. If neighborhood units depart markedly from real-world experience, the result can be measurement error, misspecification of models, and the solving of practical problems by looking for results or effect in the wrong places.

Standard methods used to define and measure neighborhoods may falter when the methods assume that neighbors share similar perceptions of their neighborhood space or that neighborhood units are fixed or constant in their boundaries. Researchers need a set of spatially calibrated and resident-informed methods that allow variations in perception to be investigated and enable the neighborhood unit to be crafted so that it is optimally bounded regarding the assumptions and purposes of the study. They can use Geographic Information System (GIS) tools, illustrated in this article, to craft neighborhood units that are more useful and authentic for research, policy, and practice than the commonly used administrative boundaries.

Background

The problem of defining a neighborhood and the practical struggle of defining its boundaries has received critical attention in recent years (Downey, 2006; Galster, 2001; Nicotera, 2007). Conceptually, neighborhoods are not merely territory, but "social constructions named and bounded differently by numerous and diverse individuals" (Lee, Oropesa, and Kanan, 1994: 252). Individuals have agency regarding neighborhoods (Entwisle, 2007) and, when they move through their surroundings, they carve their own activity space that does not necessarily map onto arbitrary geographic boundaries (Sherman et al., 2005). Neighborhood boundaries are not static but often dynamic and contested, and social interaction shapes the meaning of places for individuals and groups (Gotham, 2003). Residents can embrace some of the surrounding space and disavow other parts of it, making it more or less relevant to their everyday lives (Gotham and Brumley, 2002).

Although residents may live in geographic proximity, it cannot be assumed that their perception of a neighborhood identity is the same (Coulton et al., 2001). In particular, relative position in the social structure, such as that dictated by age, race, class, or gender, may affect how someone evaluates a neighborhood (Burton, Price-Spratlen, and Spencer, 1997; Campbell et al., 2009; Charles, 2000; Krysan, 2002; Sampson and Raudenbush, 2004). Moreover, neighborhoods themselves may differ in the degree to which they are identifiable, such as whether they have naturally occurring boundaries, demarcations, or commonly recognized neighborhood names (Taylor, 1988).

Although most researchers and practitioners acknowledge the importance of residents' experience of neighborhood, the fact is that most substantive work relies on fixed units from administrative agencies such as the Census Bureau, city governments, or planning groups. Nevertheless, studies that examine resident perceptions confirm that considerable variation exists in how individuals view the size of their neighborhood and where they locate the boundaries (Campbell et al., 2009; Coulton et al., 2001; Lee and Campbell, 1997; Lohmann and McMurran, 2009; Pebley and Sastry, 2009). Given this definitional ambiguity, it is important to further investigate residents' perceptions and other factors affecting neighborhood identity and craft neighborhood units that are informed from their input.

Using GIS Tools in Specification of Neighborhoods for Research

Neighborhoods are rooted in geography—the land, buildings, people, and organizations that compose the place—but research has often treated neighborhoods as units that are untethered to their spatial location. Increasingly, however, researchers are using GIS tools to investigate alternative neighborhood definitions and boundaries that can be informed by residents' perceptions, spatial parameters, or features of the social and physical landscape.

Community Mapping Exercises

A community mapping exercise is one technique that researchers have used to identify neighborhood boundaries. An illustration comes from the Annie E. Casey Foundation's Making Connections program, a community change initiative in low-income sections of 10 cities that focused on

strengthening families and improving neighborhood conditions. Representative samples of adults in each community were asked to draw the boundaries of their neighborhoods as they viewed them onto GIS-generated cartographic maps. One use of these digitized maps was to uncover the core area of collectively defined neighborhoods (Coulton, Chan, and Mikelbank, 2011). This collective definition was made clear by grouping maps from residents who provided the same neighborhood name and then overlaying their maps to find areas of consensus. The blocks that were included in a plurality of resident maps were considered to be core parts of the neighborhood for the purposes of community identity. Local stakeholders reviewed the resulting neighborhood units and provided evidence of face validity of the resident-defined neighborhoods based on their understanding of the local context. These collectively defined neighborhoods were then used as the basis for aggregation of other survey data and block-level census data that yielded social and economic measures for the neighborhood.

Researchers can also use data from the community mapping exercise to create unique person-defined neighborhoods for each resident based on his or her own boundary definitions. For each person-defined neighborhood, the other survey respondents who lived inside the individual's map were grouped. This made it possible to calculate aggregate scores on social and economic measures for each unique person neighborhood using the data from other residents. In addition, researchers used GIS tools to apportion census block level data into each unique person-defined neighborhood map. In this application of the community maps, it did not matter whether agreement was reached among the residents about neighborhood boundaries, because each person's neighborhood was uniquely defined.

Person-Centric Buffers

Researchers can also use GIS to define neighborhood units by drawing buffers of varying sizes around individuals' residential locations. They then calculate variables of interest for these overlapping spaces, which enable them to test hypotheses that can further clarify the scale at which neighborhood influences operate. Evidence of the magnitude of contextual effects on some health outcomes is greater when researchers use these sliding, rather than census-defined, neighborhoods in statistical models (Chaix et al., 2005). Moreover, the optimal size of the buffer may depend on the particular neighborhood characteristic being modeled. Neighborhoods based on varying buffers avoid some of the criticisms of fixed neighborhood units, such as the concern that households at the edge of a fixed unit may be more influenced by the contiguous neighborhood than by households in the center. Rather than directly asking residents to define their neighborhood, these methods infer an optimal neighborhood scale from the magnitude of neighborhood effects.

Pedestrian Street Networks

To define neighborhood boundaries, researchers can also use aspects of the built environment that structure social processes and everyday life. T-communities are theorized networks of pedestrian streets that structure localized social interaction, which are consistent with the concept of neighborhood (Grannis, 2005). Researchers can use GIS tools to identify pedestrian streets and tertiary streets, drawing neighborhood boundaries along those main streets that bound the intersecting pedestrian areas. They can also combine the resulting areal units with local knowledge to further refine this definition of neighborhood units (Foster and Hipp, 2011).

Automated Zone Design

For some purposes, it may be desirable to craft neighborhood units that are demographically homogeneous, are of a designated size, or do not cross selected barriers or landmarks. Researchers can use automated zone-design programs to aggregate areas together while optimizing such criteria (Cockings and Martin, 2005). This method of crafting neighborhood units was investigated after an interactive process that imposed various population and housing characteristic constraints, area size, and geographic considerations (Haynes et al., 2007). The resulting neighborhood units compared favorably with community areas that were designated by local government officers.

Conclusions

Currently, the capacity exists to calibrate neighborhood definitions to be more reflective of residents' experiences and spatial attributes than the commonly used administrative units. On a practical level, these methods require more fine-grained geographic data than are often available from surveys or administrative agencies. Given the nuances of residents' experience and spatial dynamics, justification is strong for making investments in the data and technology that could validate neighborhood definitions and measures. Such units should provide more explanatory power on which to base neighborhood research, policy formulation, and practical solutions.

Acknowledgments

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