

Innovation in the Measurement of Place: Systematic Social Observation in a Rural Setting

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Background

Hundreds of studies have examined the consequences of neighborhood contexts for health behaviors and health outcomes (Entwisle 2007). Most, however, focus on urban contexts. One reason for this selective view is that data collection strategies to support research on neighborhoods and health in urban settings do not necessarily translate well to rural contexts. An example is systematic social observation (SSO), an approach that involves structured observations of urban blocks or block faces. A key challenge in adapting this methodology to rural areas is defining an appropriate unit of observation. Intersection-to-intersection road segments equivalent to urban blocks are in many instances too long and heterogeneous to serve as units. This paper combines principles of sampling and the techniques of spatial analysis to develop an innovative solution to the problem, and applies and tests it in a rural county in the Southeastern U.S.

Methodology

Systematic social observation (SSO) is an approach for directly measuring the physical, social, and economic characteristics of neighborhoods in which data collectors walk or drive (slowly) along a street and mark the presence or absence of readily observed characteristics on a prespecified checklist. The unit of observation is typically a block or block face. Systematic social observation is a valuable complement to other types of data that can be used to characterize local contexts. It captures dimensions of neighborhood context such as social and physical disorder that are potentially important for health behavior and health outcomes but not easily measured with more standard data sources such as the census. Measurements are taken at a granular level, giving analysts considerable flexibility in forming a unit of analysis. In addition, data collection can be timed to correspond with the baseline of longitudinal health surveys, ensuring the proper temporal ordering for subsequent substantive analysis.

Although there is much to recommend systematic social observation as an approach, it has rarely been applied in rural areas. There are two main reasons for this, one more important than the other. First, it is not clear how to best develop a unit of observation for rural areas that preserves the appealing characteristics of blocks and block faces in urban areas. Second, there is a question as to whether a checklist can be developed that adequately characterizes rural contexts. We describe a data collection in a rural county in the Southeast designed to address both problems. It was conducted in conjunction with the National Children's Study Vanguard Center in Duplin County, NC and covers roughly half the county. Of particular interest are the more rural parts of the

county, where the standard methods for collecting systematic social observation data do not apply.

Unit of observation. Four approaches to defining potential units of observation were considered for use: intersection-to-intersection road segments; observations linked to sampled households; GPS-defined road segments of a quarter or a half mile; observations within road segments anchored to dwelling units.

A literal translation of urban blocks would use intersection-to-intersection road segments as units. In some parts of the county, this would result in units of a quarter mile or less, but in other parts, it would result in units many miles long. Because of concern about the potential heterogeneity of the latter, and related concerns about replicability, we rejected this approach. It is worth noting that we can assess the heterogeneity of longer road segments using our preferred methodology.

Another approach is to tie observations to households that are part of a planned health survey to which the systematic social observations will be linked. This approach was used, for example, in the Pregnancy, Infection, and Nutrition (PIN) study. It has the potential to work well with sample designs in which the households and respondents selected are fairly dispersed spatially, although the ability to aggregate observations flexibly to correspond to different definitions of neighborhood is likely to be lost. It would not be cost-effective for the National Children's Study, which is based on an area sample at the last stage of selection. The proposed paper will provide a complete GIS-based analysis of the roads and dwelling units eligible for the study to demonstrate this point.

Still another approach is to have data collectors use a GPS to identify and define the road segments to be observed as they drive through the area. We considered a quarter mile as an appropriate length initially, but because of the large number of units to be observed, and related costs, we chose a half mile instead. Of course, if an intersection-to-intersection road segment was less than a half mile, we used that. Concerns with the replicability of this approach, especially dependence on starting point, led us to prefer an approach with more centralized control over the definition of the observation unit.

The final approach uses the GIS to identify and define road segments to be observed by the data collectors, with location verified in the field using a GPS. Although this was our preferred approach, we were still concerned about replicability. What data collectors see and record may depend on where in a segment they take their observations. Anchoring the observation to a preselected dwelling unit in the road segment solves the replicability problem. But which dwelling unit should be selected? One possibility, illustrated in Graphic 1, selects the dwelling unit closest to the centerpoint of each ½ mile segment as the observation point. While this approach provides well-distributed coverage of the areas to be described, it is likely to produce a biased picture since observations would always be at the center of the ½ mile segments and would never include measurements taken near intersections or in front of dwelling units farther away from the road. A second possibility, illustrated in Graphic 2, examines the ½ mile segment and selects the dwelling unit closest to the road. This, too, has the potential to produce a biased picture if there is association between the length of driveways and other local characteristics. The third possibility, illustrated in Graphic 4 (3), examines the ½ mile segment and randomly selects a dwelling unit (within a 500 foot buffer of the road). For road segments where there is no dwelling unit (or barn or other building), a point to anchor the observation was randomly selected in advance and data collectors given its coordinates.

This sampling strategy produces observations that vary in distance to intersections, the road, and the segment centerpoint.

Duplin County, NC is a nonmetropolitan county, but of course, there are urban areas within it. In the towns, we collected systematic social observation data just as would be done in any urban setting—based on blocks and block faces. To permit methodological investigation, we chose block faces. Outside of towns, observations were anchored to points, as just described. Observations (n=5,666) were coded according to road ID, segment ID, and whether the observation was a rural point unit of observation (n=2,676) or an urban block (n=2,990). This coding scheme allowed for individual observations to be aggregated into secondary sampling units. Data were collected between September 2008 and February 2009.

Characteristics measured. Development of a data collection instrument that is replicable, relevant across diverse settings, and easily integrated with other population and geographical data represents the second challenge for this study. Our goals were to collect data on topics and with a spatial precision not easily captured through other sources such as the census or administrative records and to do so in a way that was meaningful in diverse settings. We replicated information gathered from the Project on Human Development in Chicago Neighborhoods (PHDCN) systematic social observation survey and the Los Angeles Family and Neighborhood Survey (LAFANS) when we believed that the items would be relevant in rural as well as urban contexts. Items were added to the instrument that were found to be sociologically relevant to health outcomes and could be easily observed regardless of time of day or year. The observations were conducted by trained field teams consisting of a driver and an observer. Observations were taken within natural eyesight between the hours of 7 a.m. and 7 p.m. up to seven days a week. The field teams used GPS to guide them to observation points and took observations on both sides of the road at preselected observation points for rural point observation units and over the span of an entire block for urban block units. The proposed paper will describe this data collection in detail.

Application and Assessment

The proposed paper will describe the data collection in detail. The utility of the data collection approach and the relevance of theoretical constructs on neighborhoods and health in a rural setting drove preliminary analysis of the data collected in this rural systematic social observation study.

We are considering methodological as well as substantive issues in evaluating our approach. As an example of the former, we have examined correlations between observations taken on different sides of the street. If observations on side Z of the road produced similar results as observations taken on side Y, then observations could be taken on only one side of the road and consequently decrease the costs of conducting the survey. Preliminary results indicate that for variables with sufficient variability, the two sides of the road were in fact different.

More substantively, we want to know whether neighborhood effects constructs used in urban areas apply in a rural setting. Physical disorder represents an example of a sociological construct that has been linked to health. In urban settings, physical disorder has been linked to violent crime (Sampson & Raudenbush, 1999), worse overall health (Ross & Mirowsky, 2001), increased risk for asthma (Cagney & Browning, 2004), and

reduced physical activity among children (Molnar, Gortmaker, Bull, & Buka, 2004). Following the approach used in urban areas, a 6-item physical disorder index was created that counted the presence of litter, graffiti, abandoned cars, neglect, abandoned houses, and poor street conditions (1 if yes, 0 if no). Preliminary analysis shows how physical disorder, a theoretical construct well established in the urban neighborhood effects literature, also applies in a rural setting. See Table 1. Data were then partitioned according to observation type to see whether performance on indexes varied according to whether the observation was taken in a more rural or urban setting within the study county. Interestingly, physical disorder was found to vary according to location type. It was stronger in the more urban sections of the study county, indicating that physical disorder had a greater presence in the more urban, geographically concentrated areas of the county. Preliminary findings for indexes illustrating a lack of social control and territoriality reveal a similar trend, which further emphasized differences according to location type.

SOURCES

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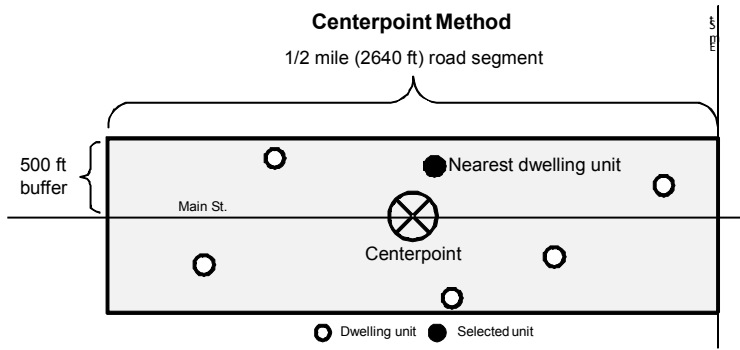
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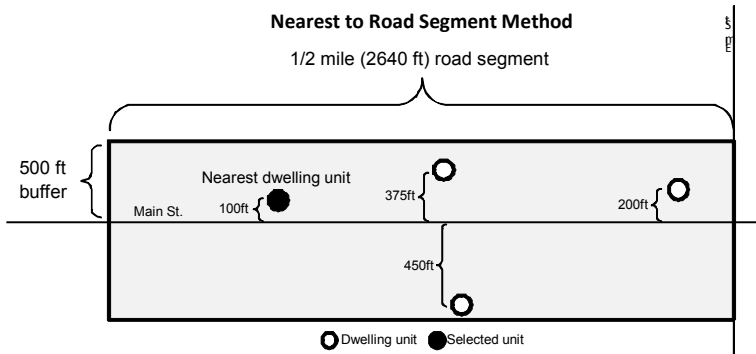
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Graphic 1



Graphic 2



Graphic 3

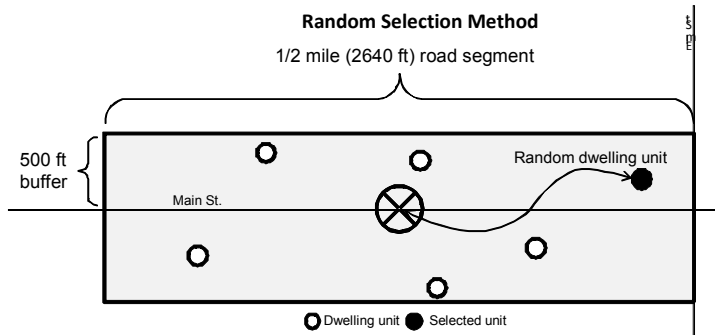


Table 1: Preliminary Results for Measures of Physical Disorder

Mean (Standard Deviation) for Physical Disorder Items & Index			
Items	Overall	Blocks	Points
Litter	.3466 (.476)	.3819 (.4869)	.3072 (.4614)
Abandoned Cars	.0817 (.274)	.1074 (.3096)	.0531 (.2242)
Neglect	.2523 (.4344)	.3231 (.4677)	.1734 (.3787)
Abandoned Houses	.0651 (.2468)	.0842 (.2779)	.0437 (.2045)
Graffiti	.0067 (.0816)	.011 (.1045)	.0019 (.0432)
Poor Street Condition	.0611 (.2395)	.0966 (.2955)	.0213 (.1444)
6-item Index	.8136 (1.0005)	1.0043 (1.1241)	.6005 (.7887)