

# Environment and Behavior

<http://eab.sagepub.com>

---

## Neighborhood Evaluation Using GIS: An Exploratory Study

Emily Talen and Swasti Shah

*Environment and Behavior* 2007; 39; 583 originally published online Jul 18, 2007;

DOI: 10.1177/0013916506292332

The online version of this article can be found at:  
<http://eab.sagepub.com/cgi/content/abstract/39/5/583>

---

Published by:

 SAGE Publications

<http://www.sagepublications.com>

On behalf of:

Environmental Design Research Association

Additional services and information for *Environment and Behavior* can be found at:

**Email Alerts:** <http://eab.sagepub.com/cgi/alerts>

**Subscriptions:** <http://eab.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

**Citations** (this article cites 36 articles hosted on the SAGE Journals Online and HighWire Press platforms):  
<http://eab.sagepub.com/cgi/content/refs/39/5/583>

# Neighborhood Evaluation Using GIS

## An Exploratory Study

Emily Talen

Swasti Shah

*University of Illinois at Urbana-Champaign*

This article presents a new approach to the investigation of resident views of neighborhood using Geographic Information Systems (GIS). GIS, an interactive mapping and analysis tool, allows multiple layers of information about a given place to be represented simultaneously, thus exposing the interactions among layers, and allows the conception of neighborhood to be represented in greater complexity. The results of a study of the neighborhood evaluations of 18 respondents in Urbana, Illinois, in which GIS was used to facilitate neighborhood evaluation, are described and analyzed. The article first presents an overview of the literature on neighborhood evaluation, followed by a description of the methodology, including a brief overview of GIS capabilities and how GIS was used to elicit responses in a survey of neighborhood residents. A final section summarizes the results of the survey and identifies some of the main findings of the evaluative method.

**Keywords:** *neighborhood preferences; GIS; spatial planning*

This article offers a methodological and empirical contribution to the literature on resident evaluation of neighborhood. A new approach using Geographic Information Systems (GIS) is described, and the empirical results of a study in which GIS was used to facilitate neighborhood evaluation in Urbana, Illinois are presented. The current study is motivated by a belief that current approaches to evaluating the importance of neighborhood

---

**Authors' Note:** Funding for this study was provided by the National Science Foundation (NSF Grant #9905349). Correspondence concerning this article should be addressed to Emily Talen, Dept. of Urban & Regional Planning, University of Illinois at Urbana-Champaign, 111 Temple Buell Hall, 611 Taft Dr., Champaign, IL 61820; e-mail: [talen@uiuc.edu](mailto:talen@uiuc.edu).

in residents' lives could be improved by incorporating a more multidimensional, spatially explicit representation of neighborhood.

Although there exist a number of studies dealing with what residents like or dislike about their neighborhoods, it is generally acknowledged that research on "what factors matter most and for whom" is inconclusive and contradictory, yielding "no definitive guidance to policy makers about the relative importance of particular neighborhood attributes" (Ellen & Turner, 1997, p. 834). The misspecification of the person-place transaction (Taylor, 1996) and the debate between subjective and objective measures of neighborhood satisfaction (Jacob & Willits, 1994) are other indicators that more work is needed to deepen our understanding of people's views about neighborhood or local living environment.

These issues may be at least partly due to methodological weaknesses, particularly because evaluations of neighborhood are often confined to Likert-type scale rankings of selected, isolated neighborhood conditions. For example, residents are asked to rate the degree to which vandalism, abandoned property, traffic, commercial activities, noisy streets, or parking are problematic (Adams, 1992; Dahmann, 1985). Quite often, residents are asked to rate, on a scale of 1 to 10, their overall satisfaction with their neighborhood or block (Chavis & Wandersman, 1990; Taylor, 1996). In neighborhood satisfaction studies, residents may be asked to rate the relative importance (possible responses of "not important at all" to "very important") of characteristics such as "close to public transportation," "close to places to shop," or "close to parks" (St. John, 1987; Vreugdenhil & Rigby, 1987).

Through these studies, much has been learned about neighborhood meaning and satisfaction; however, there is a need to investigate other approaches and analytical tools. One of these approaches is GIS, an interactive mapping and analysis tool that allows multiple layers of information about a given place to be represented simultaneously, thus exposing the interactions among layers. Although GIS is conventionally used in a top-down, technicist way to evaluate various spatial planning issues, some studies have begun to tap its potential for cognitive research (Talen, 2000). The basic idea is to use GIS to "flesh out" the knowledge gained through more traditional measures, to broaden and intensify neighborhood evaluation by offering a new methodology for articulating neighborhood meaning and satisfaction.

In the current study, residents were asked to evaluate their local area or neighborhood by working with GIS to evaluate the following: neighborhood boundaries: the elements of neighborhood that serve to adequately characterize and/or describe *neighborhood*—presumably as a multidimensional phenomenon consisting of social, physical, political, and/or economic

aspects; activity patterns of residents in relation to local home area or neighborhood; and neighborhood likes and dislikes—that is, resident perception of neighborhood problems, deficiencies, strengths, and assets. During the survey, residents were encouraged to fully exploit the interactive, dynamic nature of GIS. Thus the evaluations were based on any sociospatial aspect of neighborhood available to the resident in the various GIS layers, and any analytical capability in GIS that the respondent felt comfortable using (distance measurement, for example). With the help of a GIS facilitator, residents were able to ask questions, manipulate data, add data, or use more than one data layer to construct the most meaningful representation of different aspects of their neighborhood.

This article is structured into three parts. We first present an overview of the literature on neighborhood evaluation, including resident-based survey research and theoretical interpretation: how neighborhoods have been defined, perceived, and what meaning they hold. Our definition of *neighborhood* is very broad, encompassing notions of any local area, urban subunit, or place that extends beyond the home area, not necessarily a preconceived geographic unit defined by a government entity. Next, the methodology is described, including a brief overview of GIS capabilities and how GIS was used to elicit responses in a survey of neighborhood residents. Finally, the results of a survey involving 18 residents of Urbana, a small town in central Illinois, are presented and summarized.

## Neighborhood Evaluation

Local areas or neighborhoods have been explored through investigations of neighborhood imagery and perception (Lynch, 1960; Nasar, 1998), the assessment of factors that contribute to neighborhood satisfaction (Sampson, 1991), the use value of neighborhoods (Logan & Molotch, 1987), the social meaning and significance of neighborhoods (Jablonsky, 1993), the visual quality of neighborhood (Zube, 1980), and sense of place (Rivlin, 1987). These explorations are either empirical (i.e., based on resident interviews) or theoretical (drawn from a variety of sources). There may be personal views of neighborhood (perception, attachment, place identity), functional views of neighborhood (the servicing of daily life needs), the social life view of neighborhood (social cohesion and interaction), neighborhood as a physical entity (cluster analysis of tract data), the economic life of neighborhood (neighborhood decline and revitalization), or the political life of neighborhood (the politics of neighborhood organizations).

It is useful to sort through these typologies and select some broad categories of neighborhood evaluation that are relevant to the study described here. In trying to better understand how residents view their local environs or neighborhoods, and to determine whether an evaluation in GIS would add to what we currently know about neighborhood evaluation, relevant literature for this article is segmented into three categories: the planning perspective, the social aspects of neighborhood, and environmental perception of local environments. These interrelated categories are not meant to be comprehensive—they are, rather, a useful way to organize a review of the different ways in which neighborhoods have been evaluated.

It should be recognized that neighborhoods represent a complex interplay of all three perspectives, and thus it is not surprising that there is no universal typology of evaluative approach that can be used. A neighborhood has multiple meanings and uses, and depending on the context, different aspects might become more or less important. In fact, people often use multiple definitions of a *neighborhood* simultaneously to describe various aspects of it (Lee, 1970). A further complexity is that these definitions evolve over time, reflecting the fact that neighborhood is not a static concept but rather a dynamic one, and its function and role in the life of the resident changes.

## The Planning Perspective

A planning perspective views the concept of *neighborhood* as a subunit that builds the physical and social fabric of a city. Neighborhoods are defined administratively for planning purposes, usually based on census geography (i.e., census tract boundaries). Besides facilitating physical organization, neighborhoods serve as a means of social organization whereby, it is believed, interaction among residents is based on shared values and interests. Sometimes these spatial units are delineated to identify different ethnic, religious, or social groups, or for administrative convenience in the provision of services. Socially defined neighborhoods often form naturally through the clustering of people with similar occupations, backgrounds, or interests (Banerjee & Baer, 1984).

With a focus on spatial differentiation, planning-related studies of the qualities of neighborhoods are used to uncover neighborhood-level features or services that are important in people's lives. These include quality of and access to local services (Wekerle, 1985), perceived housing opportunities (Cook, 1988), and various levels of density and population size (Baldassare & Wilson, 1995; Dahmann, 1985). Some of the identified variables become

the basis of neighborhood indicators (Sawicki & Flynn, 1996) and asset-based community development initiatives (Kretzmann & McKnight, 1993).

These views of neighborhood are consistent with the “classical” planning conception of *neighborhood* in the American context that became important at the end of the 19th century. Specifically, the idea of the neighborhood as a distinct, significant planning component of a larger metropolitan area was strengthened by the work of Ebenezer Howard (1898), who based his design of the Garden City on the neighborhood unit. In his Garden City, neighborhoods or “wards” were relatively self-sufficient units that merged together to form a complete city. This physical planning ideal was dictated by Howard’s explicit social agenda, which called for the creation of a polycentric “social city” that operated on the principles of “freedom and cooperation.”

Clarence Perry (1929) expanded on Howard’s ideas and articulated the concept of the *neighborhood* as a building block for a larger urban area in the 1929 *Regional Plan for New York and Its Environs*. His agenda, like Howard’s, had a strong social planning emphasis (Silver, 1985). He conceived of a prototypical “neighborhood unit” that would provide residents safe pedestrian access to basic necessities like an elementary school, community center, parks and playgrounds, and small stores—all of which would be integrated with the rest of the city by connecting thoroughfares at the edges of the neighborhood. Leading architects and town planners of the 1920s and 1930s such as Lewis Mumford, Clarence Stein, and Henry Wright embraced this idea, and a small number of projects such as Radburn, New Jersey, were developed based on Perry’s ideal. Although few developments were built that emulated the neighborhood-unit principle in pure form, the basic idea of urban subunits proved to be tremendously influential in planning practice.

The post–World War II era in the United States was characterized by a large-scale exodus of affluent and educated White families to outlying suburbs in an effort to escape the real or perceived conditions of congestion, crime, and urban deterioration (Jackson, 1985). The degree to which suburban neighborhoods were able to satisfy social needs is debated (Gans, 1967); however, the satisfaction of physical needs, especially in terms of access to services, most likely declined with the decrease in housing density and increase in land-use segregation associated with suburban development. Thus the pure conception of the *neighborhood unit* as put forth by Howard and later Perry was, in a planning sense, seriously altered. The importance of local area or neighborhood as a basis for planning has been resurrected more recently by neotraditional or New Urbanist planners (Congress for the New Urbanism, 2000). The traditional neighborhood

development (TND) model, based on Perry's original conception, is now presented as the basis for many new developments.

### **The Social Meaning of *Neighborhood***

Another evaluative approach comes not from town planning but rather sociology. It recognizes the neighborhood as a distinct physical area but places greater emphasis on the social relations among its residents. These relations are based on either a social component, consisting of various types of social interaction, or an affective component, involving a whole range of psychological and emotional responses. The social interaction component consists of social networks and the emotional support that can exist among neighbors. Such activity ranges from strong social relationships, for example, when there is an exchange of help or goods, to weak social ties, involving casual greetings (Granovetter, 1973). The affective component considers the psychological aspects of "sense of community," beyond overt social interaction (although in many ways tied to it). McMillan and Chavis (1986) identified the components of membership, influence, need fulfillment, and shared emotional connection as the main determinants of community.

Research on neighborhood social behavior has been a main topic of interest in sociological research. Cooley (1918), one of the leading sociologists at the beginning of the 20th century, considered the neighborhood to be one of the three principal forms of social organization; the other two being family and local children's groups. Park, Burgess, and McKenzie (1925) identified neighborhoods or "natural areas" within the city defined by urban subareas that contained a relatively homogeneous population. They visualized natural areas as an outcome of the rapid growth of the city—similar groups of people tending to cluster together to form "natural groups," forming "natural areas" that served as urban habitats. A large part of Burgess' work focused on the role of these natural areas or neighborhoods as a means of social and behavioral control within the heterogeneous urban environment (Olson, 1982).

Hunter (1979) proposed that the inherent sentiment in the "personal relationships of proximity and the common fate of shared space" defines a social bond among residents. This social bond is the essence of the neighborhood, and it transforms physical space into a social unit. Other important studies about the social dimensions of neighborhoods include Warren's (1978) neighborhood typology based on three dimensions of social organization; (a) the extent of individual identification with the local area, (b) the degree of social exchange between neighbors, and (c) the extent to which

the area is linked to the larger community. He identified six neighborhood types distinctive in several dimensions, including social organization, service delivery systems, and neighborhood receptivity to external forces of change.

Focusing on the social aspects of neighborhoods in more recent debates can lead to the conclusion that neighborhood as a source of social relationship has lessened in importance. Researchers have questioned the relevance of neighborhood in the context of growing "placeless" communities (see O'Brien & Ayidiya, 1991; Webber, 1963). Studies have concluded that primary social groups no longer have any territorial significance but consist of friends and relatives scattered throughout the city, leading to the identification of spatially discontinuous "personal neighborhoods" as the prevalent form of social organization in highly urbanized environments (Olson, 1982). Fischer, from his research in the San Francisco Bay Area, provided evidence that the absence of community at the neighborhood level does not create psychological problems as long as an individual can find sources of community elsewhere (O'Brien & Ayidiya, 1991). Others concluded that loss of neighborhood-level social life may nevertheless have a negative effect on quality of life. Drawing on the work of several researchers (Freudenberg, 1986; Marans & Rodgers, 1975), O'Brien and Ayidiya (1991) found that even though an individual might find social support elsewhere, his or her quality of life will be significantly affected by the extent to which he or she experiences neighborhood-level community.

Banerjee and Baer (1984) studied 22 different residential areas of Los Angeles in an attempt to understand how people perceive the social and physical aspects of their "residential area." They found that although the physical structure is significant, social classifications or "the kind of people living nearby" are more important in the description of residential areas. The degree of personal and/or property safety, availability of good quality services, and environmental issues such as air quality that were the other salient issues cited by residents were influenced more by the overall metropolitan structure than the neighborhood itself. Spatial representations of residential areas (maps drawn by residents) differed greatly among individuals, ranging from a single street intersection to a collection of several blocks, and low-income residents tended to delineate smaller geographic areas than high-income residents.

## **Environmental Perception**

Rather than focusing on physical or social dimensions, another area of interest in neighborhood evaluation examines the perceptive and cognitive



recognition of *neighborhood*. Of course, such an examination does not exclude physical and social dimensions but rather seeks to draw out, explicitly, perceptual and cognitive issues about neighborhood representation. Studies by Lynch (1960), Lee (1970), Bardo (1984), and Aitken, Stutz, Prosser, and Chandler (1993), for example, all stressed the perceptive and/or cognitive aspects of neighborhood evaluation. A common finding of these studies reiterates that the neighborhood image is a complex interplay of multiple variables based on very individualized perceptions.

Images of neighborhood can consist of designative aspects (cognitive organization of space) and appraisive aspects (feelings about the local environment; see Appleyard, 1970; Pocock & Hudson, 1978). In terms of designative aspects, the seminal work of Lynch (1960) provided initial insights into the identity and structure of imageability, or how residents orient themselves within the environment. Relatedly, geographers have investigated how cognition of the spatial environment involves landmark, route, and/or survey information (e.g., Aitken & Prosser, 1990; Golledge, 1978). Such cognition involves a spatial knowledge structure—a set of “symbol structures” that provide a basis for interpreting places in the external environment and for acquiring spatial knowledge (Aitken & Prosser, 1990; Golledge, 1987). In the context of neighborhood, residents can acquire “configurational knowledge” of their environment, according to which residents have the ability to navigate complex paths and nodes within an areal frame of reference (Golledge, 1990). At the neighborhood level, habitual behavior based on day-to-day routines within a local environment constitutes an additional basis of spatial cognition. This is significant in that it legitimizes resident-constructed GIS based on place familiarity rather than requiring “complex cognitive representations to interpret what is for residents a relatively familiar environment” (Aitken & Prosser, 1990, p. 306).

The appraisive aspects of residents’ imagery (Knox, 1995; Pocock & Hudson, 1978) are also implicated in neighborhood evaluation. Related research includes the notion of levels of environmental meaning as articulated by Lynch (1960), Appleyard’s (1976) studies of connotative meaning, Rapoport’s (1990) identification of environmental elements that communicate meaning, environmental assessment studies (Evans & Garling, 1991), and research on evaluative response or the likeability of particular urban areas (Nasar, 1998). Geographers have researched how individual appraisals of local environments can be spatially evaluated. An early study of residents’ feelings about the desirability of different neighborhoods in Los Angeles (Clark & Cadwallader, 1973) showed how the geography of preference was not a simple reflection of “objective” criteria such as socioeconomic status.

Gould's (1973) studies of regional preferences and Milgram's studies of psychological or mental maps (Milgram & Jodelet, 1976) are also applicable.

Lee's (1970) studies of the spatial meaning of *neighborhood* are particularly relevant to the kind of GIS-based evaluation described in this article. Lee investigated the "sociospatial schema" of residents, whereby territorial and social information in the local environment are combined into one cognitive representation. In a study in Cambridge, England, Lee (1970) asked residents to draw out a line on a map to delineate the area they considered as their neighborhood or district. Supplementing this information with their verbal descriptions, he distinguished three different types of neighborhoods—the social acquaintance neighborhood, the homogeneous neighborhood, and the unit neighborhood. These varied in size, degree of intimacy, and population heterogeneity. Lee found that density had no effect on the size of the neighborhood or on the number of friends in the locality irrespective of how the neighborhood was defined. Neighborhood involvement was, however, positively linked to social and physical (inclusion of stores and other amenities) heterogeneity in the locality.

Bardo's (1984) research in Hemel Hempsted in England also showed that multiple neighborhood conceptions exist within a single population—he identified the neighborhood of interaction, the neighborhood of support, the neighborhood of belonging, and the neighborhood of services. Moreover, about 55% of the respondents defined their "neighborhood" to be different from a more personal "area of belonging," which was typically smaller than the neighborhood. Another significant finding (also supported by Lee's research) was that very few of the neighborhood areas defined by the residents were as large as the planning neighborhoods. Therefore, although the planning neighborhood is important, residents are likely to include other factors in defining their personal neighborhoods.

## Summary

Given the diversity of analytical approaches and empirical research results briefly reviewed above, it is difficult to formulate a set of views that adequately characterize the meaning and importance of neighborhoods or local areas. The idea of *neighborhood*—its meaning and relevance—has fluctuated during the past 100 years, in terms of planning application and sociological interpretation. It is also known that perceptions vary widely among residents even when they live in close proximity, which helps explain why resident definitions of *neighborhood* differ fundamentally from the administrative definitions used by planners because the latter are usually concerned with generalization.

It is useful, however, drawing on the literature briefly reviewed, to attempt to pinpoint what the dominant issues in neighborhood evaluation appear to be. One issue is how well neighborhoods satisfy the physical and social needs of residents. In terms of physical needs, an interesting question is whether neighborhoods are able to satisfy nonsocial daily life needs through neighborhood physical design, and the extent to which residents are willing or able to satisfy those needs locally. In terms of the latter, neighborhoods have some ability to satisfy social needs, ranging from weak social ties and resident interaction to sense of community; however, the degree to which neighborhoods do in fact satisfy social needs is highly variable. Neither is the social function of neighborhood a universally accepted ideal. Finally, the environmental perception of *neighborhood* is likely to be highly personalized. This raises the question of whether neighborhood-based planning is in fact a viable exercise, and whether it is possible to determine what common perceptual elements, if any, exist.

A final note should be made about causality. If the underlying cause of various neighborhood evaluations is sought, it is important to recognize the impact of indirect effects and interaction variables. In terms of indirect effects, for example, residents may be more engaged with their local areas if their neighborhood is able to promote feelings of safety (Newman, 1972), in turn based on environmental design factors. In terms of interaction effects, if the evaluation of neighborhood varies by the resident's age, gender, presence of children, or stage in the life cycle, it is likely that there are interaction effects (see Franck, 1984). For example, residents in neighborhoods composed mainly of families with children typically show higher levels of participation in local activities than singles or childless couples in less family-oriented neighborhoods (see Nasar & Julian, 1995).

## Method

### The Use of GIS in Survey Research

Given its ability to represent spatial phenomena (such as neighborhoods) in an interactive, visual, and multidimensional way (i.e., integrating social and physical dimensions), GIS can potentially play a role in exploring many of the dimensions of neighborhood listed above. The approach taken in the current study was to investigate how residents evaluate neighborhood vis-à-vis the three different perspectives outlined above. Although there have been a few attempts to capture indigenous views (Aitken & Prosser, 1990; Harris & Weiner, 1998), the integration of indigenous views in GIS

generally occurs outside the domain of community or neighborhood level applications.<sup>1</sup>

The use of GIS in neighborhood evaluation offers a number of advantages. Substantively, a multidimensional view of neighborhood in GIS (i.e., using neighborhood data that is visual, dynamic, interactive, and interrelated) may help to better articulate resident evaluation. This is important because traditional neighborhood research in general is often criticized for relying too much on standard socioeconomic indicators, which may obfuscate how neighborhoods differ on a variety of other factors (see Ellen & Turner, 1997). The use of GIS may also enable a better linkage between neighborhood image (identity, spatial structure) and neighborhood meaning (likeability). Past research involving links between environmental images and social meaning (as in the work of Buttimer, 1972; Lee, 1968) could be broadened beyond neighborhood delineation to include more complex evaluative maps involving a range of neighborhood images.

There are also methodological advantages, and these benefits differentiate the use of GIS from conventional survey research methods. First, GIS provides the opportunity for residents to construct their evaluation in a dynamic, interactive format. Spatial phenomena, therefore, can be more responsive to idiosyncratic notions of neighborhood. In GIS, neighborhoods can be evaluated in an interactive manner such that the particular data layer presented can be added to and/or manipulated to reflect an image that is most meaningful to the resident.

Second, a GIS-based approach can be more accommodating of spatial phenomena that vary in intensity, that is, are expressed as probabilistic rather than absolute phenomena. The freedom to express neighborhood images in terms of relative meaning (e.g., as alternative future desired development patterns) frees the respondent from making absolute representations. Such absolutes may not adequately reflect resident views.

Third, evaluation in a GIS format gives the resident the ability to combine data layers such that the interrelationships of neighborhood maps and images add an additional level of meaning. By combining layers, the interrelationships that reflect social, political, and economic contexts are made explicit. This ability to combine levels of meaning, rather than being confined to more unidimensional representations, can, potentially, extend the realm of evaluative response.

Finally, GIS can enable individuals to communicate evaluations of neighborhood in such a way that the lack of mapping or communicative skill is overcome. Lack of communicative skill has, in fact, kept some individuals from full participation in the evaluative process. For example, it has been observed that working-class and female respondents tend to draw unsophisticated maps,

and that residents of inner-city areas have a “vaguer image of the city” than others (Knox, 1995, p. 264). It is reasonable to assume that GIS has the potential to overcome “unsophisticated” representations that are a product of poor drawing skill as opposed to limited perceptions of neighborhood.

## Case Study

To contribute to the research on neighborhood evaluation, and focusing in particular on resident evaluations of local areas, a survey using GIS software was conducted in Urbana, Illinois (see Figure 1). Urbana is a small (population approximately 36,000), midwestern college town and is the older and the smaller part of the twin-city region of Urbana–Champaign. Urbana has many mixed-use, traditionally designed residential areas and a small, quaint downtown. The thriving commercial centers in the region, including a large regional shopping mall, are located in Champaign, which therefore has a stronger economic base. Most of the growth in the region, including new, low-density subdivisions, occurs in Champaign, while Urbana faces a declining tax base. The flagship campus of the University of Illinois (the University of Illinois at Urbana-Champaign) is geographically situated between the two cities.

Conducting the GIS-based survey required, first, the development of a detailed GIS database. In building the GIS for Urbana, a main consideration was that the data be at a scale residents could usefully employ in neighborhood-level evaluation—that is, it had to be able to adequately represent locally defined issues. Abundant GIS data on natural topography, administrative boundaries, infrastructure, and demographic characteristics such as ethnicity and population density are available through a variety of sources, including the U.S. Census ([www.census.gov](http://www.census.gov)), the U.S. Geological Survey ([www.usgs.gov](http://www.usgs.gov)), and ESRI, a primary commercial distributor of GIS software and data ([www.esri.com](http://www.esri.com)). However, very little of this data is specific enough for neighborhood-level queries. Data from other commercial GIS vendors is often more detailed but is expensive and geared to business-location decision making rather than neighborhood evaluation.

Although this larger scaled data is useful, supplemental, neighborhood-scaled data must usually be obtained from local government planning agencies. One of the reasons Urbana was chosen for the current study is that the City of Urbana has a detailed GIS database available, the most important data being the land parcel boundaries and their associated attributes (i.e., land use). This data was supplemented with data from other sources, including field surveys. In addition, digital images of buildings, street intersections, streetscapes, and cityscapes were taken and linked to the maps to

**Figure 1**  
**Study Area Boundaries**



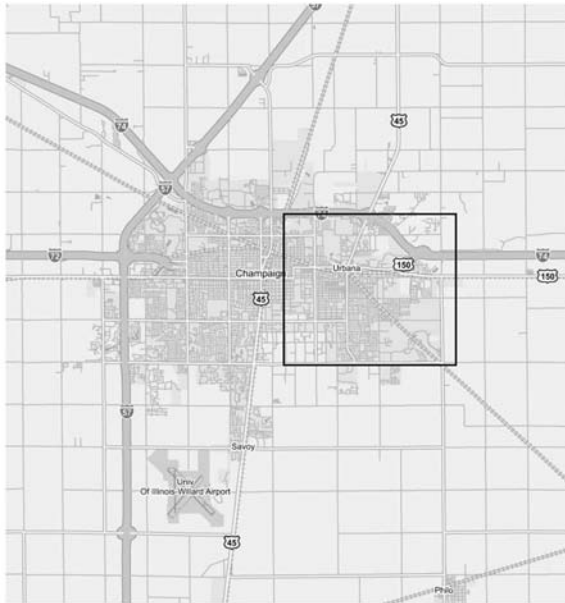
*(continued)*

provide a more three-dimensional representation. The goal was to incorporate variables that residents would find relevant, to represent data layers in an easy-to-understand format, and to build as comprehensive a representation as possible. ArcView 3.2, an ESRI product that has a high degree of user-friendliness, was chosen as the GIS software for the project.

GIS data layers or “themes” can be combined to present different views or representations of a spatial area. For the current study, the various layers available in GIS were used to construct 10 different representations or “views” (as they are called in ArcView). These were

1. The Champaign–Urbana region, including population distribution by census block for the whole of Champaign County, the locations and boundaries of both cities and the university, and major roads and buildings in the region.

**Figure 1 (continued)**



2. Land use, a map consisting of land parcels along the street network, with land uses depicted in different layers representing categorizations such as low, medium, and high-density residential, commercial, institutional, and so on.
3. Landmarks, including buildings of importance in the city and at the neighborhood level.
4. Neighborhood amenities, a map created to show the location and distribution of amenities that most residents would use frequently in their daily life, such as schools, parks, stores, churches, and health care centers.
5. Accessibility to schools, a map showing areas that are within walking distance to a school, assuming a maximum walk of 10 mins or ½ mile.
6. Commuting patterns, showing “travel to work” patterns, differentiating certain areas in the city as “less auto dependent,” presented at the block group level.
7. Housing, representing different aspects of housing in Urbana such as density, tenure, and value, at the block level.
8. Demographics, displaying the spatial distribution of various population attributes such as race and poverty characteristics, also at the census-block level.

9. Social issues, showing education, poverty, and unemployment by census block.
10. Crime, a map showing the total number of crimes committed in different areas in the city during the year 1999, obtained from the Urbana police department.

The survey itself consisted of an in-depth, structured session where the GIS facilitator had sufficient time to explain the various views, demonstrate some basic GIS operations, and then help the interviewee navigate through the various layers and respond to the survey questions. GIS facilitators were instructed to carefully avoid revealing their own preferences or recommending data layers or elements to select.

Because of the constraints mentioned above, the sample for the current survey was limited to 18 people. In an effort to make the sample somewhat representative of the Urbana population, interviews were conducted in two public places, the public library and an enclosed shopping area in downtown Urbana. A laptop computer was set up in a relatively high-traffic area in these locations, along with a sign inviting residents to participate in a Neighborhood Mapping Project. Eleven surveys were completed using this approach. A second approach was used to obtain responses from a targeted population: neighborhood organization members, city planning staff, and city council members were contacted and invited to participate in the survey, and seven interviews were conducted in this way. All respondents were residents of the City of Urbana (which was a requirement for respondent participation). Most of the participants were professionals, 13 held white-collar jobs, 3 were blue-collar workers, and the remaining 2 were homemakers. All respondents were White, although respondent ages varied from late 20s to mid-50s. A majority of the residents (10 of 18) had lived in their Urbana neighborhoods for more than 10 years, 5 of them had lived there for more than 4 years, and the remaining 3 for approximately 2 years.

Given the nature of the survey, most of the surveys were intensive, varying in length from 30 mins to 3 hrs, depending on the extent to which the participant wanted to be involved. It was assumed that the participant did not have any prior experience with GIS, therefore each interview began with some basic steps to build familiarity with the project and basic GIS functionality. The familiarization process consisted of two steps. First, respondents were shown the different views and/or maps in the GIS and the way different variables are represented, for example, parcels as polygons with color indicating land use, buildings as point symbols, and varying crime levels represented as color-gradated city blocks. Second, respondents were shown the use of some basic GIS tools. It was explained how a map could be



viewed at different scales by “zooming in” and “zooming out,” how distances and areas could be calculated, how attribute information could be obtained by clicking on any feature, and how different images could be created by turning layers on and off and copying and pasting layers from other maps.

When this orientation was completed, the evaluation of local area or neighborhood was started. Although the survey was open-ended, the following three questions were asked to elicit responses:

- The residents were asked to define their *neighborhood* boundaries, and the elements that they considered to be a significant part of their neighborhood. To discourage conditioned responses, use of the term *neighborhood* on the part of the interviewer (i.e., GIS facilitator) was avoided initially (using instead *your local area* or *the area where you feel most comfortable*). The responses were recorded by drawing either on existing maps or on a new map put together by the resident. Features and areas were annotated by the resident directly, or dictated to the facilitator.
- The residents were then asked to describe their “activity area” within the city—the places that they visited often, the routes that they traveled, and also the areas that they avoided. Their responses were again marked on whatever maps they considered most suitable for representation and supplemented by comments in text boxes.
- Finally, respondents were asked to identify what they liked and disliked about their local area or neighborhood. They were asked to comment on what they perceived as assets or deficiencies, problems, and weaknesses or strengths and opportunities. Whenever appropriate, the responses were marked on maps; otherwise they were recorded as text.

## Results

Considering the open-ended nature of the survey, a qualitative approach is used here to summarize the resident responses. Qualitative methods emphasize “the central role of subjective perception and the construction of personal meanings as determinants of how people experience reality” (Banyard & Miller, 1998, p. 488) and are particularly useful when only a few participants are involved and the questions are framed to elicit broad responses (Suchan & Brewer, 2000).

Presentation of the survey results in this section focuses on description, analysis, and interpretation. Description is a representation of responses or data, analysis moves further to identify key factors and interrelationships of factors from the responses, and interpretation is an effort on the part of the researcher to “make sense of the analysis” and to develop an understanding beyond the

certainty of the data (see Suchan & Brewer, 2000). All of the individual responses were studied and analyzed in detail; however, an attempt is made here to present a collective image of perceptions and opinions representative of the group or subgroups. A selection of individual responses—that is, GIS views put together by the respondents—are shown in Figures 2 through 6.

## Neighborhood Boundaries

As most neighborhood research has shown, people tend to have unique perceptions of what constitutes their neighborhood. In the current study, every participant felt that she or he lived in a “neighborhood,” and all but one could define a specific physical area as her or his neighborhood. One person who could not, felt that his neighborhood was not bounded by physical boundaries but rather extended out to wherever his friends were located in the region. This definition is reminiscent of “territorially detached” neighborhoods described by McClenahan and Sweetzer (as cited in Olson, 1982).

For those respondents who were able to delineate neighborhood boundaries, the size of the defined area varied significantly from 10 acres to about 400 acres. Some respondents included only a part of one or two blocks in their neighborhood, whereas others extended it far out to include a large section of the city. The elements used to define *neighborhood* varied and included physical features such as street pattern and housing type, social aspects ranging from strong friendships to loose ties resulting from similar social levels and lifestyles, individual activity patterns like walking areas, sentiments of place attachment, or characteristics such as common history. These varying perceptions reflect the complexity of neighborhood and reemphasize Bardo's (1984) conception that a neighborhood can serve multiple functions for different people and therefore have multiple meanings.

Perhaps it is not surprising, the respondents most knowledgeable about planning issues in the survey group—that is, the city planners, city officials, and neighborhood leaders—showed a greater propensity for using place characteristics (physical and social) such as streets and demographic information for determining neighborhood boundaries. Those directly involved with planning issues work regularly with formally demarcated physical areas, defined in Urbana as neighborhoods or wards, and their reliance on physical elements and formally defined social characteristics is likely a reflection of that influence. Conversely, nonplanning respondents tended to have more personalized definitions based on elements or activities that involved them directly: for example, location of friends, degree of familiarity with the area, personal characterizations of people living in the area, and the spatial range of a frequent activity such walking. Figures 2 and 3 illustrate two such responses. Both

Figure 2  
Response Map 1 – Neighborhood Image

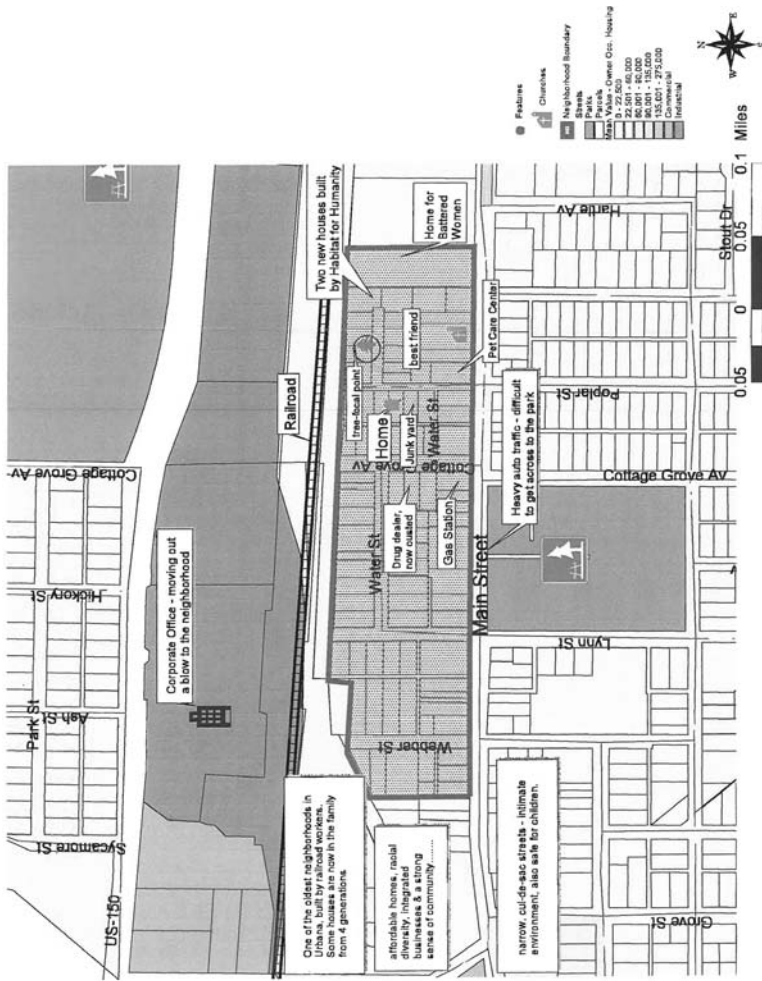
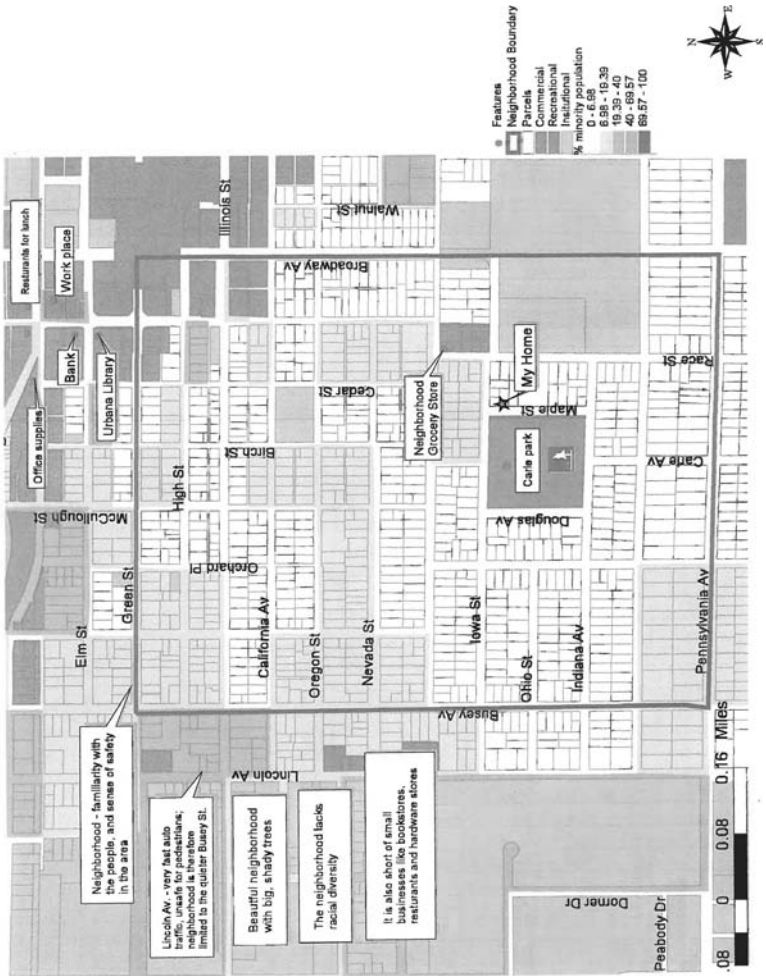


Figure 3  
Response Map 2 – Neighborhood Image



**Table 1**  
**Survey Questions Conducted in GIS Format**

---

Can you identify the block that you live on?
Do you live in a neighborhood?
Can you identify its boundaries?
Is there a center?
What themes or layers seem to have the most meaning in terms of representing your neighborhood identified above?
Now think in terms of a larger scale, outside of your neighborhood. What is your main activity area—what areas of the city and/or cities do you most frequent? What areas do you most frequently go to or travel through?
What themes or layers seem to have the most meaning in terms of representing the activity area identified above?
What do you think are this city's most distinctive features?
What blocks or neighborhoods in this area (Champaign/Urbana region) would you most like to live in, and why?
What do you dislike about this area (city as a whole, a particular area, or local area such as your neighborhood)?
What do you think are the biggest problems that this area has (city as a whole, a particular area, or local area such as your neighborhood)?
Is there anything that you think is lacking in this area? (if applicable – where would you put it?)
Are there particular areas that you avoid, or where you do not feel safe?

---

Note: GIS = Geographic Information Systems.

maps reflect responses that are similar to the “social acquaintance” neighborhood described by Lee (1970), although they are somewhat more complex in that they integrate place familiarity and sense of identity in addition to people familiarity (an element that was primary in Lee’s definition).

Other indications of the range of resident responses are shown in Figures 4 and 5. Figure 5 is a reflection of the “face-block” neighborhood described by Suttles (as cited in Banerjee & Baer, 1984) and is also closer to Lee’s “social acquaintance” neighborhood. Overall, and in keeping with Lee’s (1970) findings in Cambridge, U.K., resident definitions were unique, and therefore no “collectively acknowledged geographical area” was known by residents. Only the neighborhood leader in the sample identified a collectively defined area as the neighborhood (Figure 4).

The extent of social interaction was assessed by the resident’s response to a supplemental set of questions (Table 1). Questions about whether respondents felt they had neighbors they could rely on for company, whether they could ask small favors such as borrowing a cooking ingredient, or whether they felt they could seek moral support in times of crises are familiar measures (see, e.g., Unger & Wandersman, 1985). The results

Figure 4  
Response Map 3 – Neighborhood Image

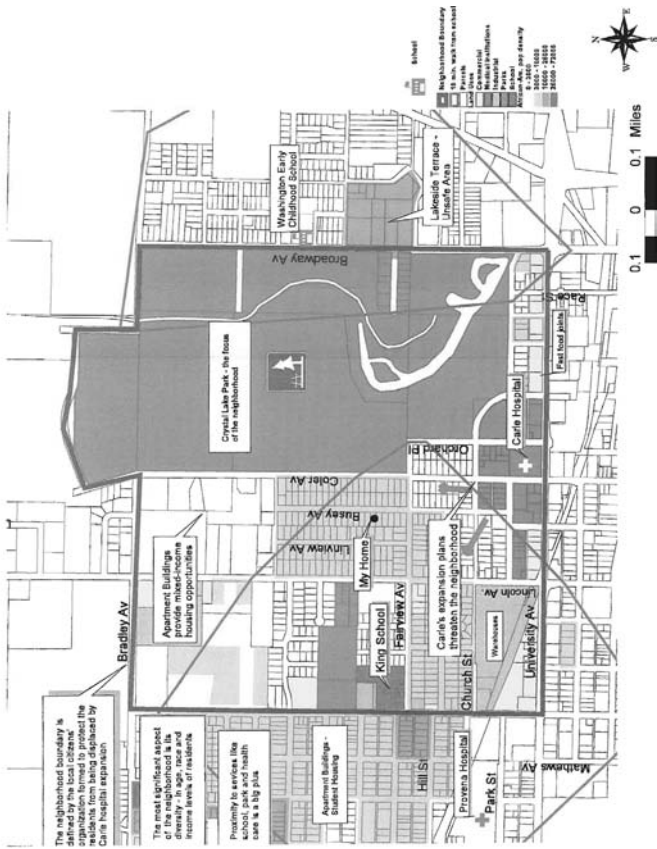
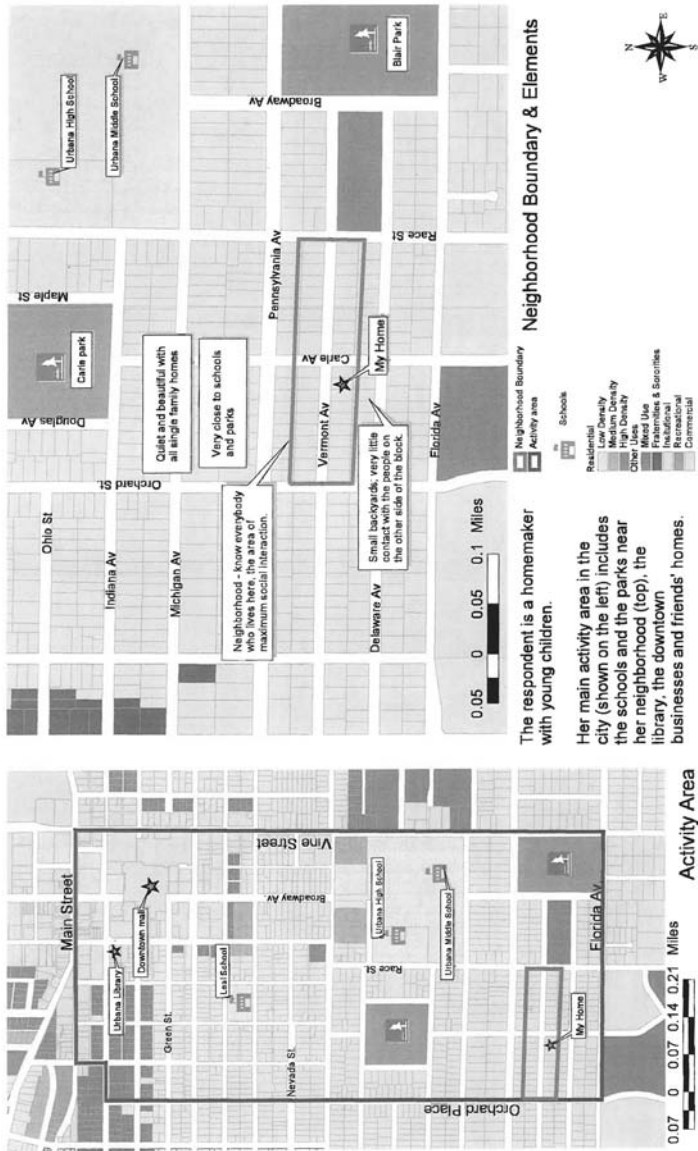


Figure 5  
 Response Map – Neighborhood Image and Activity Area



seemed to indicate that respondents who had a greater degree of social interaction within the neighborhood tended to use the locations of friends and acquaintances as boundary determinants much more often than people with comparatively little social interaction. The latter group relied more on physical characteristics such as street patterns, housing style, and formal definitions like *subdivision*. One hypothesis, then, is that if social ties with neighbors do exist, they are more important than the physical environment in determining neighborhood definition. This finding is congruent with what Banerjee and Baer (1984) observed in their studies in Los Angeles.

Where residents did include physical qualities in their neighborhood delineation, the location of facilities or service areas did not seem to be particularly important. Most often, when physical criteria were used, the appearance of the area and street patterns were more important than locations of amenities. Furthermore, when physical qualities were included in the delineation, they tended to be limited to schools and parks rather than commercial or other nonresidential areas.

Because the GIS database included explicit physical data, it was particularly helpful to those people who relied on physical characteristics to define neighborhood boundaries. For the others, it had value in the fact that respondents could translate their social relationships and activities to a physical area mapped out in detail with much greater ease, without having to rely on memory. Previous research has demonstrated that if the basic physical layout is already present, it is generally easier to concentrate on other qualitative aspects of the area (Shiffer, 1998).

## Neighborhood Elements

In addition to boundary delineation, the elements that were most important to residents in describing their neighborhood were investigated more specifically. To find these elements, residents were not only asked to choose from the various maps (views) and layers in the neighborhood GIS but were also shown how to add their own elements that might not have been displayed, using GIS as a kind of catalyst for remembering neighborhood characteristics.

The most important element that recurred in some form in every response was the location of the neighborhood with respect to other uses in the city. Type of development around (rather than within) the neighborhood, and the corresponding effect on travel patterns seemed to be important characteristics irrespective of whether the interviewee was involved in neighborhood planning issues directly. The relative importance of proximity to different uses, however, varied among individuals. For most people (13 of the 18 respondents), the distribution of neighborhood amenities such as schools,



parks, stores, and religious institutions was important. Significantly, although the respondents did not define their neighborhood boundaries based on the location of facilities, their presence or absence did affect their evaluation of the character of the neighborhood. Therefore, even though residents did not generally conceptualize their neighborhoods in a way that was consistent with Perry's (1929) neighborhood-unit configuration, they did seem to value the underlying concept of *accessibility to basic services*.

Some respondents identified externally located elements as contributing to internal neighborhood quality. For example, for some residents, proximity to the downtown or to the University campus were elements that gave special character to their adjacent neighborhood. Other elements contributing to neighborhood description, although less frequently used, were population characteristics (e.g., racial distribution, education, or income level of residents by census block); housing characteristics, such as type and age; and crime levels. All these elements were represented well in the GIS, and respondents found it easy to build a picture of their neighborhood by combining different GIS layers.

Some respondents felt the need to express neighborhood definition in terms of the aesthetics of neighborhood form, and for this GIS was less successful at facilitating representation. Neighborhood aesthetics include the architectural style of houses, the prevalence of street trees, the brick paving of streets, and the colors and the textures of buildings. These aesthetic aspects, which seemed to be an important basis of neighborhood evaluation for some residents, are best portrayed as three-dimensional elevations, and thus are somewhat awkward to portray in GIS. This underscores previous calls for a better integration between GIS and multimedia techniques (e.g., 3-D visualizations) or even traditional techniques such as sketching (see Al-Kodmany, 1998).

## Local Activity Areas

The respondents were asked to indicate the places or areas in the city that they visited or traveled through frequently (at least once a week) as a part of their regular activities. They could describe their activity pattern in several ways—as locations of destinations (points), as a general area within which most of their activities took place (polygons), as routes they traveled (lines), or any combination of these. The residents were also asked to indicate what they liked and disliked about these destinations and routes.

A majority of the respondents (15 of 18 respondents) defined their activity patterns in terms of definite destinations rather than a general area. In all cases, very few of these destinations were located within the area defined as the

neighborhood. This is, of course, dependent on the fact that many residential neighborhoods in Urbana lack a complete set of uses and facilities internally. Yet even in the more mixed use neighborhoods, respondents indicated geographically dispersed activity areas. Residents indicated that they traveled to many different parts of the region not only to get to work but also to buy their groceries and do other shopping and service-related activities. Even when the activity pattern was defined as a more specific area, it was much larger than the area defined as the neighborhood (Figures 5 and 6). This finding supports one of the main conclusions of Banerjee and Baer (1984).

It is interesting, however, that this finding did not hold for the case of parks. Residents were much more likely to confine their activity area for parks to those located within the neighborhood. Thus, where residents were willing to travel throughout the region for various retailing activities, travel to parks was confined to local areas. This was also true for schools, although in the case of schools, relevant destinations are largely determined by districting rules.

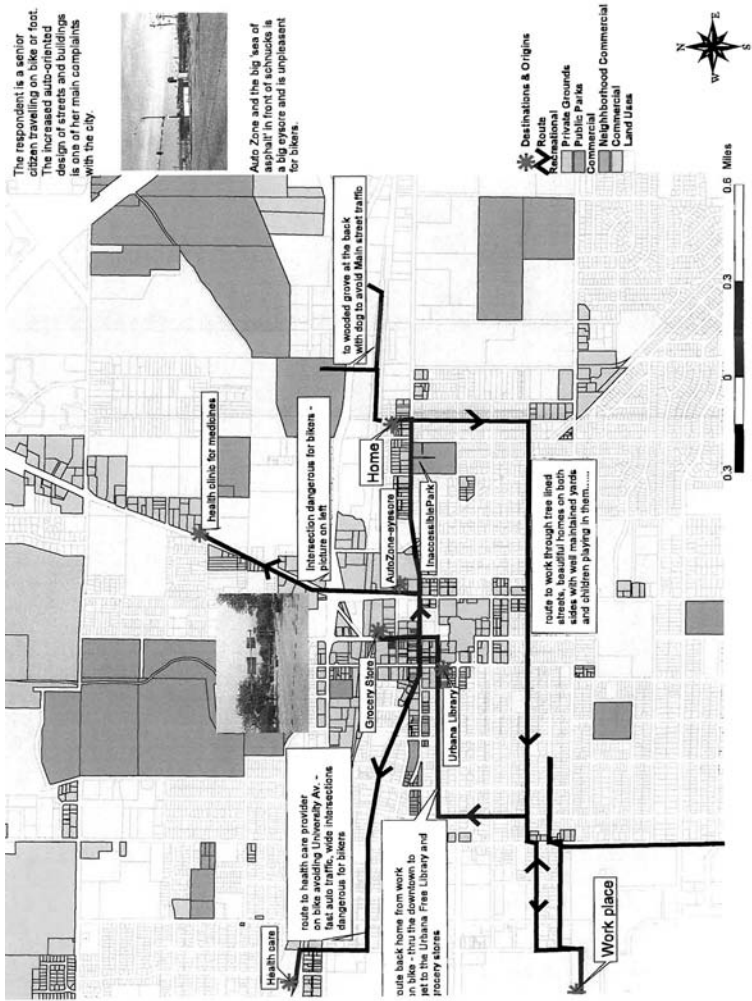
In terms of route preferences, most people said they wanted to avoid the busy arterial roads not only while walking and biking but also when they were traveling by car to reach different places within the city. They frequently identified longer routes used to avoid congestion. While walking or biking, respondents showed a preference for using neighborhood roads selectively, choosing those considered "pleasant" because of shady trees, good sidewalks, nice houses with well maintained yards, and the presence of people (Figure 6).

The GIS data layers that were the most useful in evaluating activity areas were those showing the street network, detailed land uses, and point locations of amenities and landmarks. The hot-linked images were found to be highly useful. Buildings, street intersections, and streetscapes helped respondents orient themselves in different GIS views and describe their routes specifically. Respondents also identified missing data that they believed would have been useful in evaluating activity areas; specifically, traffic counts on some major roads, and maps showing bike lanes and transit routes.

## **Assessment of Residents' Likes and Dislikes**

To develop a better understanding of what neighborhoods mean to residents, it is important to know how they delineate and define not only them but also what elements and issues they consider to be positive or negative. Thus respondents were asked about what they liked or disliked about their neighborhoods, and what they perceived as strengths or weaknesses. They were also asked how these factors contributed to their sense of satisfaction with their place of residence.

Figure 6  
Response Map 5 – Activity Area



There was a high level of satisfaction in the survey sample regarding neighborhoods, which is a common phenomenon in residential studies (Michelson, 1977). Most of the residents (14 of the 18 respondents) felt that their current neighborhood was the best place in the city for them to live. Their proximity to the downtown, to schools and parks, or to the University campus in the east were important, positive features. Generally, they also valued the physical appearance of their neighborhood—presence of old houses with unique architecture, large shade trees, quiet streets with sidewalks, and the walkability that these qualities produced. Two respondents who lived a few blocks away in comparatively newer developments felt that the older neighborhoods were better places to live in for these same reasons. At the same time, however, two residents indicated a preference for newer subdivisions at the outskirts of the city where they could afford larger houses and more open space.

The demographic makeup of other people living in the neighborhood was another significant component of neighborhood assessment. Respondents from the older neighborhoods close to the University campus viewed the presence of a large number of University faculty in their neighborhood as a positive feature. Another respondent from one of the most racially diverse neighborhoods in Urbana, which is otherwise predominantly White, felt that diversity was the strongest and most attractive aspect of the neighborhood.

There was a strong appreciation for the historic charm of the city and its neighborhoods, and many residents identified historic building locations on the map. Residents mostly perceived Urbana as a beautiful city that has retained its history and “small town character,” and many identified historical quality as the primary contributor of that character. History was perceived by many to be the greatest asset of the city and its neighborhoods.

The sources of neighborhood dissatisfaction fell into two categories, neither of which, it is interesting to note, were particularly well suited to GIS representation. First, some respondents characterized what they saw as negative neighborhood qualities in very personal, often nongeographic (i.e., nonlocationally specific) terms. For example, some respondents expressed dissatisfaction with the behavior of their neighbors, such as neighbors being too noisy or not shoveling their sidewalks. One respondent complained of a neighbor using a lot for storing “junk” and creating a visual nuisance in the neighborhood. Others complained about trees being cut down by utility companies. Where disliked qualities were more physically (rather than behaviorally) oriented, it was difficult for the respondents to pinpoint such characteristics in a spatially specific way. Examples include poor design of streets and parking areas, and blight caused by vacant buildings—issues that were identified as destroying the character of the city.

The second category of disliked qualities was also nonspecific in geographic terms. This category can be described as “economic issues.” The most significant issue that recurred in almost every response was the perception of a lack of diverse business in the city and a resultant decline in the city’s tax base. Respondents expressed a need for different kinds of businesses, particularly retailing, and this was tied to the needs of current residents and economic growth in general. In either case, responses were generally undefined in specific locational terms, and thus the applicability of GIS for this type of evaluation was not clear. This may be an issue of scale representation—that is, economic growth issues may be perceived as a city-wide rather than a neighborhood-level issue.

## Summary and Conclusion

Although it is not possible to generalize about the meaning of *neighborhood* based on the small sample size reported here, the value of the current study is its potential to tease out previously overlooked aspects of resident evaluation. What the current study revealed was that, when represented in GIS, issues having to do with boundaries, elements, activity areas, and likes and dislikes take on a somewhat different perspective than may be revealed using more conventional methods. More specifically, the current study yielded the following observations, any of which could be used as a basis for further exploration:

- Given the explicit spatial nature of GIS, neighborhood evaluation using GIS seemed to be best suited for boundary delineation and for identifying the location of elements and activity areas that were part of the neighborhood definition. Most of these aspects of neighborhood have explicit spatial qualities.
- Identification of what is liked and disliked about neighborhood—that is, incorporating the explicit use of neighborhood preference—seemed to be less conducive to GIS representation. This was especially true of disliked elements, which often consisted of personal or nongeographically specific components.
- The geographic realm of neighborhood differed not only by respondent but also by the type of element being associated with conceptions of *neighborhood*. This was seen in the difference between the widely cast activity area for commercial activities, as opposed to the much more localized area identified for parks and schools. This could indicate that some neighborhood elements have a more localized meaning, while others do not.
- The responses seemed to indicate that scale is an important issue in neighborhood evaluation. Although there was perhaps no clear pattern that

emerged, it seemed that the evaluation of neighborhood changed in relation to a “zoomed in” or “zoomed out” perspective of the region. It is unclear whether scale functions as cause or effect in the evaluation of neighborhood, only that evaluative aspects were not scale independent.

These observations about neighborhood evaluation may not necessarily be new; however, their investigation via GIS supplies, we believe, an alternative evaluative perspective. Predominantly, that perspective has to do with the way GIS allows the exploration of geographic aspects of neighborhood—a perspective not usually sought out, in part because of the lack of an appropriate, feasible method for gauging meaning in a spatial context.

This has policy implications because it constitutes an expansion of conventional uses of GIS in local community planning (i.e., beyond dissemination of government-generated data). At the local community level, this shifts the use of GIS away from information provider toward the use of GIS as an exploratory instrument for generating new ideas. Ultimately, GIS-based resident evaluation could be incorporated into neighborhood planning as a standard methodology. For this to happen, it will be necessary for resident evaluation of neighborhood to be elevated to the level afforded basic socioeconomic or environmental database themes that have become standard in community-level GIS. By seeking ways to build multiple perceptions of reality into a neighborhood GIS (e.g., using various resident perceptions of what is liked and disliked about a neighborhood), there is an increased ability to interconnect “fact” and value, the separation of which is a common critique of conventional GIS. One way to do this would be to combine the evaluations of individual residents into a composite, value-based layer in GIS that is then compared to more “objective” GIS representation.

There is an obvious technical drawback. The method described here is highly labor intensive. Even if the GIS data is readily available, it requires a good deal of patience to conduct computer-based surveys using an “opportunity sampling” approach—that is, waiting for willing participants in a public location. Going door to door with a laptop computer is not particularly feasible. This situation may be improved in the future, particularly if there is a need to conduct randomized, large sample surveys. One method would make use of Internet Mapping Server (IMS) software, which allows interactive use of GIS over the Internet. It may be possible to use this software in conjunction with preselected panels that respond to Web-based surveys.<sup>2</sup> Until these methods become more accessible, however, we believe the use of GIS as an exploratory tool presents a critical opportunity for neighborhood research, allowing basic questions of neighborhood evaluation to be explored in a new light.

## Notes

1. A few exceptions exist. First, planners in Portland, Oregon, have been working on a public participation Geographic Information System (GIS) that incorporates “traditionally intangible information,” such as how residents value their homes, feeling about the uniqueness of a given area, and other value-based information (Bosworth & Donovan, 1998). Another example is the work of Krygier (1998) and Chang (1997) in a neighborhood in Buffalo, New York. There, researchers have investigated ways in which residents can “make and un-make information and thus shape and reshape the way they understand their neighborhood” in a process called “sense making” (Krygier, 1998, p. 2).

2. For example, Knowledge Networks uses random digit dialing to select a panel of respondents who are encouraged to complete surveys over a WebTV unit provided to them free of charge ([www.knowledgenetworks.com](http://www.knowledgenetworks.com)). This methodology could be combined, potentially, with Internet Mapping Server software to allow participants to respond using GIS interactively.

## References

- Adams, R. E. (1992). A tale of two cities: Community sentiments and community evaluation in Indianapolis and Pittsburgh. *Sociological Focus*, 25(3), 217-240.
- Aitken, S., Stutz, F., Prosser, R., & Chandler, R. (1993). Neighborhood integrity and resident's familiarity: Using a geographic information system to investigate place identity. *Tijdschrift voor Economische en Sociale Geografie*, 84(1), 2-12.
- Aitken, S. C., & Prosser, R. (1990). Residents' spatial knowledge of neighborhood continuity and form. *Geographical Analysis*, 22, 301-326.
- Al-Kodmany, K. (1998, October). *GIS and the artist: Shaping the image of a neighborhood in participatory environmental design*. Position paper presented at Project Varenus Specialist Meeting: Empowerment, Marginalization and Public Participation GIS, Santa Barbara, CA [Online]. Available at [www.ncgia.ucsb/varenus/ppgis/papers](http://www.ncgia.ucsb/varenus/ppgis/papers)
- Appleyard, D. (1970). Styles and methods of structuring a city. *Environment and Behavior*, 2, 100-117.
- Appleyard, D. (1976). *Planning a pluralist city: Conflicting realities in Ciudad Guayana*. Cambridge, MA: MIT Press.
- Baldassare, M., & Wilson, G. (1995). More trouble in paradise? Urbanization and the decline in suburban quality-of-life ratings. *Urban Affairs Review*, 30(5), 690-708.
- Banerjee, T., & Baer, W. C. (1984). *Beyond the neighborhood unit: Residential environments and public policy*. New York: Plenum.
- Banyard, V. L., & Miller, K. E. (1998). The powerful potential of qualitative research for community psychology. *American Journal of Community Psychology*, 26(4), 485-505.
- Bardo, J. W. (1984). A reexamination of the neighborhood as a socio-spatial schema. *Sociological Inquiry*, 54(3), 346-358.
- Bosworth, M., & Donovan, J. (1998, October). *A mapmaker's dream: Public involvement applications utilization of GIS*. Position paper presented at Project Varenus Specialist Meeting: Empowerment, Marginalization and Public Participation GIS, Santa Barbara, CA [Online]. Available at [www.ncgia.ucsb/varenus/ppgis/papers](http://www.ncgia.ucsb/varenus/ppgis/papers)
- Buttner, A. (1972). Social space and the planning of residential areas. *Environment and Behavior*, 4, 279-318.

- Chang, K. (1997). The design of a web-based geographic information system for community participation. Unpublished master's thesis, State University of New York at Buffalo. Available at [www.geog.buffalo.edu/~jkrygier/](http://www.geog.buffalo.edu/~jkrygier/)
- Chavis, D. M., & Wandersman, A. (1990). Sense of community in the urban environment: A catalyst for participation and community development. *American Journal of Community Psychology, 18*(1), 55-81.
- Clark, W. A. V., & Cadwallader, M. T. (1973). Residential preferences: An alternate view of intra-urban space. *Environment and Planning A, 5*, 693-703.
- Cook, C. C. (1988). Components of neighborhood satisfaction: Responses from urban and suburban single-parent women. *Environment and Behavior, 20*(2), 115-149.
- Congress for the New Urbanism. (2000). *Charter of the new urbanism*. New York: McGraw-Hill.
- Cooley, C. H. (1918). *Social process*. New York: Charles Scribner's Sons.
- Dahmann, D. (1985). Assessments of neighborhood quality in urban America. *Urban Affairs Quarterly, 20*(4), 511-535.
- Ellen, I. G., & Turner, M. A. (1997). Does neighborhood matter? Assessing recent evidence. *Housing Policy Debate, 8*(4), 833-866.
- Evans, G. W., & Garling, T. (1991). *Environment, cognition, and action: An integrated approach*. New York: Oxford University Press.
- Freudenberg, W. R. (1986). The density of acquaintanceship: An overlooked variable in community research? *American Journal of Sociology, 92*(1), 27-63.
- Franck, K. A. (1984). Exorcising the ghost of physical determinism. *Environment and Behavior, 16*(4), 411-435.
- Gans, H. (1967). *The Levittowners*. New York: Random House.
- Golledge, R. G. (1978). Learning about urban environments. In T. Carlstein, D. Parkes, & N. Thrift (Eds.), *Timing space and spacing time* (Vol. 1, pp. 76-98). London: Edward Arnold.
- Golledge, R. G. (1987). Environmental cognition. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 131-171). New York: John Wiley.
- Golledge, R. G. (1990). The conceptual and empirical basis of a general theory of spatial knowledge. In M. M. Fischer, P. Nijkamp, & Y. Y. Papageorgiou (Eds.), *Spatial choices and processes* (pp. 147-168). Amsterdam: North-Holland Elsevier Science Publishers B. V.
- Gould, P. (1973). On mental maps. In R. M. Downs & D. Stea (Eds.), *Image and environment: Cognitive mapping and spatial behavior* (pp. 182-222). Chicago: Aldine.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*, 1360-1380.
- Harris, T., & Weiner, D. (1998). Empowerment, marginalization and "community-integrated" GIS. *Cartography and Geographic Information Systems, 25*(2), 67-76.
- Howard, E. (1898). *To-morrow: A peaceful path to real reform*. London: Swan Sonnenschein.
- Hunter, A. (1979). The urban neighborhood: Its analytical and social contexts. *Urban Affairs Quarterly, 14*(3), 267-288.
- Jablonsky, T. J. (1993). *Pride in the jungle: Community and everyday life in back of the yards Chicago*. Baltimore: Johns Hopkins University Press.
- Jackson, K. (1985). *Crabgrass frontier: The suburbanization of the United States*. London: Oxford University Press.
- Jacob, S. G., & Willits, F. K. (1994). Objective and subjective indicators of community evaluation: A Pennsylvania assessment. *Social Indicators Research, 32*, 161-177.
- Knox, P. (1995). *Urban social geography*. Essex, UK: Longman.



- Kretzmann, J. P., & McKnight, J. L. (1993). *Building communities from the inside out: A path toward finding and mobilizing a community's assets*. Chicago: ACTA Publications.
- Krygiar, J. B. (1998, October). *The praxis of public participation GIS and visualization*. Position paper presented at Project Varenius Specialist Meeting: Empowerment, Marginalization, and Public Participation GIS, Santa Barbara, CA [Online]. Available at [www.ncgia.ucsb.edu/varenius/ppgis/papers](http://www.ncgia.ucsb.edu/varenius/ppgis/papers)
- Lee, T. (1968). Urban neighborhood as a socio-spatial schema. *Human Relations*, 21, 241-268.
- Lee, T. (1970). Urban neighborhoods as a socio-spatial schema. In H. M. Proshansky (Ed.), *Environmental psychology: Man and his physical setting* (pp. 349-370). New York: Holt, Rinehart & Winston.
- Logan, J. R., & Molotch, H. (1987). *Urban fortunes*. Berkeley: University of California Press.
- Lynch, K. (1960). *The image of the city*. Cambridge, MA: MIT Press.
- Marans, R. W., & Rodgers, W. (1975). Toward an understanding of community satisfaction. In A. H. Hawley & V. P. Rock (Eds.), *Metropolitan America in contemporary perspective* (pp. 299-352). New York: John Wiley.
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, 14, 6-23.
- Michelson, W. H. (1977). *Environmental choice, human behavior, and residential satisfaction*. New York: Oxford University Press.
- Milgram, S., & Jodelet, D. (1976). Psychological maps of Paris. In H. Proshansky, W. Ittleson, & L. Rivlin (Eds.), *Environmental psychology: People and their physical settings* (pp. 104-124). New York: Holt, Rinehart & Winston.
- Nasar, J. L. (1998). *The evaluative image of the city*. Thousand Oaks, CA: Sage.
- Nasar, J. L., & Julian, D. A. (1995). The psychological sense of community in the neighborhood. *Journal of the American Planning Association*, 61(2), 178-184.
- Newman, O. (1972). *Defensible space: Crime prevention through urban design*. New York: Simon & Schuster.
- O'Brien, D. J., & Ayidiya, S. (1991). Neighborhood community and life satisfaction. *Journal of the Community Development Society*, 22(1), 21-37.
- Olson, P. (1982). Urban neighborhood research: its development and current focus. *Urban Affairs Quarterly*, 17(4), 491-518.
- Park, R. E., Burgess, E. W., & McKenzie, R. D. (1925). *The city*. Chicago: University of Chicago Press.
- Perry, C. A. (1929). *The neighborhood unit: A scheme of arrangement for the family-life community* (Regional study of New York and its environs, VIII, neighborhood and community planning, Monograph 1, pp. 2-140). New York: Regional Plan of New York and its Environs.
- Pocock, D., & Hudson, R. (1978). *Images of the urban environment*. London: Macmillan.
- Rapoport, A. (1990). *The meaning of the built environment*. Tucson: University of Arizona Press.
- Rivlin, L. G. (1987). The neighborhood, personal identity, and group affiliations. In I. Altman & A. Wandersman (Eds.), *Neighborhoods and community* (pp. 1-34). New York: Plenum.
- St. John, C. (1987). Racial differences in neighborhood evaluation standards. *Urban Affairs Quarterly*, 22(3), 377-398.
- Sampson, R. J. (1991). Linking the micro and macro level dimensions of community social organization. *Social Forces*, 70(1), 43-64.
- Sawicki, D. S., & Flynn, P. (1996). Neighborhood indicators: A review of the literature and an assessment of conceptual and methodological issues. *Journal of the American Planning Association*, 62(2), 165-183.

- Shiffer, M. J. (1998). Multimedia GIS for planning support and public discourse. *Cartography and Geographic Information Systems*, 25(2), 89-94.
- Silver, C. (1985). Neighborhood planning in historical perspective. *Journal of the American Planning Association*, 51(2), 161-174.
- Suchan, T. A., & Brewer, C. A. (2000). Qualitative methods for research on mapmaking and map use. *Professional Geographer*, 52(1), 145-154.
- Talen, E. (2000). Bottom-up GIS: A new tool for individual and group expression in participatory planning. *Journal of the American Planning Association*, 66(3), 279-294.
- Taylor, R. B. (1996). Neighborhood responses to disorder and local attachments: The systemic model of attachment, social disorganization, and neighborhood use value. *Sociological Forum*, 11(1), 41-74.
- Unger, D. G., & Wandersman, A. (1985). The importance of neighbors: The social, cognitive and affective components of neighboring. *American Journal of Community Psychology*, 13, 139-170.
- Vreugdenhil, A., & Rigby, K. (1987). Assessing generalized community satisfaction. *Journal of Social Psychology*, 127(4), 367-374.
- Warren, D. I. (1978). Explorations in neighborhood differentiation. *Sociological Quarterly*, 19, 310-331.
- Webber, M. (1963). Order in diversity, community without propinquity. In L. Wingo Jr. (Ed.), *Cities and space: The future use of urban land* (pp. 23-56). Baltimore: Johns Hopkins University Press.
- Wekerle, G. R. (1985). From refuge to service center: Neighborhoods that support women. *Sociological Focus*, 18(2), 79-95.
- Zube, E. H. (1980). *Environmental evaluation: Perception and public policy*. Monterey, CA: Brooks/Cole.

**Emily Talen** is a professor in the Department of Urban and Regional Planning at the University of Illinois at Urbana-Champaign.

**Swasti Shah** works as a planning consultant in Chicago.