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Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and objective indicators[☆]

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Abstract

A major program of research aimed at measuring the quality of community life using subjective and objective indicators is described. Impetus for the research was a need to inform planning and policy decisions in the Detroit metropolitan area. The study also addresses theoretical concerns about relationships between objective conditions in cities, towns and rural areas and people's subjective and behavioral responses to the conditions. In addition to measuring subjective well being of Detroit area residents, issues explored in the study include travel and transportation, neighborhoods and neighboring, parks and recreation behavior, housing and residential mobility, and sprawl and open space preservation. The program of research also involves parallel studies in other world cities.

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1. Introduction

During the past quarter century, a number of scholars operating at the interface of the social sciences and planning and other design professions have argued that quality of any entity has both a subjective dimension as well as an objective reality. Central to this assertion is the meaning of quality of both built environments and natural environments. This paper supports the contention that a better understanding of the meaning of environmental quality requires systematic study of the interrelationships between objective measures of environmental phenomena and people's responses to them. Furthermore, it suggests that such

study can occur within the context of quality of life research. This paper begins with a review of quality of life research that acknowledges linkages between objective and subjective measures. It then discusses the Detroit Area Study (DAS 2001), a major program of research aimed at measuring one aspect of quality of life—the quality of place or community life. Finally, The paper concludes with a discussion of the rationale for launching parallel studies in other world cities.

2. Meaning and measurement of quality of life

In the introduction to their comprehensive book on well-being, Kahneman et al. (1999) present an overview of the literature which addresses global evaluations of life (quality of life) and indicate that the quality of life experience is embedded in the cultural and social context of both the subject and the evaluator

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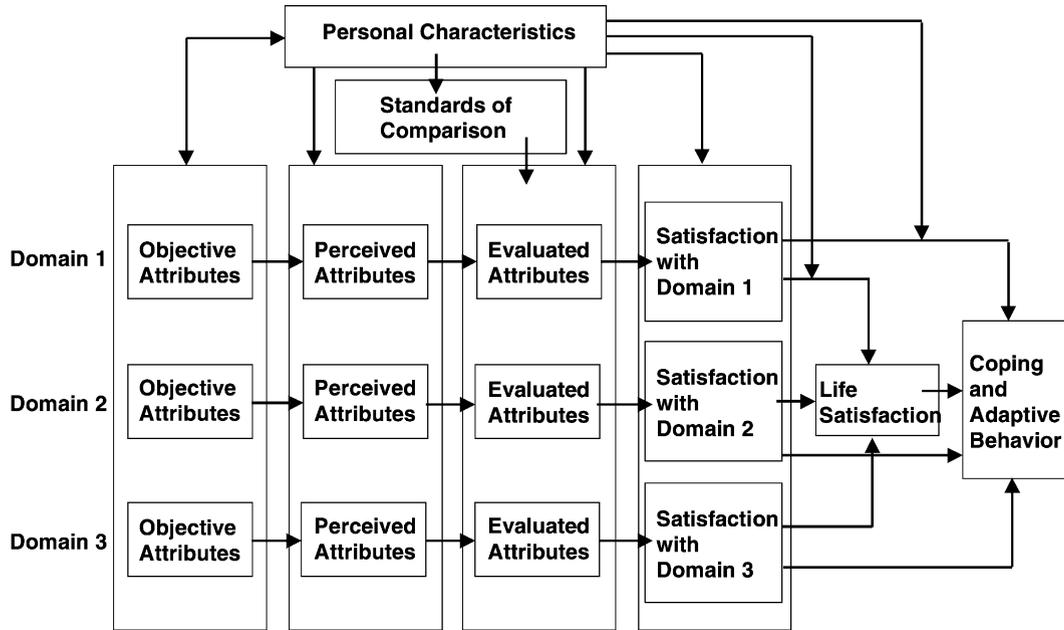
(1999; *x*). They also suggest that objective characteristics of a society like poverty, crime rates, and pollution contribute predominantly to people's judgments of their lives. A precedent for these statements is the work of Campbell et al. (1976) whose conception of the quality of life experience (or what they referred to as individual well-being) was operationalized in a seminal study that measured people's perceptions, evaluations, and satisfactions. Using questionnaires administered to a sample of over 2000 US residents, the researchers focused on the holistic experience of life rather than on actual conditions of life. In doing so, Campbell et al. addressed the concept of satisfaction rather than happiness, considered in earlier studies of well being (Bradburn and Caplowitz, 1965; Bradburn, 1969). Satisfaction was viewed as more definable to researchers, and implied a judgmental or cognitive experience whereas happiness reflected a relatively short-term mood of elation or gaiety. Satisfaction was also considered a more plausible and realistic objective for policy makers than that of creating happiness (gaiety), and the researchers were interested in generating data that could potentially influence public policy. Finally, Campbell et al. believed that "satisfaction" was more appropriate to the goals of their study than "happiness". Their intent was to measure and compare people's assessments of several domains of their lives as well as "life as a whole", and determine the degree to which each domain explained the quality of life experience. Domains considered were health, marriage, housing, family, friendships, financial situation, leisure, and community or place of residence.

In addition to the satisfaction measures, Campbell et al. believed that context and evaluator or person characteristics were important to understanding quality of life. Context was considered to be the actual conditions of life or what they referred to as objective attributes. Nonetheless, their efforts to measure these attributes as part of their empirical work were modest. With respect to domain satisfactions, Campbell et al. suggested that domain satisfactions were a reflection of people's assessments and perceptions of domain attributes which in turn, were influenced by the objective attributes (characteristics) themselves. For example, job satisfaction was seen as a function of a person's assessment of the many attributes of the job such as degree of autonomy, relationships with

coworkers, wages and so on. Furthermore, assessment of wages was considered a function of the person's actual salary. Similarly, perceptions of crowding in a dwelling were expected to be associated with an objective measure such as the number of people per room or another measure of housing density. Their conceptualization is shown in Fig. 1 and is similar to the views of Kahneman et al. on the role of the objective world in understanding subjective well being.

Schwarz and Strack (1999) however contend that, at least with respect to measurements of subjective well being, the association with an individual's objective conditions of life has often been weak in empirical studies. Although linkages between objective attributes of selected domains and domain satisfaction have been examined in past research (see Warr, 1987, 1999 for a review of such research dealing with work), studies exploring objective-subjective relationships in other domains such as housing or community have been limited. Studies focusing on quality of life in cities present an opportunity to explore such relationships. They enable us to better understand the meaning of quality of life in cities and the manner in which it can be measured.

Building on the working of Campbell et al., Marans and coworkers began to explore these issues from a conceptual and empirical perspective (Marans and Rodgers, 1975; Lee and Marans, 1980; Connerly and Marans, 1985, 1988). It was asserted that quality of a place or geographic setting (city, neighborhood, or dwelling) was a subjective phenomenon, and that each person occupying that setting may differ in his/her views about it. Furthermore, those views would reflect their perceptions and assessments of a number of setting attributes that could be influenced by certain characteristics of the occupant, and his or her needs and past experiences. The past experiences represent a set of standards against which current judgments are made. These standards or references include other settings experienced by the occupant, and settings to which the occupant aspires. Finally, it is suggested that the occupant's assessments and perceptions of setting attributes are associated with the attributes themselves. As noted above, the degree to which a person feels crowded at home is expected to be related to some degree to the number of people in his household per room (i.e. housing unit density). At the neighborhood level, assessments of air quality and



* From Campbell, Converse, and Rodgers, 1976.

Fig. 1. Model showing relationship between domain satisfactions and life satisfaction.

family health (e.g. incidence of asthma) are likely to be associated with objective air quality measures in the neighborhood. The model depicting these relationships for different residential domains and how these domains together with other domain satisfactions contribute to quality of life is shown in Fig. 2.

An important assumption underlying the model is that the quality of any geographic setting (i.e. city, neighborhood, house, etc.) can not be captured with a single measure. Rather, measures of the multiple attributes of the setting in question are needed. In combination, they reflect the overall quality of the setting. A second important assumption is that quality is a subjective phenomenon reflecting the lives of the setting’s occupants. The objective conditions of the settings themselves do *not* convey the true quality of the setting. Rather, it is the meaning of those conditions to the occupants. A model showing illustrating these relationships in explaining neighborhood satisfaction is presented in Fig. 3.

In the models described above, various domain satisfactions including place satisfaction (city or community, neighborhood, and house) are considered important outcomes worthy of study from both a the-

oretical and policy perspective. For instance, policy makers are concerned with the well being of constituent satisfaction with conditions that their policies may alter. Often, policy makers want to know the most effective means of enhancing satisfaction. An important part of the research therefore is determining the degree to which various objective conditions are associated with satisfaction. There is general agreement that satisfaction as an indicator of individual well being is an important outcome in quality of life research. Nonetheless, there are other outcomes of importance to well being that may be examined in quality of life studies. For instance, the physical health of individuals and the amount and type of physical activity they engage in are important to their overall well being. Marans and Mohai (1991) present a conceptual model suggesting how physical health may be linked to a number of objective conditions associated with a set of leisure resources including environmental quality attributes.

The model shown in Fig. 4 shows that environmental and urban amenities are related to community quality and individual activities, satisfactions, and physical health. Environmental amenities include

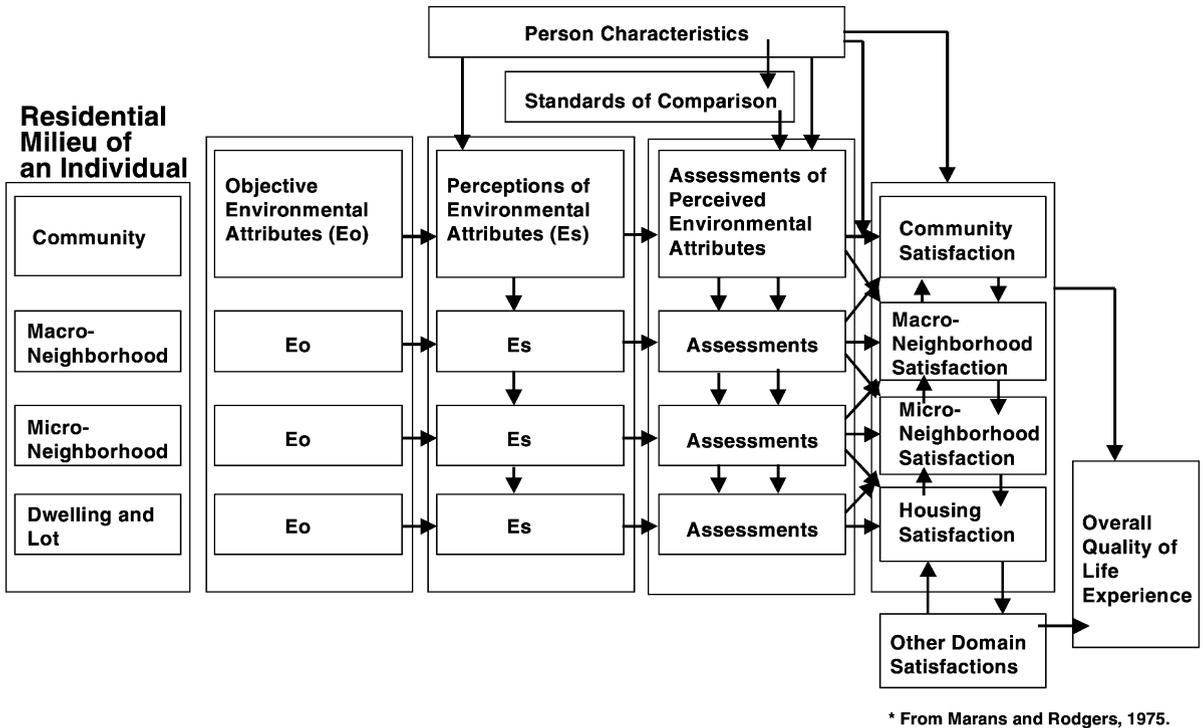


Fig. 2. Model showing relationships between residential domain satisfactions and quality of life.

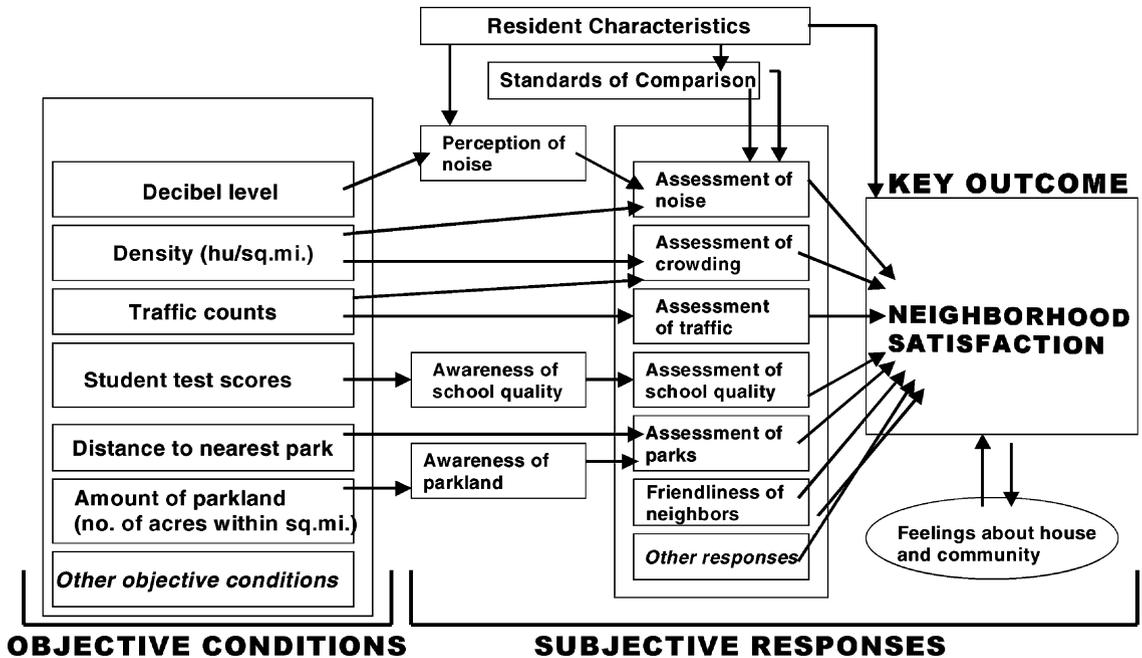


Fig. 3. Model showing relationships between objective conditions, subjective responses, and neighborhood satisfaction.

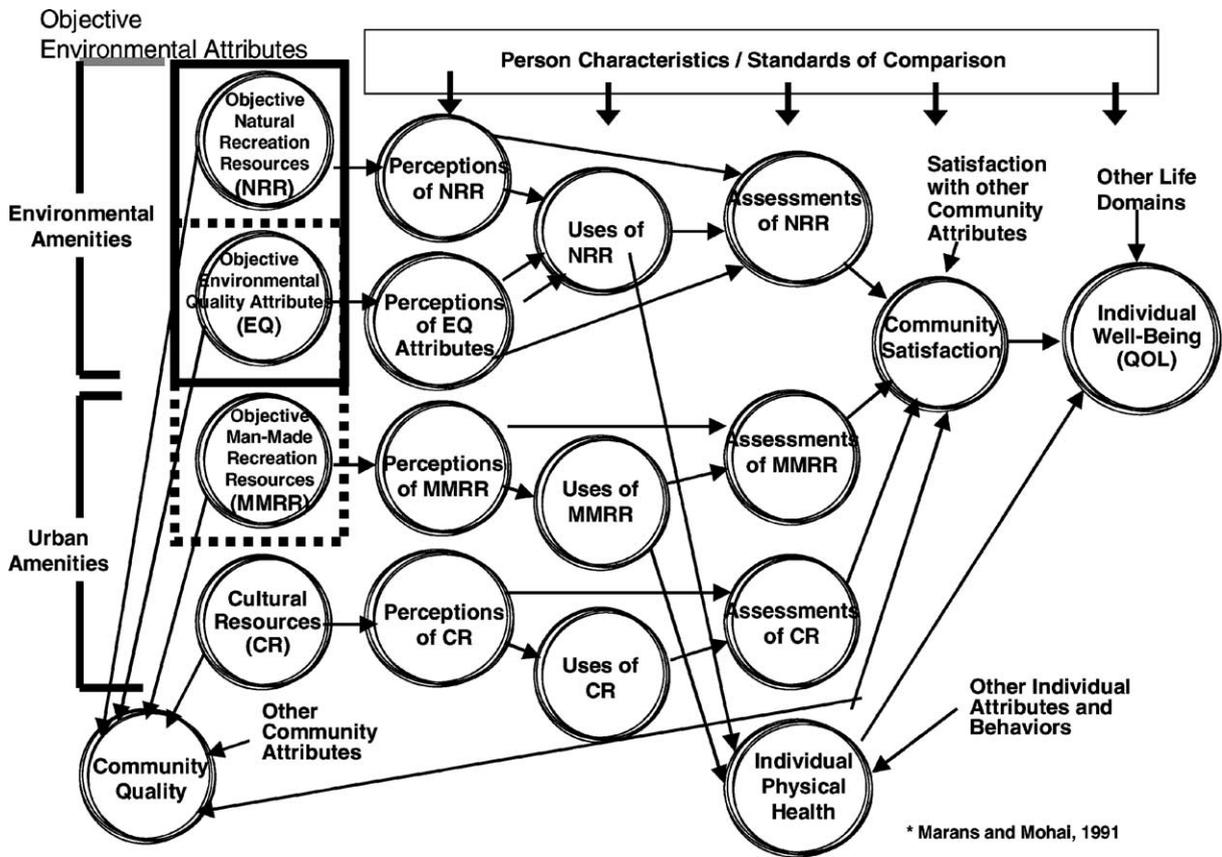


Fig. 4. Model linking recreation resources and activities to individual well being, health, and community quality.

both natural recreation resources (NRR) such as lakes, rivers, wetlands forests and park land and the quality of the ambient environment (EQ) including air and water, noise, and solid and hazardous waste. Urban amenities include both man-made recreational resources (MMRR such as swimming pools, bicycle trails, golf courses, etc.) and cultural resources (CR such theaters, libraries, orchestra, sports teams, etc.). The model hypothesizes that perceptions or awareness of these environmental and urban amenities will influence people’s evaluation and use of them. The model also suggests that in the case of the man-made recreational resources and natural recreational resources, their use (or non-use) by an individual is associated with physical health.

Opportunities exist to explore relationships suggested by the above models in studies aimed at measuring the quality of life. Furthermore, other models can

be developed to explore different outcomes associated with quality of life and the quality of place. These opportunities are expanded in studies of metropolitan areas containing different populations living in places that vary in their environmental quality. A 2001 study of the quality of community life in the metro Detroit area presented such an opportunity.

3. Detroit Area Study 2001

Quality of community life was identified as the theme for the 2001 Detroit Area Study (DAS). DAS is an annual household survey conducted in the metropolitan Detroit area by the University of Michigan. DAS was first launched in 1951 with the aim of satisfying three goals. First was the training of graduate students in the social science research techniques.

Second was providing a facility for faculty to conduct basic research. Finally, DAS was intended to make available social science data of value to the Detroit region (see Marans and Couper, 2000; Couper et al., 2002 for a detailed history of DAS). In selecting the quality of community life theme for the 2001 DAS, it was intended to examine a range of issues associated with the lives of people in a particular place. Furthermore, a better understanding of the quality of place and how it impacted on people's lives was an overarching goal of the study. The specific issues to be examined were based in part on discussions with governmental, institutional, and non-profit organizations in the region. Issues were to be addressed that met two criteria. First they had to be important and common to the missions of several organizations in the Detroit region. That is, the sets of indicators to be used had to be grounded in the political reality of the region and its parts (Myers, 1988, p. 350). Second, the findings from the household survey had to potentially inform policy and planning decisions. The issues selected included people's evaluations of their communities, their neighborhoods, their dwellings, their assessments of government and public services, their travel behavior, use of parks, and involvement in community affairs, their moving intentions and residential preferences, their willingness to pay for improvements ranging from public transit to preserving farmland, their attitudes toward growth and development, and their perceptions of environmental problems.

There were four specific goals articulated for DAS 2001. These were to: (1) produce accurate and credible information on the quality of community life that can inform governmental, corporate, institutional, and community policy makers, (2) measure and document public perceptions about salient aspects of community life in the region at the beginning of the 21st century and identify the extent to which they have changed since the 1960s, (3) establish a benchmark for assessing changes in the quality of community life and changes in community and environmental conditions throughout the 21st century, and (4) determine how much public perceptions correspond to the community and environmental conditions associated with where people live.

For purposes of this paper, the fourth goal provides the opportunity to examine relationships between

objective and subjective measures associated with environmental quality.

3.1. Sources of information

A multi-method approach to the research was employed involving the collection of information from questionnaires, and from the US census and other secondary data about the respondents' communities and their physical surroundings. Questionnaires were administered through face-to-face interviews and by mail.

3.1.1. Face-to-face interviews

As part of DAS, trained graduate students and professional interviewers from the University of Michigan conducted face-to-face interviews with adults drawn from a sample of households in three of metro Detroit's seven counties. Beginning in mid-April 2001 and ending in mid-August, 315 interviews were conducted. The average length of the interviews was 60 min. In addition to asking each respondent a series of questions, interviewers recorded data about the respondent's dwelling and the area around it. As an incentive, metropark passes were mailed along with a cover letter to half of the households that fell in the sample; the remaining half received five dollars. An additional five dollars was given to respondents who completed the interview. The response rate for the face-to-face survey was 59.8%.

3.1.2. Mail questionnaires

In order to cover the remaining counties in the metro Detroit area and expand the number of respondents in the initial three counties, a shorter version of the questionnaire used in the face-to-face interview was mailed to a sample of over 7000 adults throughout the region. The mail questionnaire eliminated about half of the original questions in order to ensure a questionnaire that could be completed in approximately 20 min. As in the case of the face-to-face survey, metropark passbooks and five dollars were used as incentives. The mail survey yielded 4077 responses representing a 56.4% response rate. Data from the face-to-face interviews and the mail questionnaires have been merged and weighted so are to represent the correct population distribution of counties in the region.

3.1.3. Secondary sources of information

Several sources were used to measure objective community and environmental conditions associated with the places where the respondents lived. As a first step in gathering objective measures, the addresses of each respondent in the survey were geocoded. That is, geographic information systems were used to spatially map the addresses of over 4000 respondents throughout the region. Besides being placed in one of the seven counties, each respondent was also be placed in a particular community (i.e. a city, village, or township). They also were assigned to a school district and a census unit (block, block group, or tract). Accordingly, contextual measures related to communities, neighborhoods, and census units have been made and matched with the survey respondents and their answers to questions. The creation of separate data files covering survey data, community data, environmental data and census data and their consolidation allow the researchers to explore a numerous relationships suggested by conceptual models similar to those described earlier in the paper.

Among the particular community or Minor Civil Division measures that are being incorporated in the database are tax rates, building permits and other indicators of growth, crime statistics, and health data. Data such as expenditures per student and MEAP scores as-

sociated with school districts are also be incorporated in the community data file.

The environmental data file includes land use information (e.g. percent in each land use category, degree of mix, percent of open space and natural resources, etc.), accessibility measures to recreational land, major employment centers, shopping areas, etc., and various density measures. The density measures using census data cover the number of housing units and the size of the population for blocks, block groups, and tracts.

The census data file uses 2000 US census statistics to determine racial mix, poverty rates, housing tenure, and median income for each block, block group, and tract associated with respondents.

3.1.4. Analysis, feedback, and ongoing work

The files containing census data, environmental data, and community data associated with each respondent are currently being merged with the survey data file (see Fig. 5).

Fig. 5 suggests numerous possibilities to examine relationships between contextual data and questionnaire responses using bivariate analysis and multivariate analysis. For example, an analysis might address the question of how density (as reflected by multiple density measures) effects people's responses to crowding, their knowing the names of neighbors, and

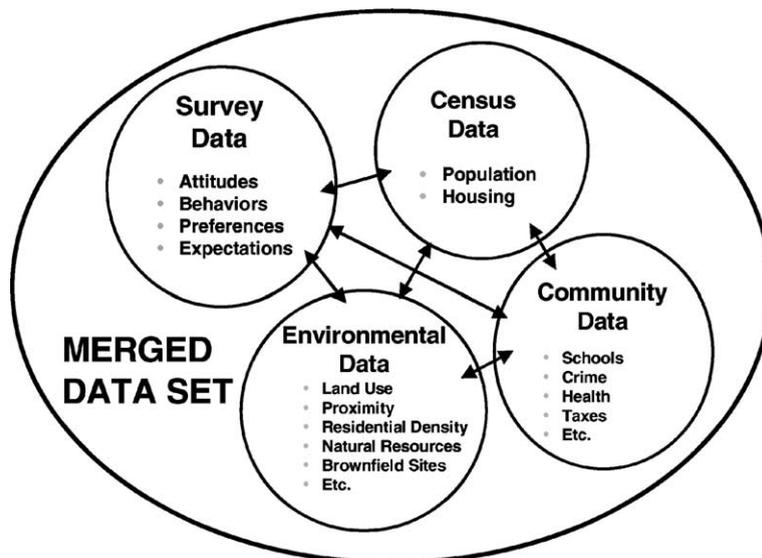


Fig. 5. Datasets from DAS 2001.

their interactions with them. Another question might explore the degree to which objective data covering school districts (i.e. student–teacher ratio, test scores, expenditures per student) are associated with people’s ratings of their public schools. Using multivariate analysis, an examination could be made of the relative importance of several measures covering school districts in predicting rating scores for respondents with varying numbers of school-age children living at home.

There are other questions of both theoretical and policy interest that can be explored using data from the merged files. Several posed by policy makers in the Detroit region and considered by researchers are as follows.

- Where do people live who feel negatively about their cities, villages and neighborhoods?
 - To what extent are police reports about crime associated concerns about neighborhood safety?
 - Is public transit use associated with proximity to bus routes and bus stops?
 - Do people living in mixed-use neighborhoods use public transit more and walk more than people living in neighborhoods consisting of single family homes?
 - Is there a relationship between access to parks and frequency of park visits?
 - Is the amount of walking that people do associated with self-reports of health?
- What physical and social attributes of neighborhoods if any contribute to residents feelings about “sense of community”?
 - Are preferences for open space neighborhoods associated with feelings about urban sprawl, preservation of farmland, and natural resource conservation?
 - Is the type of street network in a neighborhood associated with amount of automobile use and walking behavior?

As suggested by the above questions, there are innumerable opportunities to explore relationships within and between objective and subjective indicators. In part, determination of relationships to be explored can be made by policy makers who pose questions after reviewing responses to the questions posed to residents. That is, examining the data has been an interactive process in the Detroit region involving the researchers on the one hand and policy makers and planners on the other. Initially, the percentage distributions of responses for each question in the questionnaire were presented to policy-making bodies. Discussions regarding responses have led to new questions that will be addressed through further analysis of the data. The relationships between research, policy, and planning as conceptualized in the DAS are shown in Figs. 6 and 7.

Fig. 6 presents a basic model indicating that policy makers and planners rely on available information

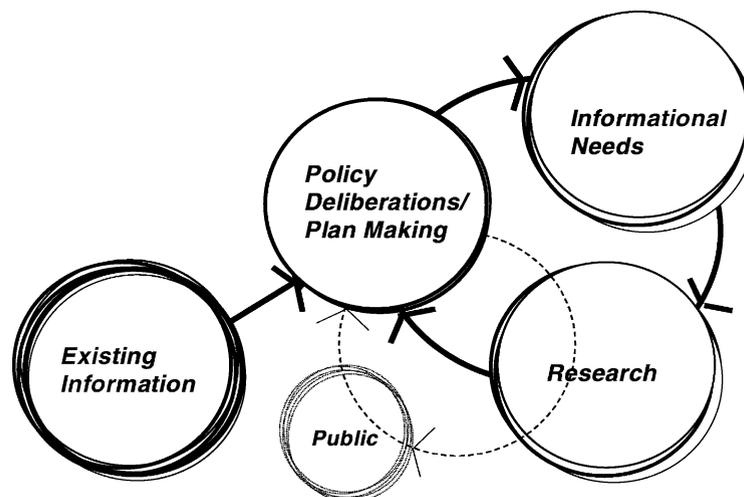


Fig. 6. Basic model showing relationship between policy, planning and research.

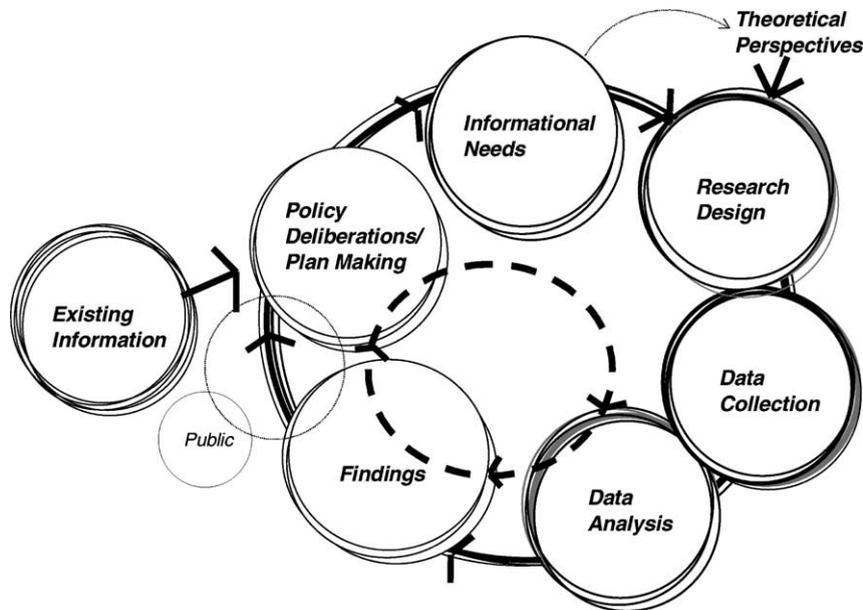


Fig. 7. Detailed model showing relationship between policy, planning and research.

in their deliberations and actions. In democratic societies, they also listen to and have input from their constituents (the public). But often, they require new or up-dated information which in turn can drive a research agenda. The results of the research can then satisfy the informational needs of the policy makers and planners. Those results made available to the public through the media and the Internet create a more informed citizenry that in turn communicates with and elects their government officials.

In Fig. 7, the model is expanded in two ways. First, the research component is shown in four parts: research design, data collection, data analysis, and findings. The design for the research is often guided by various theoretical perspectives and is constrained by budgetary considerations. As part of the design, determination is made about data needs and the most efficient means of obtaining the data. Next, the data are collected and analyzed and findings are then presented to decision-makers and the public.

Second, the expanded model suggests that relationships between policy and research are interactive and ongoing. Policy-makers and planners during their deliberations typically pose questions, many of which can be addressed through additional analysis

of available data. These questions may be sparked by research findings, changing conditions in the environment, or citizen concerns. If the data are not sufficient for addressing new informational needs, further research may be initiated. Over time, research findings for policy and plan making purposes may also become obsolete as environmental conditions and people's responses to them change. New research can then be initiated that measures the environment and people's responses which offer policy-makers a new set of findings and an indication of the magnitude of change in conditions and responses that has taken place.

The model presented in Fig. 7 in part has guided DAS 2001 activities. That is, the feedback of initial findings to policy makers and planners has sparked further inquiries of the data. At the same time, comparisons of the 2001 findings with findings from early quality of life studies in the Detroit region are sensitizing both groups to the potential value of launching another wave of data collection dealing with quality of community life in the next 4–5 years.

Other DAS 2001 activities currently being pursued include exploring relationships between subjective measures drawn from the household survey and the

growing number of objective measures that are being incorporated in the dataset.

4. Conclusions

The program to study the quality of place or community life in the Detroit region (DAS 2001) was designed to combine policy interests with scientific or theoretical concerns. From a policy perspective, the program was intended to provide public and private sector planners and other decision-makers at the regional and county levels with information about the quality of life as experienced by area residents. At the same time, information about the contributions of place to the quality of life experience was a central goal in the study. Place includes the particular communities and neighborhoods where people live and the community amenities and environmental conditions associated with those places. The quality of those communities and neighborhoods and their attributes, together with the quality of the ambient environment largely reflect actions taken by public and private decision makers including planners and environmental designers. As past research has demonstrated, these domains are important to the well being of individuals and families. As urban areas continue to grow throughout the world, it is likely that the quality of cities and their suburbs and the quality of ambient environment will become even more important in defining quality of life.

We are at the beginning of a new millennium, where the majority of the world's population now resides in urban areas. Under the circumstances, now is an opportune time to document quality of life in world cities by measuring the environment objectively and as it is experienced by residents. Indeed, research paralleling the study in the Detroit region is currently underway or is being considered in other cities and regions including southeast Queensland in Australia, Belo Horizonte Brazil, Singapore, Lisbon, Portugal, and the Brabant region in The Netherlands. While many of the issues and questions addressed in these places are identical to those examined of the Detroit region, issues and questions reflecting local concerns are also being explored. The parallel studies in other world cities present opportunities for comparative analyses across cultures and places, for satisfying the informational needs of

local decision-makers, and for documenting the quality of life in several world cities at the beginning of the millennium.

There is also growing interest in many parts of the world in sustainability indicators that reflect conditions in the city, that can be used to monitor change, and that are accessible to all segments of society. These indicators can inform public and private actions, and be used to assess the city's progress in moving toward its overall goal of enhancing the quality of life of its residents. It is important to recognize that, besides reflecting conditions in cities, the indicators need to address changing behaviors such as travel and energy use, and the perceptions of residents. Without these indicators, we delude ourselves in believing that we understand the meaning of the changes that are taking place in our cities.

In conclusion, an exciting initiative is underway that brings together researchers from one of the great universities in the world and public and private decision-makers in a large metropolitan area. They are working together toward the common goal of enhancing the quality of community life in that region. Other cities are invited to launch similar efforts so that experiences and knowledge about environmental quality and its antecedent objective and subjective indicators can be shared.

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