# Basic Approaches to the Measurement of Community Values

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This paper serves as an introduction to the requirements and techniques for the measurement of community values in urban transportation planning. The need for the measurement of community values is presented, and some philosophical issues surrounding such measurement are discussed. Some informational requirements for comprehensive transportation planning are identified, and the role of value measurement in meeting these needs is presented. The process by which individuals perceive and evaluate the physical systems in the urban environment is used as the setting for the discussion of 4 basic strategies for value measurement in transportation planning. Each of these basic approaches is analyzed, and examples of their use are cited with particular reference to their role in the planning process.

•IN PAST DECADES transportation planners and engineers emphasized efficiency of movement in the selection of criteria for planning and designing facilities. Measurement of costs and benefits, with particular emphasis on the viewpoints of the users and the financing agencies, has always played an important role in program and project evaluation and will doubtless continue to do so. In more recent years, it has become obvious that factors related to other community values must also be considered in the planning and design of transport facilities. Impacts, such as noise, air pollution, and glare, on surrounding neighborhoods and the economic and social changes that occur in communities as results of highway or transit facilities should, and now must, be considered along with considerations related to the efficiency of movement. The measurement of these effects and the development of criteria related to the concomitants of transportation services are relatively poorly developed and are rarely employed in purposive planning studies, although they are discussed more frequently in the research literature. Economic impact studies are becoming more effective and more standardized, but efforts are required to develop deeper understanding of the impact of transportation facilities on other human and social values.

Despite the widely recognized and often stated need for attention to an array of community values broader than that considered in the past, little support has existed for efforts to consider these values in quantitative terms. In spite of several notably successful research efforts to measure and compare the perceptions and needs of the citizenry, many planners still place value measurement beyond the state of the art. At the Highway Research Board's conference on community values in 1969, many participants seemed uninformed about existing measurement techniques directly applicable to the subject of the conference. Some voiced great skepticism about the applications of quantitative techniques to the measurement of environmental perceptions and to individual and group requirements for system performance.

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It is not surprising that the professional planning community has been skeptical about the application of measurement to community values. The measurement of individual and group values is based on assumptions and techniques that originate in the social sciences and that are very different from the assumptions and techniques for measurement incorporated into the training and experience of engineers and physical scientists. Because most members of the highway planning community have engineering backgrounds, they are uncomfortable with and suspect of approaches to their problems that evolve from entirely different theories and techniques. This is not meant to imply that all of the engineers' objections to value measurement spring from disciplinary prejudices or from the apprehension of unknown techniques. Many of these apprehensions seem to be warranted and are often cited by social scientists who are more familiar with the techniques of value measurement. The transportation engineer, however, often underestimates the capabilities and overestimates the limitations of value measurement techniques. Rather, he should recognize that, like those for social and behavioral measurement, engineering measurement techniques are often inexact and incomplete, particularly those dealing with the costs and benefits of transport facilities. He should not, therefore, necessarily reject value measurement on these grounds alone. This is particularly true in the current community environment in which citizen groups are constantly pointing out that the incompleteness of the engineers' evaluations and measurements lies principally in the realm of community values.

Those who question the validity of attempts to utilize measurement in the assessment of community values often state that personal evaluations of subjects such as aesthetics, community cohesiveness, or environmental satisfaction are essentially qualitative judgments and should not be subject to measurement. Measurement of such qualities is said to obscure the real issues or to fail to get at the heart of the matter. The answer to this position might be that the transformation of qualities into quantities is a semantic or logical process and is not excluded by the nature of those qualities. "Whether something is identified as a quality or a quantity depends on how we choose to represent it in our symbolism" (9). For example, before the existence of thermometers or temperature scales, the notions of hot and cold could be expressed only as qualities rather than quantities. Clearly, the introduction of quantitative scales of temperature measurement have helped us understand the meaning of the qualities hot and cold. Although the qualities involved in community values are more complex, their quantitative measurement need not obfuscate what those qualities are. Such measurement should actually help us to define what they are.

Some have said that the enjoyment of a scenic vista or the revulsion at the sight of a junkyard through the smog are emotional experiences, and that it is useless or even dehumanizing to analyze them quantitatively. But the quantification of the preference for particular qualities does not in any way detract from such an emotional experience. It merely provides us with a metric for comparing the emotional responses of different individuals or groups toward environments consisting of different qualities.

The measurement of individual and group preferences is, of necessity, incomplete. What is not measured, because of a gap in our current capability to measure values or preferences, may be just as important as what is measured. Although this is certainly true, it constitutes a poor reason for opposing attempts at value measurement. Similarly, an IQ test may not measure artistic talent, but this does not invalidate it as a measure of many aspects of student potential. More to the point, one might say that a benefit-cost ratio does not measure the aesthetic benefits or cost of highways but this does not invalidate the benefit-cost ratio as a useful tool for planning and decision-making. A measure of the aesthetic quality of a highway may also be incomplete, but it too would be a useful tool for planning and evaluation when thoughtfully employed.

A difficulty with respect to the attempt to quantify human responses to elements of the physical environment is the subjectivity that results from the involvement of the investigator in the measurement process. Clearly, the analyst's decision to include certain subject matter and exclude other questions from a questionnaire or interview can influence the conclusions that the analyst may reach in his assessment of the responses of his subjects. Similarly, the choice of a particularly connotative word for an interview question may also result in responses by and conclusions about the subjects

that are not warranted. In these cases the subjects' responses to the survey instrument may be the results of the measurement process, rather than the desired responses to the characteristics of the environment. It is true that value measurement yields not simply a relationship between a respondent and a characteristic of the environment but a relationship among such a characteristic, a respondent, and the persons who intervene to survey the responses. But similar intervention must even be tolerated in experiments in which the strength of materials is investigated. The success of such efforts relies on the controls employed and the discrimination and sensitivity with which judgments are made. This fact should lead to the use of experienced and competent investigators in the measurement of human value responses, but it need not lead to an abandonment of such efforts.

A brief comment may be required to clarify the relationship between citizen participation and the measurement approaches discussed in this paper. Although the measurement of community values and the development of improved strategies for citizen participation are both responsive to the need for greater consideration of human needs and desires in planning, the 2 approaches are not substitutes for each other. Citizen participation may actually raise some interesting questions that may be answered by value measurement techniques. We might ask, for example, whether citizen participants in fact represent the same value set as that of nonparticipants. If the answer to this question is "No", perhaps new citizen participation strategies are required. Measurement techniques and citizen participation should be mutually supportive approaches for the development of needed information about the impact of public facilities on the members of the community.

## INFORMATION REQUIRED FOR PROPER CONSIDERATION OF COMMUNITY VALUES

Man is constantly modifying his environment in order to satisfy his currently perceived needs and desires. The transportation systems of our cities are obvious examples of physical systems that have evolved over time in response to changing perceptions of need. Because man is a complex animal he experiences many needs and desires. The priorities that he assigns to particular aspects of physical systems in order to satisfy his needs depend, to a large extent, on the degree to which currently existing systems fail to satisfy those needs. As the more basic needs are met, higher priorities are assigned to those that were previously overlooked or categorized as mere luxuries. Transportation planners must recognize that new community priorities on the environmental impacts of transportation facilities result from earlier successes at satisfying community transportation requirements. Design and evaluation criteria must now be broadened to include the interactions between the transportation system and the physical and sociocultural environments. Transportation planners are not alone in the realization that their criteria are too narrow, for we live in a decade during which scientific and technological humanism is being born (4).

To carry out this task of more adequately incorporating community values into transportation planning and design requires new sets of information, and the techniques previously referred to as value measurement provide promising sources for this required information. The remainder of this section is a discussion of some of the informational needs that can be at least partially met by value measurement. In the sections that follow, the process by which people perceive and evaluate their environment is described, and ways for monitoring that process, which constitute value measurement techniques, are presented. These techniques can contribute to meeting the informational requirements that are essential to effective planning and design.

First, information is required by which we may characterize the relevant system characteristics according to dimensions that truly reflect performance and its impact on the environment (1). This task could be performed in many ways, the simplest of which might be to rely on the planner to produce a list of dimensions. But past and current conflicts between citizen groups and planning agencies indicate that the planner's list might be incomplete or, at least, might be at variance with a set of dimensions produced as a result of monitoring community opinions and behavior. Past experience

shows that the planner has placed greatest emphasis on the transportation performance measures of the system. Commonly cited dimensions of transportation performance include point-to-point travel time, cost, congestion, driver and passenger comfort and convenience, and safety for the system user. A more complete characterization of the system must also include dimensions that define the concomitants of transportation service, such as effects on the environment surrounding transportation facilities. Monitoring the individual opinion-formulation and decision-making process, illustrated in the next section, would appear to be useful and perhaps necessary in the identification of a set of dimensions that is complete in the sense that the entire range of needs of the citizenry is recognized.

The identification of a comprehensive set of dimensions of the transportation-related physical environment is only a first step toward the development of design criteria that are comprehensive and relevant to individual and group values. Next, we must develop measures of the physical systems that describe them according to the appropriate dimensions. This means that we must develop a metric or scale for each dimension so that the degree or intensity of the attributes central to each dimension may be measured. Some examples may help to demonstrate the point that there is a difference between the definition of a relevant dimension for system performance and the development of a measure for each dimension. Suppose that congestion is decided to be a meaningful system dimension. One would still have to decide among travel times, traffic volumes, delay times, or combinations of these and other measures of congestion in order to characterize that dimension. These alternatives may be correlated, but they are probably not simple substitutes for one another. Furthermore, an appropriate measure of the performance of a link in a transportation system may not be appropriate as a system-wide measure for performance along a similar dimension. This problem of scale may be illustrated by considering the dimension of accessibility. A link in a transportation system may make 2 areas of the city more accessible to each other but simultaneously may make neighborhood facilities less accessible to residents because of the barrier effects of the facility. Different measures of the accessibility dimension would, therefore, be required at these different scales.

An appropriate technique for selecting meaningful measures of transportation system performance is the study of human responses to system dimensions. Such responses are indicative of the value that individuals place on these dimensions. The study of human responses is not an easy task, but much more may be learned from such study than many transportation planners believe. The remaining sections of this paper describe some of the basic techniques or approaches available to help the planner accomplish this task.

This information is made more useful to the planner in his efforts to evaluate existing and proposed transportation systems if measures are developed of the characteristics of the people whose value responses are being examined. The collection of socioeconomic, demographic, and behavioral information is useful in classifying value responses to determine their relationships to personal characteristics and to role. With this information, the planner can analyze value responses by determining the relative influences on them of both system characteristics and citizen characteristics; he can also begin to discern indicators of stability or transition in value responses. In an earlier exploratory study, for example, the author discovered that variables such as age, sex, and educational level influenced people's perceptions of the desirability of alternative routes in the journey to work. These characteristics had an influence on perception that was found, in a statistical sense, to be as significant as some of the route characteristics, such as lane width, traffic volume, or frequency of intersections (16).

If information that is descriptive of the respondent is studied in conjunction with his responses and if systematic relationships are found to be stable in a variety of experiments, these relationships can lead to the building of theories of behavioral and environmental impact that are more definitive than today's tentative hypotheses. Ultimately, such theories may result in the successful prediction of value responses and thus reduce the need for repeated exploratory data collection. Information about the characteristics of the respondent also helps the planner to separate the responses of particular groups

such as the aged, the poor, or the homeowners, on which he may wish to focus when particular projects might have a special impact on such a particular segment of the total population.

## PERSONAL INTERACTION WITH THE ENVIRONMENT AND THE PERSONAL EVALUATION PROCESS

The purpose of applications of measurement techniques to the assessment of community values is, of course, to broaden the base of information available to the planner and designer. If values are not measured, our knowledge of individual and group responses to the physical environment can consist of little more than conjecture and untested hypotheses. The opportunities for useful and appropriate measurement of responses to the physical environment are many. The evaluation of each may usefully begin with a model of the process of personal interaction with the transportation-related environment and of the process by which people evaluate their interactions with that environment to arrive at satisfaction or dissatisfaction. Having presented this model, we may examine alternative techniques by which this process may be monitored in order to provide the planner with much of the required information that was discussed in the previous section.

Figure 1 shows the process by which individuals evaluate transportation facilities or, more generally, any components of the physical environment with which they interact. It shows, in very simple terms, the ways in which people receive information about their physical environment, form opinions about the levels of satisfaction provided by that environment, and make decisions about how to behave in that environment (18).

When an individual drives his car or is a passenger on a public transportation facility, he interacts with the transportation system and, for a time, may be viewed as having become a part of the system itself (15). This intimate interaction between the individual and the physical environment is shown, in Figure 1, by the embedding of the box labeled "behavior" within the larger box labeled "environment." The result of this interaction is that the individual gathers information about the performance of the physical system

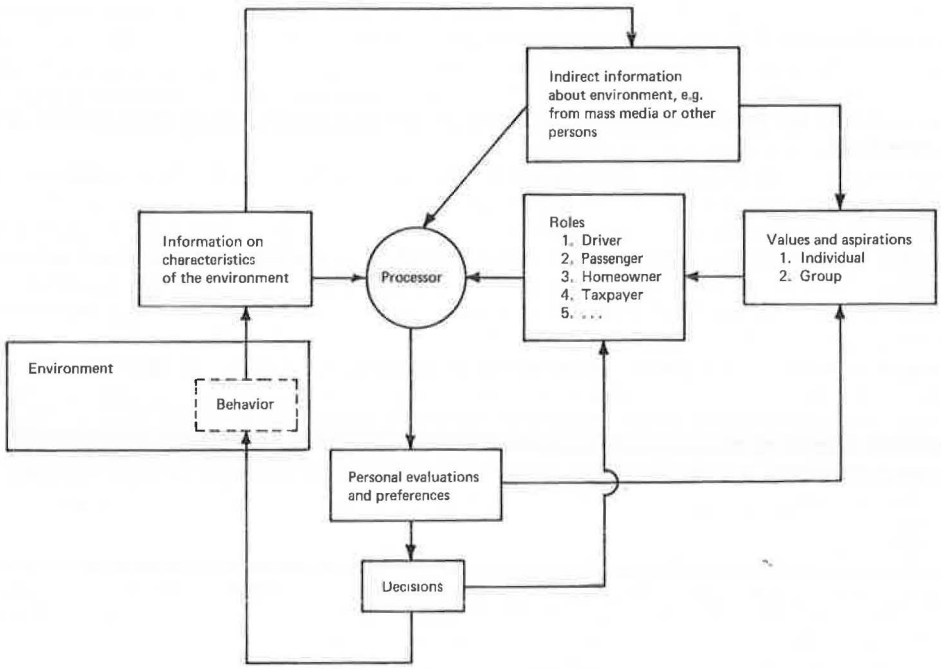


Figure 1. Evaluation process in which preferences result from behavior and behavior results from preferences.

with which he is interacting. He hears noise, sees congestion, and senses temperature changes. One need not be a user of the system to interact with it and thus receive information from the system as to its characteristics as part of the total environment. The homeowner who sits in his backyard, which may be adjacent to a freeway, can through this passive form of behavior interact with certain aspects of the transportation system. In this manner, he too obtains information on certain characteristics of the physical environment. By interacting with the transportation system as user and also as nonuser, the individual is exposed to a wide range of performance-oriented information about that system and to information about the system's environmental effects that are concomitant to the performance of transportation service. More critical interactions with the concomitants may occur if a person's home or business must be taken in order to provide transportation service.

In addition to the information that comes to the individual directly from his interactions with the transportation system as part of his environment, information also comes to him from indirect sources, as Figure 1 shows. Other persons tell him about their experiences with the system or he hears via the news media of traffic accidents, smog problems, or the taking of homes for a freeway right-of-way.

In processing the composite of direct and indirect information about the environment, a person often responds very differently to the same kinds of information. In large part this is a function of the role he is playing at the particular time. A person does wear many hats as he forms opinions and makes decisions regarding his interactions with the physical environment (14). As a driver, homeowner, taxpayer, or parent, he may form different opinions at different times based on the same raw information about the physical environment. His behavior patterns in each of his different roles may even conflict with one another. Thus the roles that a person plays, which are a function of his values and aspirations as an individual and as part of cultural and social groups, should always be considered in our assessments of personal evaluations of the physical environment, in our studies of preferences among alternative characteristics of that environment, and in our analyses of individual decisions made about how to behave in that environment. In practice, it is often difficult to determine, however, how behavior or opinion results from the interaction of the several roles that an individual may have. A useful approach to discovering the effects of role is first to group respondents into homogeneous behavior or opinion categories, and then to examine the within-group similarities and between-group differences in personal characteristics. From these comparisons, inferences regarding operative roles may sometimes be made (7, 17).

Raw information obtained from personal interactions with the physical systems in his environment, information about those systems from more indirect sources, and preconceptions and expectations that are a function of role, social values, aspirations, and remembered experiences—all are used and processed by the individual to form his personal evaluations of the physical systems in his environment and to determine his preferences and opinions for certain aspects of the systems over others. Figure 1 shows that these preferences and opinions form the basis for decisions regarding future behavior related to the system. Of course, role once again plays an important part in these decisions regarding travel behavior, residential location, home-work separation, and other personal relationships with the environment. Having made these decisions, the person acts to carry them out, and interacts again with the systems in his environment. In doing so he repeats the process just described. His preferences thus formed also are fed back into his memory and form part of the basis for the evaluation of future sensory information gathered through interactions with the environment.

## MONITORING THE PERSONAL EVALUATION PROCESS: THE TECHNIQUES FOR VALUE MEASUREMENT

To meet the informational requirements presented earlier, the planner may take essentially 4 approaches. These may be used singly or in combination with one another.

1. Monitor individual behavior with respect to existing transportation systems, and from behavioral manifestations of decision-making infer the dimensions of the system relevant to the individual and the relative importance of each dimension in his value structure;

2. Monitor individual behavior in a simulated transportation system by means of mechanical devices or by means of a gamelike representation of the system, and from decisions made within the constraints of the simulated environment infer the dimensions of the system and the relative importance of each dimension in his value structure;
3. Measure opinions and stated preferences with respect to the existing transportation system, and from such statements derive the dimensions of the system relevant to the individual and the relative importance of each dimension in his value structure; and
4. Measure opinions and stated preferences with respect to a hypothetical transportation system, and from such statements derive the dimensions of the system and the relative importance of each dimension in his value structure.

Clearly, a major important characteristic of each of these approaches is whether it measures actual behavior or stated preference. Operative value is manifest in actual preferential behavior. Something that is actually chosen, where the real consequences of the choice are brought to bear on the individual, is a result of operative value. Conceived value relates to the extent to which one conceptually desires some things, whether or not this concept is consistent with behavior (11). Conceived value is measured in studies of opinions and stated preferences that are not necessarily related to actual behavior. All of these 4 approaches consist of monitoring the personal evaluation process shown in Figure 1. The differences among them lie in whether behavior or opinion are measured and, to a lesser extent, in whether the information given the individual about the transportation system is about a real or hypothetical system. Now let us consider each of these 4 basic approaches and evaluate their past and potential contributions to urban transportation planning.

The first approach to value measurement consists of monitoring actual behavior with respect to the existing transportation system and then inferring the dimensions and degrees of value. Urban transportation planners have often used this approach as the basis for prediction of future travel behavior. Specifically, the origin-destination (O-D) survey has been used to derive statistical relationships among certain socioeconomic variables and travel behavior. Based on predictions of population distributions and socioeconomic population characteristics (e.g., income, family size, and automobile ownership), these relationships have been used to predict future travel behavior and to derive the future need for transportation facilities. This approach measures operative values in that personal preferences are derived from decisions that are monitored in a real-world environment and choices are thus realistically constrained. The transportation planner would generally prefer to measure operative value rather than conceived value, because operative value will affect the usage of and reactions to systems that will be built in the future. A measurement technique such as the O-D survey does, however, have some important limitations that should be carefully understood.

The travel behavior observed in an O-D survey certainly does measure the transportation performance-related values of the citizens to a large extent, but these measures are influenced by the opportunities provided by the existing system and constrained by its inadequacies. By basing future plans on estimates of value derived from these measures, we may be propagating these inadequacies when our objective should be to remove them. If, in the past, we assume that a trip-maker's attitude was such that he principally sought to minimize travel time, we probably built transportation networks with the goal of helping him to do so. If we now observe behavior on those networks, we may easily conclude that travelers principally value minimal travel time. We might, therefore, feel confident in planning facilities to meet the goal of minimum travel time in the future. This conclusion might or might not be justified, but our measures serve, in this case, to help the planner make self-fulfilling prophesies. We do not really know if the behavior we are observing is the result of preference or the effect of constraints on behavior. The measurement of behavior in the existing system also provides little information about responses to possible future systems with performance levels outside the range of current observable performance.

The O-D survey, as an example of the monitoring of individual behavior with respect to an existing transportation system, provides the planner with information about operative value. This type of survey, however, focuses on the individual as a user of the

transportation system. Rarely does such a survey enable us to examine responses related to the conflict between the values of the respondent in his various roles such as system user, homeowner, and parent. The technique of observing behavior in the existing system could, however, be extended to contribute to such comparisons. For example, the changes in the social dimensions of a neighborhood, including turnover of families and changes in typical family composition, could be measured in the vicinity of a new transportation facility to gain some measures of operative value with respect to that facility from points of view other than those of the users. The interpretation of such findings may be a difficult task, but it can yield valuable information (6).

The second approach to monitoring the personal evaluation system with respect to the transportation system is to observe individual behavior in a simulated transportation system. In effect this approach requires a respondent to go through the entire evaluation and decision-making process in a model environment. Within the model environment, we may vary system performance and constraints over ranges wider than those that exist in the real world and, of course, at minimal cost. Because the subject is aware that he is in a gamelike situation, this approach clearly must measure conceived value. If the simulated environment is quite realistic, however, the conceived value responses may approximate operative value.

The use of a game situation provides one approach to the investigation of values by allowing behavior to be observed in a simulated environment. As a respondent chooses from among alternatives within a set of realistic constraints, we may learn a great deal about the ways in which he values elements of his environment. Peterson and Worrall (12), for example, used a simple locational game to measure accessibility preferences to several neighborhood services, and the ways in which people trade off the desire for proximity to urban services against the nuisances that those services may generate if they are located too close to the home. The transportation system is clearly one urban service for which proximity generates both sources of satisfaction and dissatisfaction. More elaborate games have been developed to simulate the development of land and the growth of metropolitan areas (5). These too can provide insights into the choices that people make as a result of the benefits and disbenefits that they perceive to be associated with transportation facilities. In gamelike situations of this sort, as in the real world, a person must simultaneously weigh the impact of a transportation system or facility on him from the points of view of his various roles, such as system user and homeowner. The ways in which a person does this in order to make decisions is a subject that should be of great interest to planners.

The concept of observing behavior in a simulated environment can be extended by the use of photographs, motion pictures, or more complicated devices to place a respondent in a model situation more like one in which he might find himself in the real world. Clearly, such techniques cannot capture all aspects of a real-world environment, but they might possibly simulate simultaneously the visual, auditory, and olfactory experiences of proximity to a transportation facility (3). Utilizing such a system of mechanical simulation, we might then observe a person's decisions as he interacts with the simulated transportation system in much the same way as we may learn about the needs and performance of a pilot as we observe him in a Link-trainer environment.

Additional information, which is quite useful in assessing community values, may be obtained by monitoring opinions and stated preferences with respect to the characteristics of existing transportation systems. This approach constitutes the third basic method of value measurement. Figure 1 shows that opinions, as well as behavioral decisions, are outputs of the personal evaluation process. Depending on the method used for measuring opinions, the information thus gathered may be related to conceived values, operative values, or the degree to which manifestations of operative value and conceived value diverge. Such divergence is itself a measure of the impact of physical systems on freedom of choice. For example, an opinion survey eliciting responses about why the respondent makes particular choices with respect to a transportation system may help us to understand operative values. A survey that elicits information about why such choices with respect to the system fail to generate satisfaction can yield useful information about the gap between conceived values and operative choice situations. Rarely has the latter approach been employed in a specific transportation study to enable

system designers to endeavor explicitly to close that gap. One might argue that the reasons for this lie in institutional reluctance rather than in the shortcomings of the measurement techniques.

In an earlier study, this author was able to identify, using an opinion survey, several performance dimensions of an existing transportation facility in the Chicago area and the relative importance of these dimensions in the respondents' choices of routes in their automobile trips to work. Thus, for these particular respondents and within the study environment, the relative importance of travel time, scenery, access control, and other factors was learned, and part of the respondents' operative value structure was revealed (16). Possibilities exist for extending this approach into much broader areas of application. Rossi (13), for example, examined the operative value structure of families who changed residences and found the impact of the transportation system to be very unimportant in their decision-making. One would suspect that his sample of respondents included very few families whose neighborhood had recently been invaded by a freeway, however, and this type of study might be repeated in such a neighborhood to gain additional information of interest to transportation planners.

The work of McMillan and Assael (10) begins to identify gaps between desired performance and actual alternatives available to the respondents and, thus, gives us some insights into the gap between conceived value and operative choice. By requiring respondents to rate the importance of certain transportation characteristics in the abstract and to rate existing transportation modes according to the degree to which they satisfactorily provide the desired characteristics, the authors attempted to identify gaps between the ideal and the existing choices. Unfortunately, their interpretation of their own findings is highly suspect and appears to favor the automobile more than is warranted by their data. This is not surprising, however, because the authors are employed by a firm that is quite dependent on the automobile industry. This study points up the difficulties, cited earlier, that can arise from the fact that an analyst must, in attitudinal research, be interposed between the respondent and the subject of his responses.

The final basic approach to the measurement of community values is the monitoring of opinions and stated preferences with respect to a hypothetical transportation system. This approach provides an opportunity to measure conceived value because it removes some of the technological and economic constraints of existing systems.

The study of conceived value, through the examination of responses to hypothetical system performance, may reveal strong personal preferences for particular system attributes that were previously not revealed because of the difficulty associated with observing them in existing systems. In one study, for example, it was discovered that a very important variable in defining an "ideal transportation system" from the point of view of the user was the degree to which the user had individual and personal control over the vehicle in which he was riding (2). Although there had been speculation about the importance of such a factor in modal-choice behavior, the measurement of this preference, even in a hypothetical setting, adds much to the understanding of human values.

Another study (17) of citizens' preferences for alternative transportation planning criteria and decision mechanisms revealed that, in considering criteria for freeway location or priorities for hypothetical transportation-related expenditures, the respondents held views of the hypothetical system that could be statistically "explained" in terms of a few key variables. Homeowners seemed most concerned with environmental impact, as were those with a longer tenure of residence in the study area. Renters and shorter term residents showed more interest in emphasizing transportation efficiency than environmental effects. These results, which have also been observed by other researchers dealing more closely with specific operative-choice situations (7), imply that the monitoring of personal opinion and preference is a useful tool for the identification of conflicting roles and of the causal variables (e.g., homeownership) associated with role-playing in conflict situations.

An important but rarely employed strategy for monitoring opinion toward hypothetical transportation system attributes is the analysis of conflict over proposed transportation system changes. When a new freeway is proposed, for example, we may learn a great

deal about human values by analyzing the content of the protest movements that are instituted and by examining the differences in socioeconomic background between participants and nonparticipants. Transportation planning agencies have concentrated on implementing their proposals and thereby removing them from the category of hypothetical systems. The expenditure of some resources on the analysis of such conflicts would help to avoid future conflicts in 2 ways. First, it would provide better understanding of the values of the community and thus enable planners to better satisfy such values in the future. Second, if the satisfaction of those values is not possible, the knowledge gained from this analysis would enable planners to anticipate community reaction more accurately and to prepare a more effective effort at public relations.

## CONCLUSIONS

The transportation planning community has recently been the target of much criticism for its lack of concern for community values. Most of the members of that community would probably now agree that such criticism has been largely justified and that planners today are more concerned with the human impacts of their product than they were even 5 years ago. Today we face the important problem of developing an appropriate set of tools and procedures with which to respond to a now more clearly defined set of requirements. The practice and techniques for measureing community values are beyond infancy, but they have not reached adolescence. The nascent capabilities of these techniques can form an important part of the needed set of tools. A requirement still exists to move such studies from the category of exploratory research to one of larger scale application to specific decision-oriented problems. This step has 2 prerequisites. First, we must clearly demonstrate that the techniques of value measurement are sound and have useful applications. Second, we must remove reluctance to institutionalizing these techniques as part of the planning process. When the first prerequisite is achieved, it is hoped that we will have gone a long way to also meeting the second.

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