

# Identification of Transportation System Problems: Public Involvement Through a Telephone Survey

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## ABSTRACT

In connection with updating its areawide transportation system plan, the Northeast Ohio Areawide Coordinating Agency (NOACA) effectively combined public seminar/workshops with a random-digit-dialing telephone survey. The two techniques were combined to gather data on publicly perceived transportation system problems and to achieve an additional measurement for triangulation. Similarities and differences between the two techniques and resulting data sets are explored. The authors advocate combining traditionally accepted public meetings with surveys to achieve both research and public involvement goals.

The transportation planning process has, from time to time, included surveys of opinions, beliefs, preferences, and behavior of clients or other persons. These surveys have been carried out by mail [Pulliam et al. (1) and Lane et al. (2)]; in-home interview [Wachs (3,4) and Gamble and Sauerlender (5)]; telephone [Levinson and Gersten (6)]; and other methods. Surveys have been advocated (7)

[A]s a relatively inexpensive way to gather information, attitudes, and opinions from a large number of people. . . . (The survey) is the only technique, other than talking to every citizen, which is capable of being statistically representative of all citizens, including the "silent majority;" it thus measures opinions and attitudes in a way which allows planners to understand the depth and magnitude of various points of view.

Surveys are not without their critics, however. Professional planners are less receptive to poorly designed studies, to those with low response rates, and to surveys that are used for situations in which other data collections and previous experience indicate that other public involvement techniques are more effective (7). The lesson may be drawn from this experience that surveys cannot always stand on their own merit (this is equally true for all other data collection approaches) but can often be effective as one of multiple data collection techniques applied to the same issue or research question. Social scientists have described this multiple-measure strategy as "triangulation" (8,9).

As a rule, staff planners concede that federal regulations necessitate consultation with the public during the program development process. This concession does not necessarily, however, translate automatically into acceptance of comments and concerns expressed by small groups of attendees at public meetings as genuinely reflective of broader public opinion in the affected community. Technical plan-

ners and planning agency administrators probably regard the requirement for public consultation as a nuisance at best and one to be addressed in the most perfunctory manner possible. As a result of these biases--the first derived presumably from allegiance to scientific canons of proper sampling techniques and the second probably stemming from resistance to challenges to expertise per se--planners and planning agency officials tend to downgrade the credibility and relevance of input to the planning process derived from a public-meeting-based consultation process.

To counteract, at least to some degree, these sources of inertia operating against recognition and consideration of public input as part of what is generally perceived by planning practitioners as an essentially technical process, the citizen participation program manager will have to do more than just hold meetings to ensure that public input receives its due respect and will have an impact on the decision-making process. Experience gained from the project reported here indicates that meeting-based public input can and should be subjected to confirmation or refutation in the course of the public participation process. Recorded in this paper is the success with a random-digit-dialing telephone survey of selected households across the five-county area where transportation needs were being assessed for updating the long-range transportation system plan.

The more general lesson to be learned here appears to be that the random-digit-dialing telephone survey can be used to support the reliability of information and recommendations derived from meeting-based public involvement activities. Where results of the public consultation process survive the survey process--that is, where results of the public consultation and survey processes tend to converge--technical planners are served notice that public consultation process results are genuine and significant elements in the overall planning process. The authors believe that combining the two techniques significantly increases the reliability of data resulting from the public consultation process and, therefore, planners should treat these data as a meaningful contribution to the program development process.

The Northeast Ohio Areawide Coordinating Agency (NOACA), Cleveland, Ohio, has recently updated the long-range transportation system plan for the metropolitan area. The update was in three phases: (a) system problem identification, (b) development of alternative systems, and (c) evaluation of alternative systems. The seminar/workshops and survey discussed in this paper generated output from the first phase and provided input to the second phase. NOACA has found it desirable to test technically feasible solutions to areawide problems against broader civic and social standards. Therefore, it has established a continuous process of public involvement that is designed to assist responsible public officials in canvassing community opinions and preferences. The process involves recognizing that public involvement does not make decisions, but does contribute to a public opinion context in which decisions are made.

In the course of updating its five-county long-range transportation system plan, NOACA effectively combined a random-digit-dialing telephone survey with three public seminar/workshops to facilitate public involvement in transportation system problem identification (10). NOACA seminar/workshops are public meetings, available to the public at no cost, that focus on a particular developmental stage of a planning program. The sessions consist of a short, instructive seminar presentation by NOACA technical staff, followed by workshop discussions carried out in small, informal groups. Discussions typically culminate in participants completing a data collection form relevant to the project being discussed. The complete seminar/workshop lasts about 2.5 hours. The term seminar/workshop is intended to connote a forum characterized by dissemination of public information and conversational interchange rather than a public meeting or public hearing, which often connotes confrontation and controversy.

Seminar/workshops held in downtown Cleveland in the morning or afternoon generally attract from 30 to 50 participants. Downtown session participants are more likely to be those professionally affected by a planning program--representatives of corporations, governmental agencies, interest groups, or private nonprofit organizations. Other seminar/workshops are held in the evening at locations outside the central business district and within an outlying community of northeastern Ohio. These tend to attract participants who reside in the surrounding neighborhood, municipality, or county in which the session is located (although all NOACA seminar/workshops are open to any resident within, or user of, the five-county NOACA area).

Seminar/workshop attendees can be conceptualized as representing either themselves or interest groups to which they belong or by which they are employed. Logically, these persons are either "interested and available but not necessarily affected" or "interested and affected and available." Seminar/workshops are probably poorly attended by "affected and available, but not interested" persons or "interested and affected but not available" persons. Thus the federal directive to involve interested and affected parties raises a surprisingly complex sampling problem.

During the process of updating NOACA's long-range transportation system plan, it was necessary to convene public seminar/workshops in local community facilities in sufficient numbers to provide an opportunity for interested and affected persons to consult with program planners about proposed planning recommendations and to voice their concerns about them. Although seminar/workshops were publicized, as usual, through newspaper advertising, news releases to printed and electronic media, and other promotional activities, it should be understood that attendees were a self-selected civic-interest group, with a somewhat higher than average interest in civic concerns in general and transportation matters in particular.

Public officials may want to know more about active and organized potential supporters and opponents than about the usually unorganized public at large. The seminar/workshop is particularly useful to draw out views of opinion leaders and other interest group representatives whose comments reflect important concerns that are not necessarily widely shared among the general public. Therefore, although self-selection participation is an understandable problem in a formal research design sense (where statistical representativeness is a concern), it is not always crucial in matters of public policy development.

On the other hand, the pluralistic model of political participation embraced by a number of

scholars, for example, Dahl (11) and Riesman (12), is constructed on the assumption that the American political system is open to new participants as issues become increasingly important to them. This model is based on an assumption that individuals are free to join or to form interest groups. On any given issue, the roster of participant groups and the nature of political controversy is rendered unpredictable. This means that, even though many issues are resolved by established interest groups, which influence the decision making of responsible officials, general public opinion remains an important input to policy decisions because it can become galvanized without prior notice. Further, the reality of local electoral politics makes it desirable for elected officials to sample public opinion broadly.

A long-range plan for the five-county area served by NOACA was originally developed in 1969 (13). It specified system improvements then thought necessary through 1990. Federal regulations require that area-wide system plans be updated every 10 years. Accordingly, NOACA developed an updated document, projecting transportation system needs through the year 2000. (In June 1982 the revised transportation system plan was approved by the Policy Board.)

To facilitate the testing of technical analyses, NOACA planned to consult the public during the following key phases: (a) an analysis of the existing transportation system and current areawide problems and conditions, which would be compared with the existing system plan (13); (b) development of computer simulation programs as alternative test systems; and (c) evaluation of alternative test systems and development of a recommended system plan.

The NOACA telephone survey took place during the first of these three planning phases to seek information on currently experienced transportation problems and on future needs and expectations for improving the system. The survey was intended to make it possible to compare responses from seminar/workshop attendees with those from a statistically representative sample of areawide households. Questions were asked about specific and general current problems, proposed solutions to those problems, and locations that are considered to be attractive yet inaccessible via the existing system.

#### METHODOLOGY

NOACA's survey was conducted by telephone with residents in 149 households in the region of Cuyahoga, Geauga, Lake, Lorain, and Medina counties during August 1981. All calls were made within area code 216. The list of telephone numbers was developed by a random-digit generation process, using all working residential exchanges in the five-county area (as identified through the assistance of Ohio Bell). Exchanges outside the downtown Cleveland local call area were assigned a prefix of one and local exchanges were assigned a prefix of zero. A computer program was used to select an exchange randomly and match it with four random digits. No attempt was made to screen within exchanges for working number groups, as suggested by Waksberg (14), because the survey was small in scale. Therefore, the share of completed calls in each exchange, municipality, township, or county was expected to be roughly proportional to the share of households in each exchange, municipality, and so forth (15, p.76). The sampling process was not stratified by smaller political subdivisions and, therefore, does not permit intra-area comparisons.

A questionnaire was developed jointly by NOACA's Community Involvement and Transportation Planning Divisions in consultation with the executive di-

rector of the agency. It was based on one previously developed for and used in public seminar/workshops and was abbreviated and modified to suit a 5-minute interview. In both response situations respondents were asked to identify (a) one specific "worst" travel problem encountered recently in northeast Ohio, (b) other problems, (c) solutions they considered feasible for these problems, and (d) locations in the area they "would like to go to more often" if the attraction were easier to reach. It was hoped that these open-ended questions would provoke sufficient commentary from which general themes could be extracted. Some differences between seminar/workshop and phone survey results may be attributable to the placement of the one "worst" problem question as the third question of the seminar/workshop questionnaire and as the first question of the telephone survey instrument.

Calls were made in two time periods--from 12 noon to 4 p.m. and from 5 p.m. to 9 p.m. This was done to secure sufficient numbers of working persons (especially males), who were more likely to be available in the evening period. No screening procedure was used to alternate within selected households among young and old, male and female members. This was considered too time consuming. Nor was the respondent asked to indicate his or her sex, but all interviewers concurred that approximately equal shares of males and females were contacted, based on the perceived voice pitch and other impressions. Further support for this conclusion stems from the effort made to offer respondents an opportunity to request further informational mailings from NOACA.

Of the 70 respondents requesting information, 30 were male and 33 female (7 names were not classifiable by sex). Calls were terminated if a nonresidential phone was reached, a recording was heard indicating a nonworking number, a busy signal was heard, 10 rings went unanswered, a residential respondent was under 16 years old, or a respondent refused to participate. Several calls were completed to automatic answering machines. This recent development of electronic technology is rarely discussed in telephone survey manuals. This was resolved by treating such calls as no answers. To leave a message might have biased the sample toward persons with higher incomes and certain occupations. There is no analogous way to leave a message for other persons not at home at the time of the initial call.

**RESULTS**

The 1,165 dialings produced 149 responses, a ratio of 7.82 to 1. This compares favorably with the efficiency of other telephone surveys that have run as high as 10 dialings per completed call. The 1,165 dialings to an eligible respondent included 27 call-backs invited by respondents. Results were distributed as follows:

| Result   | No.          |
|--|--------------|
| Completed interview  | 149          |
| Refusals   | 95           |
| Contacts with ineligible (businesses, juveniles, and so forth) | 84           |
| Not working or no answer                                       | 810          |
| Initial invitations to call back later                         | 27           |
|  | <u>1,165</u> |

To assess the effectiveness of the sampling procedure in producing a representative sample, a tabulation was made of the shares of completions and refusals for each county and compared with the 1980 population and housing unit counts for each county. (Neither "population" nor "housing unit" is the precise equivalent of "household." But either can be used as a proxy in estimating expected county shares.) Table 1 gives the success rate by county. The close approximations to actual household shares by county suggest that the random-digit-dialing process was effective in sampling representative area-wide public opinion. It also suggests that the large number of calls made to Cuyahoga County was reasonable because of its relatively large share of the area's population and housing units.

Completed surveys were reviewed by the transportation planning staff of NOACA and treated as data to be included in the formulation of alternative test systems. Although the interests of the transportation planning staff focused on specific problems, facilities, and locations cited in individual comments, an attempt is made here to draw out inductively recurrent themes from survey responses and to compare them with outcomes of three related public seminar/workshops.

Answers to open-ended questions on specific and general problems and their solutions were combined into a composite response for each respondent and coded according to whether or not the respondent

1. Mentioned concern for the maintenance of roads, bridges, or other system elements;
2. Had encountered traffic congestion (without regard for its location, supposed cause, or supposed cure);
3. Identified the need for or otherwise supported one or more transportation system management (TSM) techniques, such as signal coordination, enhanced law enforcement, ridesharing, flextime, and so forth (16);
4. Commented on a public transit problem or concern; and
5. Expressed support for new construction of

**TABLE 1 Results of Telephone Survey**

| County     | Percent of Area Population | Percent of Area Housing Units | Calls Completed |         | Refusals |         | County Refusal Rate <sup>a</sup> |
|------------|----------------------------|-------------------------------|-----------------|---------|----------|---------|----------------------------------|
|            |                            |                               | Number          | Percent | Number   | Percent |                                  |
| Cuyahoga   | 68.9                       | 71.9                          | 109             | 73.1    | 63       | 74.1    | 36.6                             |
| Geauga     | 3.4                        | 2.9                           | 5               | 3.4     | 2        | 2.4     | 28.5                             |
| Lake       | 9.8                        | 9.1                           | 16              | 10.7    | 5        | 5.9     | 23.8                             |
| Lorain     | 12.6                       | 11.6                          | 15              | 10.1    | 11       | 12.9    | 42.3                             |
| Medina     | 5.2                        | 4.6                           | 4               | 2.7     | 4        | 4.7     | 50.0                             |
| Area total | 99.9 <sup>b</sup>          |                               | 149             |         | 85       |         | 36.3                             |

<sup>a</sup>Refusals/(Completions + Refusals).

<sup>b</sup>May not equal 100 percent due to rounding.

specific lanes, ramps, interchanges, routes, and so forth, or for new construction in general.

It was also noted whether the respondent

6. Experienced at least one transportation-related problem; and

7. Identified at least one attractive potential destination that was considered to be hard to reach or inaccessible.

Table 2 gives the distribution of these themes among the seminar/workshop participants on the one hand and the telephone survey respondents on the other. Some similarities and differences are noteworthy.

**TABLE 2** Distribution of Composite Responses to Seminar/Workshops and Phone Survey

| Problem Theme                         | Seminar/Workshop Participants <sup>a</sup> |         | Telephone Survey Respondents <sup>b</sup> |         |
|---------------------------------------|--|---------|---|---------|
|                                       | Number                                     | Percent | Number                                    | Percent |
| Better maintenance                    | 27   | 58.7    | 72  | 48.3    |
| Traffic congestion                    | 26   | 56.5    | 39  | 26.2    |
| Specific TSM                          | 21   | 45.7    | 37  | 24.8    |
| Public transit problem                | 3  | 6.5     | 12  | 8.1     |
| Support construction                  | 25   | 54.3    | 46  | 30.9    |
| At least one travel problem           | 43   | 93.5    | 125                                       | 83.9    |
| At least one inaccessible destination | 26   | 56.5    | 36  | 24.2    |

<sup>a</sup>Number of respondents was 46.

<sup>b</sup>Number of respondents was 149.

A somewhat surprisingly low level of concern was expressed by both groups for public transit. This might mean any of several things. Either the public is satisfied with the area's public transit, or some persons do not use public transit (either because of unavailability or because of past dissatisfaction). Northeast Ohio residents are well aware of transit opportunities but may have a somewhat lower level of loyalty to transit in comparison with other urban areas in the nation. Because the questionnaire did not probe for reasons why a person mentioned or did not mention a given theme, this assessment is highly speculative.

Another similarity in both groups is the high level of concern for road and bridge maintenance. It is probable that the commitment of funds to maintain the existing system will continue to receive support from a majority of the public.

Contrasts are also apparent between the two groups. Telephone survey respondents showed a generally lower level of interest in TSM solutions and road construction, had experienced less traffic congestion, and less frequently identified inaccessible destinations.

Seminar/workshop participants were, perhaps, more likely to identify TSM problem solutions because of prior personal or professional interest in transportation planning or attendance at previous NOACA public involvement activities. For example, seminar/workshop participants were more likely to respond in terms of traffic signal coordination while a typical phone survey respondent making essentially the same comment would speak in terms of timing the lights. Thus the very language used reflects somewhat different interests and experiences between the two groups. Because special efforts are made to include interested parties in seminar/workshops (in addition to general newspaper advertising and other notices to the affected general public), such differences should not be too surprising.

Another contrast is that more seminar/workshop participants reported experiencing traffic congestion than did survey respondents. But traffic congestion can result from insufficient roadway capacity (too few lanes or no alternative routes), an inefficiently operated transportation system (involving, for example, uncoordinated traffic signals and lax enforcement of parking laws), or poorly maintained roadways (resulting in lower average speed). Thus percentages of persons experiencing traffic congestion do not necessarily inform planners about which of several alternative solutions might be preferred. It is instructive, however, to note that far fewer telephone survey respondents than seminar/workshop participants commented on traffic congestion. This may be attributable to the holding of seminar/workshops in more heavily populated locations, where participants are more likely to experience congestion. The large turnout at an afternoon, downtown Cleveland seminar/workshop is a likely contributor to this phenomenon.

Similarly, areawide residents contacted through the telephone survey show less support than seminar/workshop participants for new road construction (31 percent versus 54 percent). Because responses were coded as supporting new construction if even a project as small as adding a lane or exit ramp were mentioned, these percentages may be somewhat inflated. A parallel result (25 percent versus 57 percent) holds for the identification of inaccessible locations—many of which could be reached better, presumably, over newly constructed roadways. (Supporting construction and identifying an inaccessible location appear to be independent of each other. Chi-square = 1.60 with 1 degree of freedom and alpha = 0.05; phi = 0.10.) These results suggest that seminar/workshop participants may be more supportive of capital intensive construction projects than members of the general public.

Neither the seminar/workshop questionnaire nor the telephone survey schedule included extensive background questions about respondents. This was attributable to both time limits and political sensitivities related to such probes by a public agency. Nevertheless, it has been possible to cross-tabulate results on four key themes by community per capita incomes and by the ratio of vehicles to adults in a household. Although other indicators might be desirable from a theoretical viewpoint, pragmatic considerations related to the mission of the agency conducting the research limited the scope of such analyses.

Community per capita income was assigned to each completed call by matching the list of municipalities and townships served by an exchange with 1977 survey data (1980 Census data are not yet available). Where more than one local jurisdiction was served by an exchange, an unweighted mean per capita income was computed for the cluster and assigned to each call from that exchange area. It should be apparent that per capita income is not a measure of individual-level or household-level income. Instead it is a contextual factor (17). Here an analysis of the differences in prevalent themes among the varying communities is based on an aggregate measure. There remains the possibility that a respondent's income was actually well above or well below the amount assigned to his or her call. Perceptions of per capita income levels, then, are affected by differences in perceptions among people who live in residential areas of different economic levels, irrespective of the respondent's own individual income. In the ideal situation, one would control statistically for the effects of individual-level income before assessing the effects of the contex-

TABLE 3 Telephone Survey Responses by 1977 Community per Capita Income Group and Major Transportation Problem Theme

| Theme                                 | Low <sup>a</sup> |         | Medium Low <sup>b</sup> |         | Medium High <sup>c</sup> |         | High <sup>d</sup> |         | Total  |         |
|---------------------------------------|------------------|---------|-------------------------|---------|--------------------------|---------|-------------------|---------|--------|---------|
|                                       | Number           | Percent | Number                  | Percent | Number                   | Percent | Number            | Percent | Number | Percent |
| Better maintenance                    | 23               | 52.3    | 18                      | 58.1    | 19                       | 40.4    | 12                | 44.4    | 72     | 48.3    |
| Support construction                  | 13               | 29.5    | 13                      | 41.9    | 16                       | 34.0    | 4                 | 14.8    | 46     | 30.9    |
| At least one inaccessible destination | 7                | 15.9    | 9                       | 29.0    | 13                       | 27.7    | 7                 | 25.9    | 36     | 24.2    |
| Public transit problem                | 3                | 6.8     | 3                       | 9.7     | 6                        | 12.8    | 0                 | 0.0     | 12     | 8.1     |

Note: Survey was conducted among 149 respondents in a random-digit-dialing survey of all active, residential telephone exchanges in NOACA's five-county area.

<sup>a</sup>Less than \$5,780; n = 44.

<sup>b</sup>From \$5,780 to \$6,600; n = 31.

<sup>c</sup>From \$6,600 to \$7,350; n = 47.

<sup>d</sup>\$7,350 or more; n = 27.

tual variable. This was not possible in the present case.

Table 3 gives quantities and percentages of telephone survey respondents in each community income group for four of the key themes. By comparing down the columns, it can be observed that maintenance is the highest concern of each group when compared with other themes. The second highest priority for all except the highest community income groups is support for new construction.

Comparing across rows, it can be observed that support for new construction is greater among residents of the two medium-income community groups than among low- and high-income groups. This same pattern holds for public transit problems as well as the citation of at least one inaccessible desirable destination. Such a curvilinear relationship suggests that a "relative deprivation" explanation may account for the phenomenon (18,19).

Residents of low-income communities may perceive fewer transportation problems (given different personal priorities) because they lack the resources to use even the best available transportation system. Residents of wealthy communities, on the other hand, may experience relatively fewer problems because of their abundant resources. Those in this second group may be more likely to use private means to overcome even the worst transportation system.

Persons in the middle-income groups, however, have enough resources to take advantage of an existing public system of transportation facilities yet are not able to move through the system with maximum satisfaction. That is, middle-income groups are more likely to experience the gap between the ideal and the actual transportation system. It is these persons who are most likely to make extensive cost-benefit calculations about prospective changes in the transportation system.

Table 4 gives the distribution of the four key themes by automobile availability. It may be reasoned that access to a private vehicle conditions perceptions of areawide transportation problems. The

ratio of vehicles to adults was computed for each household of respondents. Table 4 is constructed with two values of this ratio--less than one for those who have no vehicle or who must share a vehicle with at least one other adult, and one or more for those who have exclusive use of one or more vehicles. As the data in Table 4 indicate, some differences appear between these two groups. Independents are more supportive of road maintenance and new construction. Sharers tend to be more concerned about inaccessible destinations than their counterparts. Little difference is found between the two groups on frequency of complaints about public transit.

#### CONCLUSION

The random-digit-dialing telephone survey has been demonstrated to be an effective supplement to public seminar/workshops held in connection with NOACA's update of the transportation system plan. The survey results provided additional data on types and locations of problems for technical transportation planners. In addition, seven major themes were extracted from responses to open-ended questions, and comparisons were made between the distributions of seminar/workshop and phone survey responses. The results of this comparison suggest that seminar/workshops are effective in eliciting opinions and information from key persons representing broader, usually organized constituencies. But both support and opposition encountered from such assemblages may reflect greater depths of interest than expressed by the general public. This, of course, does not mean that either seminar/workshop or surveys need to be selected as the better data collection technique. Instead it is an indication that public involvement is important at the data collection phase of planning and can effectively combine both techniques. That is, seminar/workshops can be useful in identifying prominent problems and issues, and statistically representative, follow-up surveys can be used effectively in assessing the degree to which these viewpoints are generally shared by the public.

TABLE 4 Responses by Vehicle/Driver Ratio and Major Transportation Problem Theme

| Problem Theme                         | Sharers <sup>a</sup> |         | Independents <sup>b</sup> |         |
|---------------------------------------|----------------------|---------|---------------------------|---------|
|                                       | Number               | Percent | Number                    | Percent |
| Better maintenance                    | 30                   | 43      | 38                        | 50      |
| Support construction                  | 20                   | 20      | 26                        | 34      |
| At least one inaccessible destination | 18                   | 26      | 17                        | 22      |
| Public transit problem                | 6                    | 9       | 6                         | 8       |

<sup>a</sup>Sharers live in a household where the ratio of available vehicles to adult drivers is less than one; n = 69.

<sup>b</sup>Independents live in a household where the ratio of available vehicles to adult drivers is at least one; n = 76.

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## REFERENCES

1. R. Pulliam, R.F. Pain, M.T. Shaffer, and J.L. D'Ignazio. Survey to Assess Public Perception of Values Critical to Transportation Planning. *In* Transportation Research Record 617, TRB, National Research Council, Washington, D.C., 1976, pp. 13-18.
2. P.P. Lame, D.E. Moore, and S.M. Lembeck. Trends in Citizen Involvement in Government: A Pennsylvania Survey of Citizen Attitudes. Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, University Park, 1981.
3. M. Wachs. Relationship Between Drivers' Attitudes Toward Alternative Routes and Driver and Route Characteristics. *In* Highway Research Record 197, HRB, National Research Council, Washington, D.C., 1967.
4. M. Wachs. A Survey of Citizens' Opinions of the Effectiveness, Need, and Techniques of Urban Transportation Planning. *In* Highway Research Record 229, HRB, National Research Council, Washington, D.C., 1968.
5. H.B. Gamble and O.H. Sauerlender. Adverse and Beneficial Effects of Highways on Residential Property Values. *In* Transportation Research Record 508, TRB, National Research Council, Washington, D.C., 1974.
6. L. Levinson and M.C. Gersten. Transportation Attitude Survey for Modal-Split Forecasting as Part of Long-Range Transit Planning. *In* Transportation Research Record 508, TRB, National Research Council, Washington, D.C., 1975.
7. Effective Citizen Participation in Transportation Planning. Socio-Economic Studies Division, FHWA, U.S. Department of Transportation, 1976.
8. N.K. Denzin. *The Research Act*. Aldine, Chicago, Ill., 1970.
9. D.B. Gurin. Methods for Collecting Information About Traveler Subgroups. *In* Transportation Research Record 617, TRB, National Research Council, Washington, D.C., 1976.
10. Northeast Ohio Areawide Coordinating Agency (NOACA). Results of Public Seminar/Workshops on Transportation Systems Planning. Cleveland, Ohio, 1981.
11. R. Dahl. *Who Governs? Democracy in Power in an American City*. Yale University Press, New Haven, Conn., 1961.
12. D. Riesman. *The Lonely Crowd*. Doubleday, New York, 1953.
13. Seven County Transportation/Land Use Study (SCOTS): A Framework for Action. Cleveland, Ohio, 1969.
14. J. Waksberg. Sampling Methods for Random Digit Dialing. *Journal of the American Statistical Association*, Vol. 73, 1978, pp. 40-46.
15. A.J. Tuchfarber and W.R. Klecka. Random Digit Dialing: Lowering the Cost of Victimization Surveys. Police Foundation, Cincinnati, Ohio, 1976.
16. Northeast Ohio Areawide Coordinating Agency (NOACA). Analysis of Transportation System Management Policy Alternatives: Final Report. Cleveland, Ohio, 1979.
17. L.H. Boyd, Jr., and G. Iverson. *Contextual Analysis: Concepts and Statistical Techniques*. Belmont Wadsworth, 1979.
18. R. Dahrendorf. *Class and Conflict in Industrial Society*. Stanford University Press, Stanford, Calif., 1959.
19. L.A. Coser. Violence and the Social Structure. *In* *Continuities in the Study of Social Conflict*, Free Press, New York, 1967, pp. 53-72.

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