Methods for Collecting Information About Traveler Subgroups

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A variety of research methods to learn about traveler subgroups can be used to differentiate among travelers and to explain travel patterns and problems. This paper evaluates indirect methods (such as literature reviews and expert interviews), unobtrusive methods (such as field observations and written record analysis), and direct methods (such as informal conversations, large sample surveys, and long-term personal interviews with subgroup members). The best features of these methods can be successfully incorporated into long-term meetings that involve small sets of homogeneous panels of travelers. Widespread use of the panel method, in combination with other research methods, is encouraged to explain subgroup travel behavior, identify travel problems, determine preferred solutions, and forecast and assess the impacts of policies and programs. Panel discussions seem particularly productive for helping transportation-disadvantaged subgroups such as the elderly, the handicapped, and the young.

Politicians and planners have become increasingly interested in travel patterns and problems of population subgroups because they need to determine preferred problem solutions and to forecast and assess social, political, and other impacts of transportation policy and programs. However, most existing knowledge about subgroups is inaccurate or incomplete. This paper covers a variety of research methods that explore and explain travel behavior patterns and attitudes that are historically stable and observable in the United States and abroad. The methods can also help uncover behavior patterns and attitudes that are changing, potentially responsive to public policy, or reflective of the unique conditions of demography, culture, or local environments. Since institutions need better methods to anticipate which investments and legislative actions will or should be supported, this paper focuses attention on exploratory causal research.

Two classes of methods are presented:

1. Indirect methods that employ observations about subgroup members made by nonsubgroup members and
2. Direct methods that involve individuals of the traveler subgroup and their observations about themselves and their peers.

The appropriateness, accuracy, validity, reliability, generalizability, cost, and other features of these methods are highlighted.

PRINCIPLES OF RESEARCH DESIGN

Several worthwhile principles of research design merit review before specific methods are introduced.

1. Subgroup research should be based on several contrasting research methods that permit observation and data collection from different vantage points. This multiple approach, referred to as triangulation, makes use of the best features of each approach. Research credibility is enhanced if comparative data from several methods result in similar conclusions. Credibility is reduced, however, if different conclusions are revealed; the use of multiple methods helps to reveal inaccuracies in observation, measurement, or analysis that must be explained and resolved (1, 5, 7, 14, 15, 16).
2. Research credibility can be enhanced if at least one method used in triangulation research permits reinforcing comparisons of new subgroup data and findings with those revealed in other research covering similar topics or using similar methods, but involving populations in different eras, locations, and cultures. To diversify the comparative data base for major research studies, efforts should be made to include travel-related questions in other census or research projects.
3. Subgroup research should be designed to learn the fundamental reasons why observed subgroup patterns, problems, and solutions exist. Research methods must permit direct explanations by subgroup members as well as causal inferences by researchers (1, 7, 10, 13, 15).
4. Research should identify information on actual behavior and attitudes of the subgroup (7, 10). Objective, theoretical, and normative information (based on simplified or idealized approaches used in engineering, economics, and city planning) should supplement and not substitute for empirical information.

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5. Subgroup research should expand and illustrate mobility possibilities and problems and improve mobility measurement. The nature and extent of interacting factors that affect mobility and travel problems have not been documented or understood. Until a comprehensive overview of mobility has been established, the research to simplify and synthesize most aspects of travel is premature (5, 7, 9, 15).

6. Subgroup research will be more persuasive if it emphasizes careful quantification of information (2, 3, 4, 5, 6, 7, 9, 11, 12, 14, 15, 16). Subsequent data and forecasting can only be as realistic and accurate as the measures that were used to record observations and information. Questions can often solicit quantitative information instead of simple yes-no or true-false responses. Detailed and disaggregated data can always be simplified, but simplified responses cannot be expanded by the researcher.

7. Subgroup research design should include control group concepts (1, 2, 3, 4, 7, 12, 14, 15). Research will also be improved if contrasting populations can be investigated simultaneously. For example, studies of subgroup immobility problems should cover both immobile subgroup members and the mobile members whose age, experience, education, income, and other conditions have already helped them overcome or avoid immobility.

8. Research designed to help predict the impacts of public policy and programs should employ longitudinal or time-series data-gathering methods (2, 5, 11). The stability or change in mobility patterns and problems are needed indicators of the causes of existing and potential travel behavior and the public response to problem solutions.

9. Research plans should provide adequate time, money, and staff competence. Exploratory research may take several months or years to learn about subgroup populations, develop appropriate questions, secure clearances for research questions from the Office of Management and Budget and funding sponsors, and collect and analyze subgroup information. Adequate funds for staff selection, training, and information collection are vital. The most experienced and competent staff should be employed to deal with the inherent difficulties of exploratory research. These resource requirements will be offset, however, by the benefit that a large core of the research findings will likely have in widespread and long-term relevance. Many aspects of subgroup travel patterns and problems can receive future policy and program attention without costly site-specific and follow-up studies.

INDIRECT DATA-GATHERING METHODS

Literature Search

A review of printed information is a necessary but often frustrating and time-consuming experience. Researchers should expect to encounter several unique and seldom-described problems in locating and using existing subgroup information. Substantive exploratory and causal material on subgroups is too new a topic of concern to find in printed form. When material is found, its quality must be evaluated carefully and skeptically before it is used because (a) quantitative data are of dubious accuracy or completeness and (b) qualitative insights on particular topics are neither developed in depth nor documented by empirical research nor integrated with theories of travel and behavior. Existing efforts are rarely designed to explain and predict subgroup responses to new policies and programs.

One reason for research difficulties is that new areas of research seldom have a widely accepted, specific language or vocabulary that frequently appears in titles, tables of contents, or indexes. Researchers coin their own phrases such as physical mobility or subgroup travel. Researchers and librarians do not find existing bibliographic guides very helpful in locating printed material. Books of abstracts, card catalogs, computer retrieval systems, and periodical listings require this existence and the knowledge of access points or key words on the subject in question so they can be used. The lack of a specific vocabulary, however, forces researchers to use equivalent key words that are vague and that rarely lead to worthwhile material. For example, material indexed under mobility almost always deals with economic, social, or residential movement—there is no subject heading that deals specifically with physical movement. Other complications arise when different authors use different words to refer to the same topic (e.g., population subgroups, market segments, or consumer groups) or when authors use the same word to imply different meanings (e.g., the word panelists implies either a group of isolated respondents who submit periodic reports or an assembled set of discussants.) Bibliographic guides are also of restricted use because (a) authors who work in exploratory fields are seldom well-known to researchers or information retrieval experts, (b) many government documents do not reveal authorship, and (c) many sources of exploratory ideas do not include footnotes.

Authors seldom help catalogers, librarians, or researchers. Many authors choose titles with little or no regard for the problems other researchers will encounter if they try to identify the potentially relevant materials. Titles are too short to be explicit and informative; they do not include conventionally established key words; and they do not choose key words to appear in the title first so researchers can locate information. Abstracts before the early 1970s were seldom written to be informative and to contain key words that help catalogers, guidebook publishers, and researchers. Thoughtless titles and abstracts cause researchers to overlook the author's work or to waste time tracking down and reading irrelevant material.

Much of the material of greatest use in exploratory work is not indexed or available to the public. Typically, relevant material is unpublished or is printed in limited numbers, anthologies, or collections or prepared for the private use of companies. Determining the existence of the material and obtaining copies of it depend on luck or on access to professionals or professors who are familiar with this underground material. Telephone and personal contacts must often be established with authors and people who serve on transportation committees of various institutions (i.e., TRB, NCHRP, American Automobile Association, American Institute of Planners, American Public Transit Association, American Society of Planning Officials, American Society of Civil Engineers, and the Highway Users Federation for Safety and Mobility).

Institutions, with few exceptions, hamper exploratory literature reviews. TRB is slowly developing a computerized information system (TRISNET), and the Smithsonian Institution and various universities and government agencies are attempting to publicize recent and ongoing research in progress. On the other hand, the major clearinghouse of transportation reports (National Technical Information Service), the Federal Register, the Congressional Record, and most bureaucracies have administrative procedures that complicate and discourage retrieval of speeches, testimony, regulations, and other documents.

The dearth of scholarly and professional material on

exploratory topics necessitates the search for relevant material. Relevant sources of causal insights include market studies, advertising, photography exhibits, music, biographies, regional newspapers, popular news-weeklies, and hobby and fan magazines. These sources are often the only ones that contain many types of information about short- and long-term behavior and attitudes; unfortunately, most of these sources are not carried by many libraries, are not listed in periodical indexes, and lack respectability in many universities and agencies.

The literature of nontransportation fields must be searched for relevant or analogous material to supplement existing transportation literature prepared by engineers, econometricians, and planners. Other fields to be covered for substantive and methodological information include marketing, education, social relations, psychology, anthropology, sociology, political science, and consumer and regulatory economics. However, the social-behavioral sciences have not focused their attention on most aspects of transportation and travel (1, 7, 12).

Expert Interviews

The authors who write the most relevant material located during a literature review should be interviewed directly and as early as possible in the review process. Authors should be asked to evaluate their efforts and those of other researchers, identify existing but unanalyzed data and literature sources, recommend further research priorities and methods, and describe time-consuming or hard-learned research lessons. Since authors seldom publish this helpful material, these interviews are important for improving and speeding up the exploratory work.

Subgroup studies can benefit from the insights of perceptive people who are not members of the subgroup. Initially, professors should be contacted to identify relevant literature and improve research designs. Regional planners and transit and highway officials can provide descriptive information about general travel patterns; however, they rarely have information about the behavior and attitudes of a particular subgroup, nor do they display an understanding of the reasons behind observed behavior.

The most stimulating informants about the causes of travel patterns and problems are professionals who deal directly with subgroup members in a social service capacity (7, 13). Police officers, guidance counselors, employment placement workers, clergymen, and transit and taxi drivers have roles as authority figures and, as a result, have frequent contact with a cross section of subgroup members and their families. They view travel and car accessibility in symbolic as well as transportation terms. They can sense the insecurities and family problems of the subgroup members that lead to psychological demands for mobility. In particular, police and taxi drivers know about informal subgroup activities—their locations, timing, and participation rates among the subgroups. Since police and taxi drivers come from social-class backgrounds and family experiences that are similar to those in the neglected transit-market segments, they are often sympathetic with the feelings of subgroup members. Police and other people who have grown up in one geographical area can provide some historical perspective on the stability of the behavior and attitudes of the subgroup.

Informants who can provide contrasting perspectives about subgroups include newcomers (new town residents and young teachers), politicians and storekeepers, people who have had personal experiences in situations similar to those of the subgroups being studied, and people who sell or finance products related to transportation (7, 10, 14, 15).

Family Interviews

The families of subgroup members (e.g., the children of an elderly person) can provide a unique type of information that can improve the accuracy and reliability of the information gleaned from subgroup members. At a minimum, families can confirm basic facts about socioeconomic status and access to transportation. They can describe and explain changes in the travel behavior and attitudes of the subgroup members over the years and during a typical week. They can compare the behavior and attitudes of the subgroup member with his or her siblings, children, parents, and friends to learn how people of similar backgrounds respond to maturation, changing economic status, technological and institutional innovation, and tax-supported transportation programs.

The use of family informants raises serious ethical and methodological questions that can only be briefly cited. How can the rights to privacy of subgroup members be assured? How can people for whom mobility and feelings of independence are symbolically important (e.g., adolescents, working class fathers) be encouraged to permit family interviews? What steps can be taken to prevent disclosure of confidential remarks? How can one overcome subgroup members' fears that family members are likely to be more observant of their travel behavior after the family members are interviewed? How biased are the findings if only a fraction of the subgroup population permits family consultations?

Written Records

Written records of data compiled for educational, health, tax, safety, and other institutions can occasionally be tapped to help explore travel behavior and attitudes of the subgroup. Examples of these records include psychological tests, attendance and vacation records, medical disability files, and records for parking permits and traffic accidents. These records can be used to verify subgroup reports, estimate trip frequencies or travel problems, and develop personality profiles associated with specific travel behavior patterns such as poor driving. This type of research is recommended to supplement information gathered directly from the population being studied (16). Caution should be exercised by researchers when reviewing the behavioral science, labor, safety, and other professional journals that deal with the ethics and procedures for obtaining public access to these records and the generally poor quality of most institutional files (3, 4, 7, 16).

Field Observations

A wide variety of methods exist for exploring subgroup behavior visually, mechanically, or photographically (16). These unobtrusive techniques are often inexpensive and require little manpower. Visual inspection of the geographical environment in which travel takes place can provide general impressions about the density and nature of trip generators and the hours and seasons when they are available to subgroup members. Other useful but crude approaches for studying mode, route, destination choices, and travel behavior involve the development of physical indicators of activity (such as tracks left by pedestrians, snowmobiles, and parked and skidding cars; wear and tear on facilities; and amounts of litter) and mechanical and photographical counting devices triggered by vehicles, door and gate openings, and turnstiles.

Field observations seem best suited for studies of specific kinds of subgroup behavior along certain routes and at destinations (6, 15) and for the design and behavioral analysis of small sites and facilities such as pedestrian overpasses, parking lots, or bus interiors. However, observational techniques have important limitations. Subgroup members may not be easy to identify visually or from the physical indicators they leave behind. The causes of the observed behavior are seldom discernible; therefore, other direct methods must be used in conjunction with observation. Last, travel patterns that are dispersed over a large area or long periods of time make field observations difficult.

DIRECT METHODS

Informal Conversations With Subgroup Members

Informal conversations are a necessary part of subgroup research. These conversations help researchers learn subgroup idioms and popular travel topics and concerns. They also build researchers' confidence to do a more critical follow-up for interviews and group meetings. The conversations permit a pretesting of interview and written survey materials and can be used to identify potential informants. From the viewpoint of the subgroup members, informal conversations acquaint them with the objectives, time commitments, participation demands, privacy guarantees, and staff associated with the collection of information. This informal conversation is especially valued if long-term research is planned (7, 10). Conversations that appear in newspapers and on network radio and TV news stories are sometimes the only available validation sources for comparing the behavior and attitude information obtained from subgroups of similar or contrasting sex, geographical region, social class, and income—especially if travel conditions change significantly (such as during an energy crisis, a transit strike, or a crippling storm).

Participant Observation

A special application of conversation and field research is participant observation; the researcher spends days or months associating with one or more subgroup members, develops a trusting relationship with them, unobtrusively observes their behavior, and occasionally asks them to explain their behavior. Participant observation permits identification of a subgroup member and opportunities for clarifying the nature, frequency, and other characteristics of observed behavior and displayed attitudes. Observation also permits documentation of travel and decision behavior, perhaps in greater detail and for a greater duration then subgroup members would record by themselves. However, participant observation is difficult and time consuming particularly if the needs of the subgroup require travel within a large area; therefore, this technique appears marginally useful to produce data for a general mobility study. It is also one of the more controversial research methods for sociological study (3, 4, 12).

One-time or Multiple, Open-Ended, Semistructured Interviews of Individuals

The one-time interview can generate considerable information about subgroups if sufficient interview time and skilled interviewers are part of the research design. Small numbers of respondents, perhaps 50, can be used to explore and explain a variety of topics in sufficient depth to perfect measures of neglected aspects of travel and to generate hypotheses for future prediction and testing. Exploratory interviews can be conducted in an informal and trust-building environment and conveniently scheduled to generate several hours of material per respondent. Once the time limits are overcome, several methods of data collection can be explored, and questions can be developed and repeated to gain reliability and validity. These interviews can involve a small subsample of subgroup individuals who have unusual attributes such as a broken arm or leg, who are about to gain or lose access to a car, or who use particular types of transportation such as transit, taxis, and snowmobiles.

Small-sample, open-ended interviews have disadvantages. The recruitment for respondents can be complex, since respondents who are willing to invest time and effort must be found. Interviewers should preferably be of similar age and race and have other attributes that match those of the subgroup respondents, and interviewers must have verbal skills and imagination to take full advantage of this method. The verbal collection of respondent data such as age and address can be boring and an inefficient use of skilled interviewers. The most serious limitations of exploratory interviews relate to the necessity of a nonrandom, small-scale survey and to the varying treatment of topics among the respondents. Generalizations to nonstudied populations can only be made with caution and with explicit qualification, since use of inferential and nonparametric statistics is inappropriate (7, 14, 15).

Large-Scale Sample Surveys

The use of large-scale random-sample surveys offers particular advantages for certain types of subgroup research. Such surveys are appropriate for empirical testing of theoretical hypotheses, determining attribute bias in subsamples of a traveler subgroup population, or estimating totals and population travel volumes, origins, and destinations. The speed of data collection and the minimal training needed by staff have encouraged the use of large-sample surveys in studies during the last 20 years.

However, researchers should be wary of the inappropriate use of surveys and the weaknesses of existing survey data. The survey approach is criticized as an unrevealing method for conducting exploratory research (14). Time limits of the survey permit only certain predetermined kinds of data to be collected from any one respondent. Random surveys of 2000 to 3000 people are usually needed to obtain the numbers of subgroup respondents required for a statistical analysis. The survey-sample approach intrinsically but questionably assumes that the survey data (a) cover the most important topics perceived by the respondent and (b) validly and accurately represent the behavior and attitudes of the respondents. Surveys typically collect respondent data at only one point in time and inaccurately presume that survey questions generate reliable responses and that memory-related responses are accurate. Serious questions have also been raised as to the completeness and accuracy of trip data that are private and personal in nature and that respondents fear might be reviewed by authority figures (e.g., the family members of respondents, teachers, employers, police, clergy). These problems of survey research are compounded by the characteristics of traveler subgroups whose immobility is of societal concern—the elderly, the poor, and the young. These subgroups tend to have inadequate educations for self-administered written surveys, to be undercounted in the census and other surveys, and to be distrustful of strangers seeking information about their incomes, social activities, and other personal matters. In growing numbers of communities, survey

costs have risen to $14 to $20/respondent, and refusal rates for survey participation are increasing.

Existing surveys commonly have serious shortcomings. They seldom contain specific subgroup information; travel data are either aggregated for many subgroups or subgroup distinctions do not make important subclassifications that control for income, family size, social class, life-cycle, and employment status. Sociologists and psychologists claim that these factors are associated with distinctive behavior patterns and attitudes. Existing data probably undercount actual trip volumes and misrepresent the actual nature of travel. Our understanding of a subgroup's preference for a certain mode or transportation service depends on vital information such as personal access to automobiles, walking and chauffered trips, ride-sharing, non-home-based trips, late night and weekend trips, and trips for courtship and other informal social and recreational purposes. However, this information has not been sought or reported.

Periodic Panel Discussion Meetings

One of the most neglected but promising research methods for exploratory research involves one or a series of semistructured panel meetings with 5 to 10 subgroup members. The use of 10 panels can produce both ideas and large amounts of verbal and written personal data, and this serves as a compromise between the data-gathering efficiencies of large-scale, closed-end surveys and open-ended individual interviews. Several transportation researchers have explicitly recommended this data-gathering approach (7, 8, 9, 13, 15).

Group meetings have many advantages over individual interviews. Discussions can be lively and stimulating because of positive interactions among panel members. On certain topics such as attitudes toward taxis, only the use of discussions will likely generate data. The constructive and supportive comments among panelists encourage spontaneous and penetrating statements that only an extremely skillful interviewer might be able to elicit in individual interviews. Subgroup panelists question the reliability and validity of each other's statements in ways that a group leader could not do or would not think of doing. For the leader, group discussions and data collection can be less repetitious and therefore more enjoyable than individual interviews. The group approach also shortens the time needed to collect information from each person and permits only a limited number of scheduled meetings. The use of peer group panels can probably contribute to higher participation rates than the use of interviews can. Panel discussion meetings would probably appeal most to adolescents, elderly, ethnic minorities, and other disadvantaged subgroups who value social interactions among their peers and provide few discipline problems.

The panel meeting research approach is most informative when meetings are held with each panel on a weekly or multiweek basis for a period lasting several months. Time limits are eliminated, and open-ended discussion about a range of mobility topics, research techniques, and data collection forms is encouraged. Many more questions can be asked and can be repeated with or without refinements during the same discussion to determine response reliability. Answers can be reviewed between sessions, and poorly stated questions can be improved or asked again. Other methods such as map making and photo interpretation can be employed to understand perceptions and feelings of the panelists (7, 15). Multiple meetings of the same panelists essentially reduce the recruitment, training, and data processing efforts of each subgroup member in the research; administratively, regularly scheduled meetings are easy for most panelists to remember and require a minimum of staff time to ensure good panelist attendance.

Periodic meetings permit a social situation that improves subgroup research. Pressures to develop immediate trust between a panel leader and the subgroup members are diminished; the research staff can become well acquainted with study participants. This method also seems consistent with the preferences of adolescents, working class people, and other subgroups to form friendships gradually. A series of panel meetings is recommended if research is aimed at establishing the causes of existing behavior and predicting future behavior (2, 5, 7, 15). Sequences of events, patterns of repeated behavior (e.g., trips, decisions, expenditures), and the long-term availability of travel resources such as automobile access must be monitored; this longitudinal data collection is particularly desirable when one is investigating or planning mobility for adolescents, growing families with young children, low-income households, and other subgroups with changing travel demands or resources. Diaries can be introduced to subgroup members within meetings and can be completed between meetings. Panel meetings also permit easy collection and improvement of such diaries and minimize both memory-based errors and poor response rates.

The panel discussion approach has several administrative weaknesses that may limit its use in subgroup travel research. Panels must be carefully planned, located, and scheduled to meet the convenience, interest levels, and attention spans of panelists. Panel leaders must be skilled at subgroup recruitment and panel assignments, individual and group exploratory interviewing, transportation planning, and data evaluation. Ideally, leaders would have the same sex and racial attributes as panelists and be approximately the same age. Uncertainties in panelist attendance, interests, and question responses create stresses that continually force the staff to consider the psychology of the subgroup. The tape recording of group discussions requires careful planning to ease subsequent transcript preparation and use.

Problems of long-term research relate to sample bias, behavioral and attitudinal responses to participation, and panelist attrition. Sufficient monetary and other incentives must be offered to attract and retain a representative sample of subgroup members. Demographic and behavioral differences among nonparticipants, short-term panelists, and long-term panelists should be identified for possible biases of the research data. Research should monitor the impacts of repeated discussions and peer pressures on travel behavior and attitudes. Flexible panel scheduling and multiple meeting times must be built into long-term research design so that changes in employment, school, sports, and other activities of panelists will not force participants to drop out of the panel series. Contact between researchers and panelists must be maintained by letter or phone, if the time interval between meetings lasts longer than several weeks. The total duration of the panel series should last several weeks or months for subgroup members who have seasonal jobs or recreation preferences. Examples of these populations include members of military families, seasonal residents of recreation and college communities, or members of young and growing families. However, the duration of the series can be longer if many other subgroups have stable residential and activity patterns (e.g., members in households that are fixed in size, experience discrimination in housing, have low or declining incomes, or have an extended rather than nuclear family structure). Panel participation is likely to be sustained for longer periods for groups that have little involvement in work, social-

recreation, and other time-consuming programs than for groups that have many programs and activities that compete for their time.

Some of the disadvantages of using the panel method can be minimized by careful planning, staffing, and supplementation with other research methods. Readers who want to use panel methods and who want to avoid problems are encouraged to review the technical material listed in the references, particularly those reports (7, 15, 17, 18) that review panel methodology in depth and offer guidance on topics such as costs, task timing, data collection forms, tape recording, and panel recruitment and leadership.

CONCLUDING REMARKS

A variety of methods for gathering subgroup information have been described. No single research effort for prediction or impact assessment will use all the methods to explore travel patterns, problems, and attitudes. However, each method has advantages that can be used in combination with other contrasting methods to improve the scope and quality of information on subgroups. Long-term series of meetings that involve subgroup panel members together with surveys and interviews of subgroup family members and social service workers appear particularly appropriate for subgroup research. The total expense to examine fundamental and widespread mobility patterns and problems of the most neglected subgroups is likely to be less than $3 million—approximately the cost of 1.6 km (1 mile) of rural highway or eight subway cars. The findings of this research can be used to realistically anticipate the response of subgroups to various transportation policies and mobility-improvement programs.

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