

QUALITATIVE METHODS IN TRAVEL BEHAVIOUR RESEARCH

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ABSTRACT

This purpose of this paper is to both demonstrate the importance of qualitative methods in travel behaviour research and explore the challenges researchers face in employing them. Qualitative methods offer a powerful tool for helping us understand the complexities of travel behavior. Methods such as focus groups, interviews, and participant-observer techniques can be used in conjunction with quantitative approaches or on their own to fill the gaps left by quantitative techniques. Some of the most interesting research in travel behaviour in recent years has made use of qualitative methods of one sort or another. This paper provides an overview of the types of studies being done and some of the important results being generated. These studies have produced important new insights into travel behaviour that increase our ability to understand and address transportation problems. But doing qualitative research well is more challenging than transportation researchers might think. The nature of qualitative research raises several issues concerning theoretical frameworks, data collection, management, and analysis. While these issues are also pertinent to quantitative research, qualitative research has been criticized for lack of scientific rigor and the threat of subjective interpretation. Increasing the quantity and quality of qualitative research in transportation requires two things, an increase in the acceptance and appreciation of these techniques, and an increase in training in their use among travel behaviour researchers. Recognition of what qualitative research has contributed to the field so far is a starting point. We believe that without more widespread use of qualitative techniques in travel behaviour research, we will make little meaningful progress towards improving our fundamental understanding of travel behaviour.

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1. INTRODUCTION

The study of travel behaviour as it has evolved over the last half-century has yielded critical insights into the choices that individuals and households make about their daily travel. These insights have contributed to the development of increasingly sophisticated models to forecast travel behaviour and predict changes in behaviour in response to changes in the transportation system. Yet the more we understand about travel behaviour, the more we recognize how much there is that we don't understand. As one question is answered, new questions emerge, and our appreciation of the complexity of travel behaviour grows. Qualitative methods, used in conjunction with quantitative approaches or on their own as an alternative to quantitative approaches, offer a powerful tool for helping us understand those complexities.

Qualitative methods, including focus groups, interviews, and participant-observer techniques, can help fill the gaps left by quantitative techniques. The reliance on survey data for forecasting and decision making has come under fire for a number of shortcomings. First, surveys are often used in circumstances when the issues under study are clearly defined and participant responses are anticipated. The survey instruments frame the questions and limit the range of answers to those questions. As Poulenez-Donovan and Ulberg (1994) argue, "The world of the survey, however, is bounded by the perspectives and goals of the survey writers. The survey restricts not only the question frame but the answer frame as well, anticipating the important issues and questions and the responses." These survey methods are not well suited to exploratory areas of research where issues remain unidentified and the researchers seek to answer the question "why?"

Second, data collection methods using traditional travel diaries or telephone recruitment can under-represent certain segments of the population, particularly the elderly, persons with little education, minorities, and the poor. For example, Dowling and Coleman (1995) reported that poor households were underrepresented in a telephone stated preference survey conducted in the San Francisco Bay area. Sen et al. (1995) tested the biases with the Chicago Area Transportation Study Household Travel Survey, a mail-out/mail-back survey, and found that the survey under-sampled blue-collar professionals, minorities, low-income households, large households, and single-member households. It is not surprising that these population segments are the very groups whose transportation issues are the least understood. Different kinds of techniques are needed to reach these households.

Qualitative methods can also be used to improve both the design and interpretation of traditional surveys (Deakin, 2001). Before the survey, focus groups, for example, can be used to identify what socio-demographic variables to include in the survey, how best to structure the diary, even what incentives will be most effective in increasing the response rate. After the survey, focus groups can be used to build explanations for the survey results, to identify the "whys" of the results as well as the implications. Qualitative techniques can bring survey results to life, providing the stories and examples that help us to understand what the numbers mean (e.g. Clifton, 2001).

For all of these reasons, qualitative methods, long used in other disciplines, have caught the attention of a growing number of travel behaviour researchers, for good reason: "Qualitative research is vital to understanding the complexity of transportation behaviour, which rests upon the

subjective beliefs and behaviours of the individual person” (Poulenez-Donovan and Ulberg, 1994). Qualitative research techniques can complement traditional quantitative approaches but also stand as a legitimate mode of inquiry in their own right. Grosvenor (2000) provided an overview of the use of qualitative techniques in the transport sector for the 1997 International Conference on Transport Survey Quality and Innovation. Four years later, our goal in this paper, prepared for the 2001 Conference, is to both demonstrate the power of qualitative methods in travel behaviour research and explore the challenges researchers face in employing them. We end the paper with recommendations on the use of qualitative methods to advance the field of travel behaviour research.

2. EXAMPLES

Some of the most interesting research in travel behaviour in recent years has made use of qualitative methods of one sort or another. Our review is by no means a comprehensive survey of these studies, but it does provide an overview of the types of studies being done and some of the important results being generated. As a part of our review, we contacted several researchers using these techniques for their comments and reflections. These studies have produced important new insights into travel behaviour that increase our ability to understand and address transportation problems.

We should note that the distinctions between quantitative and qualitative methods and the data derived from them are not always so clear. Travel surveys increasingly incorporate questions about qualitative factors that may influence travel behaviour – attitudes about the environment or orientation to leisure, for example. Data gathered using qualitative methods such as interviews and focus groups can also be quantified (although rarely are the samples large enough to yield statistically-significant results). Our focus here is mostly on purely qualitative techniques, but we include a section on attitudinal surveys because of the important results they have generated on the role of qualitative factors in travel behaviour.

We should also note that our focus here is on the use of qualitative techniques in travel behaviour research. Qualitative techniques are also frequently used by transportation planners to gauge public opinion on problems and potential solutions. Although these studies do not generally demonstrate the same level of academic rigor of the studies reviewed below, they nevertheless contribute to our understanding of travel behaviour at some level. Our exclusion of such applications is in no way meant to suggest that they are not also of importance. Indeed, researchers working in conjunction with planning agencies might help to improve the quality of the data collected and find ways of using such data to complement traditional travel surveys and academic research on travel behaviour.

2.1 Attitudinal Surveys

A growing number of travel surveys now include attitudinal questions to supplement the data on household characteristics traditionally collected in these surveys. Although attitudinal surveys are not generally classified as a qualitative method, they provide a means for measuring qualitative factors important in travel behaviour. Most of these surveys follow a similar format: a series of attitudinal questions in the form of statements with which respondents are asked whether they agree or disagree on a 5-point or 7-point scale, called a Likert scale. Factor analysis is often used to collapse the questions into a smaller set of factors that are then included as explanatory variables in travel behavioural models. In many cases, the surveys include other non-traditional questions – other kinds of individual and household characteristics, factors influencing choices, and so on.

Analyses of these surveys consistently show that at least some attitudinal factors are significant predictors of travel behaviour and are often more significant than traditional demographic variables.

For example, the Puget Sound Transportation Panel Survey included “attitude and value surveys” in its 1990, 1991, and 1993 waves (Puget Sound Regional Council, 1997). These surveys included a series of attitudinal questions relating to the transportation system; performance ratings for a variety of characteristics for different modes; a series of questions about the need for a car, the availability of transit, the availability of a possible co-rider; and importance ratings for a variety of transportation system characteristics. The 1996, 1997, 1999, and 2000 waves of the panel survey included attitudinal questions focused on awareness and use of advanced traveler information systems or on transportation and land use issues (Kilgren, 2001). Kuppam, et al. (1999) used the 1991 wave of the data set to explore the role of attitudinal and preference variables in explaining mode choice for commute trips. Using multinomial logit models, they estimated mode choice models using specifications with and without demographic and attitudinal variables. They concluded, “the contribution of attitudinal factors is greater than that of demographic variables” (Kuppam, et al., 1999: 2). The Volpe Institute is in the process of analyzing attitudinal data from the most recent survey wave.

Kitamura, et al. included attitudinal questions in their three-day travel diary survey of residents of five neighborhoods in the San Francisco Bay Area (Kitamura, et al., 1994). Besides the usual sorts of questions, the household questionnaire included questions about the respondent’s neighborhood preferences and feelings about his current neighborhood. An individual questionnaire included questions about the reasons for selecting particular modes as well as a series of attitudinal questions about transportation, time, the environment, housing, and the economy. This questionnaire also included a lifestyle section that asked about reading habits, the use of leisure time, and participation in a variety of outdoor activities and sports, entertainment and events, and hobbies. The researchers used factor analysis to collapse the thirty-nine attitudinal questions into eight factors. The modeling results showed that “the attitude factors are strongly associated with the travel demand measures used in this analysis,” providing additional explanatory power beyond demographic, socio-economic, and neighborhood characteristics (Kitamura, et al., 1994: 8-8).

Several other studies have included attitudinal and perceptual questions in surveys focused on particular aspects of travel rather than travel diaries. For example, Mokhtarian and Salomon (1999a) conducted a study of factors influencing the desire of workers to telecommute. Their survey included a series of questions on the perceived advantages and disadvantages of telecommuting plus a series of attitudinal questions about family life, work habits, and commuting. Their analysis showed that perceptions about telecommuting and other attitudes were significant predictors of the preference to telecommute. In a study of the impacts of telecommunications technologies on nonwork travel behaviour, Handy and Yantis (1997) conducted a survey of the use of different technologies and included a series of attitudinal questions about technology, transportation, time use, and social interaction. Several of these factors proved significant in models of the frequency of use of different technologies. In a study of shopping and walking trips in six neighborhoods in Austin, TX, Handy, et al. (1998) conducted a survey of neighborhood residents that included questions about the perception of the walking environment and the quality of local shopping areas, as well as questions on the importance of different design characteristics. In models of the frequency of walking, several design factors, reflecting perceptions and importance, were statistically significant.

Recent work by Mokhtarian and Salomon (1999b; forthcoming) demonstrates the power of using attitudinal surveys to delve into the factors that explain observed travel behaviour. To test the common assumption that travel is a derived demand, they designed a study that would measure “affinity for travel,” test whether a positive utility for travel impacts the amount an individual travels, and relate preferences for travel to personal attributes. The challenge in the research design was to separate the utility of activities conducted at the destination, activities conducted while traveling, and the activity of travel itself. Their survey, administered to 1900 households in the San Francisco Bay Area, included questions about demographic characteristics, attitudes toward travel, lifestyle, personality traits, and amounts of travel. This study has been widely cited for its finding that the reported ideal one-way commuting time is just over 16 minutes, but its more general finding that “humans possess an intrinsic desire to travel” (Mokhtarian and Salomon, forthcoming: 16) has important implications for planning and forecasting. They conclude: “our findings firmly indicate that some people just love to go, even when they’re going nowhere in particular,” that some people “travel for the fun of it” (Mokhtarian and Salomon, 1999b: 31).

In reflecting on her research, Mokhtarian (2001) warns that “the usual challenges of survey design are exacerbated when you are trying to capture attitudes, not just factual information.” Attitudinal surveys are “especially susceptible to wording biases, order or context effects, and such problems.” In her research projects, she starts with a preliminary conceptual model of the processes she is studying and then carefully designs and pretests a set of questions “intended to obtain measurements on the variables and relationship embodied in the conceptual model.” This approach doesn’t mean that the researcher won’t learn things along the way that modify that conceptual model, but if the researcher’s ideas are “fuzzy” to start with, the survey results are likely to be “fuzzy” as well. She concludes, “. . . the more intelligently-directed thought you apply to formulating the research questions and how to obtain the answers, the more it will pay off in rich, high-quality data that can give you rigorous and useful results.”

A possible downside of including attitudinal questions in travel diary surveys, of course, is that it increases the length of these already cumbersome surveys and may thus decrease response rates and increase respondent fatigue. However, careful and creative survey design and administration may enable the inclusion of attitudinal questions without a loss in the quality of the travel data. The growing body of work in this area suggests that the benefits of attitudinal data may outweigh such costs anyway, and attitudinal questions may become as necessary a part of travel diary surveys as basic demographic questions.

The ways that attitudes and preferences shape travel decisions is also fertile ground for qualitative research. The methods discussed below present a means to further explore the information gained from attitudinal surveys, to expand our understanding about how these preferences are formed, how they influence travel decisions, and the limitations that current transportation choices place on an individual’s ability to realize their preferences.

2.2 Focus groups

Focus groups have been used in some studies to understand more about the factors that influence decision making. In a focus group setting, a small number of people, usually between six and twelve, are recruited based on a specific set of criteria. The participants exchange their ideas, experiences, and attitudes about a particular subject in a guided discussion facilitated by a moderator. These discussions are usually audio and/or video recorded to ensure an accurate record of the interactions and enable identification of responses. The small sample size does not allow for

statistical testing or broad generalizations, but it does allow for in-depth exploration of selected issues.

These methods have become a popular tool of marketing firms in gauging consumer reactions to various products and services. The concept has been adopted by the transportation field to identify mobility needs, evaluate programs, identify preferences and attitudes, and assess reactions to different service or policy scenarios. Focus groups have been used to aid in the planning of transport services; feedback from participants is used to design programs that are better suited to the needs of users. For example, Polena and Glazer (1990) conducted focus groups with a number of participants in an employee-based vanpool. The focus group results were used to design a guaranteed ride home program that was responsive to employee needs. Focus groups were conducted by Gaber and Gaber (1999) to identify transit users' needs in mid-sized Nebraska cities. The qualitative techniques were used to "identify personal transit needs, which would not emerge from a traditional, quantitative assessments, and outcomes that were more locally applicable." Another example comes out of the welfare-to-work policy arena (Multisystems et al., 2000). A series of focus groups was used to discuss the role of transportation in supporting welfare reform. Participants representing various stakeholders were convened to identify and discuss their issues. The focus groups enabled the researchers to get at the complexity of their problems and extent of their constraints.

Focus groups are also being used by academic researchers to better understand the factors behind observed travel behaviour and the implications of travel choices for the household. Handy, et al. (1998; 2001) conducted focus groups following their survey of residents of six Austin neighborhoods. The focus groups revealed important factors influencing the choice of where and how frequently to grocery shop, whether or not to walk, what local businesses to patronize, and where to live. For the most part, the focus group discussions supported the survey results, but they helped to identify factors not included in the survey that explain travel choices. The focus group discussion also shed light on the connections between choices – the choice of where to live and the frequency of walking to the store, for example. Most importantly, the focus group discussions showed how people think about their travel choices.

Focus groups can be an effective way to understand the travel choices of particular segments of the population. Goodwin (1989) used a group interview technique to identify the impacts of changing transit service on women. The qualitative techniques proved valuable in understanding more about the perspectives of the transit riders and how service changes would affect their mobility. As noted in their paper, "discussions of this sort are not intended to provide statistically significant analyses of public opinion; rather, they are much more effect at going outside the constraints of a conventional questionnaire, giving an understanding of possible cause and effect processes, and providing an important safety net in case important questions have not been asked, or asked in the wrong way." (Goodwin, 1989: 131). Rosenbloom (2001) used focus groups to explore the challenges facing older drivers. These discussions revealed numerous strategies that older drivers use to continue to drive as their physical and mental abilities decline. The discussions also highlighted the importance of continued access to an automobile for the quality of life of older persons.

Different kinds of techniques can be combined with focus groups in interesting and effective ways. Mayes et al. (1996) facilitated thirteen group discussions combined with other qualitative techniques to identify the reasons why people do not bicycle and to craft successful strategies to

encourage more cycling activity. A number of enabling techniques were used to remove inhibitions, encourage discussion, and generate ideas and creative thinking. These techniques included word association, prompt boards, image response, and benefits laddering (technique to probe the rationale behind behaviour). Moderators proposed strategies designed to attract more people to cycling and strategies that discouraged car use and participants were encouraged to give their reactions to each. These strategies were also tested in a series of stated preference exercises designed determine their relative potential. The integration of these varied qualitative techniques allowed the researchers to get at the complexity and variation in attitudes about cycling and link them with other choices such as lifestyle, automobile use, and life stage.

Deakin has used focus groups in a number of different studies, including a study of public acceptance of pricing strategies and a study of participation in car inspection programs. She offers important suggestions for how researchers can effectively use this technique (Deakin, 2001). For example, focus groups can be particularly useful in the development of a survey instrument. They can be an invaluable way to see if participants can understand proposed questions are understood or if they interpret questions in multiple ways. Focus groups can also be used to test alternative forms of questions. Researchers can explore what kinds of incentives might be effective in increasing the response rate for the survey and why some people choose not to participate in the survey. Says Deakin, "I wouldn't do a major survey without a focus group first."

Of course, like stated-preference techniques, focus groups have the problem that respondents may not do what they say they will; like any survey, focus groups may produce halo effects and strategic response effects. Deakin has seen lots of poor quality focus group work, where the questions were not clear, where the recruiting of participants has relied on overused panels of potential participants, where facilitators have over-managed the discussion, or where one vocal participant has dominated the discussion or made other participants feel uninformed. The best focus groups, she says, turn into an animated discussion among the participants with little interference from the facilitator.

2.3 Personal Interviews

Interviews can provide the same rich, situational response as focus groups. Because informants are interviewed individually, the confidentiality issues and normative pressures that often plague focus groups are not as problematic. The interview format provides a more intimate setting for discussion of sensitive issues or very personal matters, and more detailed information about the individual or household circumstance can be relayed. Interviews allow for flexibility in the type of information being collected. Researchers can mix attitudes, options, and preferences with information that is typically quantified from a questionnaire. Guides and filters can be used to tailor subsequent questions based on previous responses. Finally, because the respondent is answering questions in the presence of an interviewer, there is an opportunity for clarification, explanation, and elaboration of questions and responses.

The HATS technique, developed at the Transport Studies Unit at Oxford University in the 1980s, by Jones, Dix, Clarke, and Heggie (1985), remains a classic in the use of qualitative techniques in travel behaviour research. This work widely is acknowledged for its contribution to the development of the activity-based analysis approach, yet the qualitative aspects of the work seem largely to have been forgotten. The researchers started with what they called "diagnostic studies," defined as "an exploratory phase in which travel behaviour was examined in as general a way as possible" (Jones, et al., 1985: 8). Through interviews with a small sample of households, the researchers tested several alternative theoretical frameworks for describing and understanding travel

behaviour in order to develop the most useful and appropriate frameworks: "At this state there was an interplay between the researchers' development of concepts, and what was learned from respondents' descriptions of their behaviour and its causes" (Jones, et al., 1985: 8). The exploratory phase lead to several important conclusions. First, the interviews helped researchers define what behaviour should be taken into account and pointed to the need for activity diaries rather than travel diaries. Second, the interviews revealed that "any record of an individual's behaviour represents the outcome of a covert decision process involving some form of 'choosing' or 'deciding'" (Jones, et al. 1985: 41) within the constraints of the availability of facilities through time and space. Third, the interviews made a strong case for interviewing each household as a group, given the interdependencies between household members. Fourth, the interviews highlighted the importance of using survey tools "capable of revealing the sometimes subtle constraints and interactions, covering both the conventionally analyzed travel behaviour and the less well understood activity patterns" (Jones, et al., 1985: 42). These conclusions may sound old hat today, but they represented an important new way of thinking about travel behaviour and travel behaviour research at the time.

Based on the results of this diagnostic phase, Jones, et al. (1985) developed a new methodology for collecting travel and activity data that involved "interdependent structured quantitative ('what do people do?') and unstructured qualitative ('why do people behave as they do?')" questions (Jones, et al., 1985: 8). Two key findings from the diagnostic phase influenced the design of this methodology: "the importance of the household group, rather than the individual, as the decision-making unit," and "linkages between individual and/or household travel arrangements over successive days" (Jones, et al., 1985: 49). A pilot study using a "freeform diary" highlighted several challenges for the survey design, including technical difficulties in the recording of activity patterns and substantive problems in the definition of an "activity." The researchers abandoned the free-form diary as providing insufficient quantitative data but also inadequate qualitative data. Instead, they employed a structured activity-travel diary and conducted in-depth surveys with a sub-sample of one out of ten households that completed the diary survey. The development of the Household Activity-Travel Simulator (HATS) was "a logical extension of the unconventional survey methodology" used by the researchers (Jones, et al., 1985: 134). At the heart of the technique is a "HATS display board," one for each household member that includes a map for recording detailed spatial data and a time-scale for recording temporal data on activity participation. In the household interviews, data from the activity-travel diaries were represented on the display boards, which were then used to structure a discussion of the reasons for the observed behaviour, an exploration of the linkages between household members and the constraints of the household, and an investigation of responses to proposed policy changes.

More recently, semi-structured interviews were employed by Clifton (2001) to identify the mobility constraints of low-income households, the factors that contributed to automobile purchase, and the short-term coping strategies used to gain the mobility needed for their non-work activities. These findings complemented analysis of a regional travel diary data by illuminating the decision-making process behind the observed travel behaviours. The application of these two complementary research approaches enabled a more comprehensive examination of the mobility needs of the poor. The interviews provided rich details of the daily lives of a small sample of households and more depth of understanding than possible through analysis of the travel diary data. The individual situations of each household were conveyed, including the demands on their time, their financial resources and obligations, their preferences for destinations and activities, and their ways of gaining the mobility needed to meet their needs. In contrast, the analysis of the trip level data described the aggregate travel patterns of a much larger sample. This analysis revealed striking differences

between the observed travel behaviour of low-income populations and those with more financial resources. The circumscribed travel patterns exhibited by persons of low-income speak to their various constraints and are potentially the product of the various mobility strategies identified from the interviews. Taken together, the findings of both research methodologies provide a breadth and depth that is unique to transportation research.

Poulenez-Donovan and Ulberg (1990) used semi-structured interviews to uncover factors that were influential in an employee's decision to participate in an employer-based TDM program. The researchers used results from a traditional survey questionnaire to evaluate program participation and employee satisfaction. Then, individual employees were interviewed about their personal travel patterns and choices and their attitudes about the program. The interviews revealed a number of personal, social, organizational, and economic factors that influenced the transportation choices that employees made. These findings uncovered factors that were not anticipated and thus would have been excluded from a traditional questionnaire. For example, one may expect employees to respond that they do not carpool because their personal responsibilities required the flexible accommodation that the automobile provides. In contrast, the interviews revealed that many employees felt uncomfortable in the quasi-social setting of a carpool, particularly when passengers were of a different occupational class.

When conducting personal interviews, a researcher must be cautious on several points. Researcher skill, trustworthiness, and general rapport are crucial to data collection. Interviews tend to be labor-intensive, and interviewers need education and training before interacting with participants. The interaction between the interviewer and the respondent can influence the outcomes of the interview, the type of information revealed, and extent of discussion. Personal interviews may not be appropriate when the respondent is required to recall specific, factual information such as travel time or distance, expenditures, or activity durations.

2.4 Participant-Observer Methods

When employing participant-observer methods, the researcher is inserted into the daily life of the study participants and shares their experiences. The investigator directly observes the phenomenon under investigation. Participant observation has the advantage of mitigating some of the issues that arise with other qualitative and quantitative data collection techniques. Because participants are observed in the context of their daily lives, problems such as self-selection bias, recall and memory issues, and behaviour modification do not interfere with the investigation. By observing persons as they interact in their daily life and by taking part in that experience, the researcher can develop a better understanding of how people behave and how they respond in particular situations.

This approach has not often been used in travel behaviour research, but it has a rich tradition in studies of behaviour in urban space. Chapin (1974) employed participant-observer techniques in his seminal work *Human Activity Patterns in the City*. This qualitative technique was used as a field study method complementary to the conventional survey research method and assisted in identifying predisposing factors that motivate individuals to engage in particular activities. "Activity analysis is concerned not only with how people presently use their free time (i.e. description), but also what factors prompt them to use their free time in these ways (i.e. explanation)" (Chapin, 1974: .206-7). In addition to identification of the explanatory factors, Chapin identified additional benefits that participant observation techniques lent to the survey data collection methods. For example, participant researchers were able to monitor any unusual events that may have occurred during the survey study periods, provide feedback about how the survey is

being received by the community, define patterns of over- or under-represented activities, and interpret meaning of the survey results. William Hollingsworth Whyte dedicated his life to the study of human behaviour in urban settings. Whyte used participant observation techniques to study pedestrian behaviour and interaction in public spaces (1980). As unobtrusively as possible, he watched people and used time-lapse photography to chart the meanderings of pedestrians. His analysis revealed critical insight into how people behave and interact in public spaces.

In the transportation field, Niemeier combined surveys with participant-observer techniques to study the travel patterns of welfare mothers (Niemeier, 2001). She conducted surveys at Job Fairs, then followed-up by spending a day with each of a few of the survey respondents, traveling with them throughout the day. During the day, she would talk with the participants about their schedules, problems with the system, and other factors affecting their travel choices. This work uncovered important differences in the daily routines of these women relative to standard assumptions about activity scheduling and travel behaviour. Their survival, for example, depends on complete flexibility in their schedules, which don't follow the standard sort of divisions between work time, daycare time, shopping time, etc. One woman she spent the day with changed her schedule four times in a period of 40 minutes as new needs and constraints emerged. Niemeier concludes, "We can't possibly capture the subtleties and complexities [of their lives] if we don't even know enough to ask about them."

One drawback of participant observation is that often it takes time to enter into a community, gain acceptance, and learn about the particulars of local culture. Similar to the ethnographic techniques employed by field researchers in anthropology, participant observation entails immersion into local culture and can provide the kind of contextual and comprehensive information needed to fully understand and evaluate how decisions are made. Granted, not all participant observation techniques require this level of commitment from the investigator; however, the time and emotional investment can be considerable, even with a more general application of the technique.

In more passive observation techniques, such as the observation of behaviour in public space, questioning the persons being observed can interfere with the phenomenon under investigation. Direct observation provides the opportunity to gather data in-situ, observing the behaviour and choices made as people are confronted with them. But concurrent investigation of the underlying rationale behind the behaviour can hinder the data collection process.

3. ISSUES

Doing qualitative research well is more challenging than transportation researchers might think. The nature of qualitative research raises several issues concerning data collection, management, and analysis. While these issues are also pertinent to quantitative research, qualitative research has been criticized for lack of scientific rigor and the threat of subjective interpretation. Qualitative methods require the same attention to rigor in the research design, data collection, analysis, and interpretation as conventional quantitative methodologies. In this section we will discuss some of the issues that emerge in the application of qualitative techniques to transportation research, including theoretical frameworks, data collection, data analysis and presentation, time and monetary costs, and the need for increased acceptance of and training in these techniques.

3.1 Theoretical Frameworks

A sound theoretical framework is an essential component of good travel behavior research. Most travel behavior research is deductive in nature: researchers start with a theory of travel behavior then use that theory to develop their hypotheses and research design. The alternative is an inductive approach: researchers start without a preconceived theory of behavior but develop a theory through their analysis. While deductive research can involve quantitative techniques, qualitative techniques, or both, inductive research generally relies on qualitative approaches. Careful attention to the development and articulation of the theoretical framework is necessary, whether at the beginning of the study, as in the deductive approach, or at the end of the study, as in the inductive approach.

The traditional utility-maximizing theory of travel behavior, widely used in the development of quantitative models, can provide a guiding framework for qualitative research as well. According to this theory, the choices that individuals make about travel depend on the utility of each alternative relative to the utilities of all alternatives. Decisions depend, then, on the set of possible choices, the set of factors that determine the utility of each alternative, the values of those factors for each alternative, and the relative contribution of each factor to utility. This theory thus points to areas of exploration for which qualitative techniques are ideally suited. What choices do individuals actually consider in their decision and why? What factors matter to them in evaluating utility and why? How do they perceive the characteristics of the alternatives? How do the answers to these questions vary over time and from individual to individual? By addressing these questions, qualitative research can shed light on the substantial share of variation in behavior left unexplained by standard quantitative models.

But this framework is also rather confining. Utility-maximization theory assumes that individuals act in a rational, calculating, systemic way, evaluating each opportunity with complete knowledge of alternatives and consequences. Much of what is gained through the use qualitative research techniques reveals the underlying complexity of these decisions, the variations in tastes, and the instability of behaviors. In other words, these techniques focus on those factors that make up the random error term in a utility model. In this way, qualitative research provides a complement to traditional travel behavior modeling. But traditional theory provides little guidance in navigating through the complex tangle of information that emerges from qualitative research. For one, it tends to dissect complex decisions into discrete choices assumed to be unrelated. It also falls short of explaining the interaction between individual behaviours and decisions made at the household level. It does not explicitly address constraints on choices or the implications of travel choices on other aspects of life. In these areas, researchers need to turn to other theories or to inductive approaches if appropriate theories cannot be found.

Theories borrowed from other disciplines may also provide useful frameworks for qualitative research in travel behavior. Theories from the field of psychology, for example, lay a ground work for decision making based upon an individual's prior experiences that is specific to the context under investigation. (Ettema and Timmermans, 1997). These heuristic theories are based on the notion that an individual's choices are based on his cognition of his environment; his interactions and experiences collectively inform his activity and travel decisions. These psychological theories are used to develop decision rules that inform choice models. With the help of this framework, qualitative methods can be applied to develop, test, and refine the understanding of preferences, experiences, objectives, and constraints that shape travel choices in different contexts. Qualitative methods can help to uncover how a person's travel choices are related to her prior experiences with different transportation modes and living environments.

Qualitative research can be used not just to test theories but also to develop them, through an inductive research process. The challenge for the researcher is to not impose her particular understanding of the behaviour being investigated, rather to let that understanding emerge from the research itself. Niemeier's (2001) experience with the participant-observer approach highlights how important it is for researchers not to assume that standard theories of travel behavior apply to everyone – or that the researcher's own experiences are at all typical or universal. The work by Jones, et al. (1985) described in the previous section shows the power of using qualitative techniques for developing and testing alternative frameworks for understanding travel behavior through an iterative process. Inductive research can lead to important changes in standard deductive approach to research, changes ranging from the kinds of data that are collected to the structure of the data analysis process.

In the social sciences, King et al. (1994) provide a theoretical framework for social inquiry that combines qualitative and quantitative approaches. The authors agree that the styles of the two approaches are different. Numbers and statistical methods are the mainstay of quantitative research that seeks to answer the question “what” through the measurement and description of phenomena, testing causal hypotheses, and presentation analyses that are replicable by others. In contrast, qualitative research seeks to answer the question “why” by focusing on a small number of cases explored in depth, usually using a discursive method, and generating a comprehensive account. King et al. argue that these differences are rooted in the research problems being investigated but that both approaches share the common goal of making descriptive or explanatory inferences on the basis of empirical observation (King, et al., 1994: 7). This logic of inference defines the rules for validity, and thus provides a basis for reconciling and combining the approaches.

3.2 Data Collection

The experience and skill of researcher is important in any research endeavor; however, for those engaged in qualitative research, the role of the investigator impacts the process of data collection and the quality of data in distinct and profound ways. In many of the techniques and applications mentioned above, the researcher has a more direct, intimate, and sustained contact with study participants than in other modes of inquiry. For these reasons, qualitative investigators must be able to secure the trust of informants, develop a rapport with them, engage them in discussion, and guide them through the interview or focus group.

These requirements make it difficult to find persons qualified to conduct data collection efforts. In contrast to the relatively straightforward training required to conduct a survey, it is much more challenging to train students or research assistants to do qualitative data collection. In interviews and focus groups, the work involves substantial initiative in probing for meaning, following up interesting responses, and keeping discussion focused on the research questions of interest.

The interviews not only take skill and energy to do; they are many times more difficult to record. Video cameras and audio recorders are useful tools to enable word-for-word recall of the interview or focus group. However, use of these devices may make informants uncomfortable and may inhibit conversation. Recording devices should be placed as inconspicuously as possible; but informants should be made aware of their use and ensured of their privacy. Keeping written notes during the interview is important to aid in recall and analysis and is crucial when recording devices cannot or should not be used (or when they fail, as happened to us on one occasion; having multiple recording devices reduces this risk). But this can also be distracting to both the interviewer and the informant.

In his autobiographical account of his years as a participant observer, William Foote Whyte (1994) recounts receiving this advice: “Go easy on that ‘who’, ‘what’, ‘why’, ‘when’, ‘where’ stuff, Bill. You ask those questions, and people will clam up on you. If people accept you, you can just hang around, and you’ll learn the answers in the long run without even having to ask the questions.” However, most researchers, particularly in a policy-driven discipline such as transportation planning and policy, do not have the luxury of waiting until the “long run” to find the answers to their research questions. Questions need to be carefully crafted and a relationship of trust needs to be established within a relatively short time frame. This is aided by the fact that many of the lifestyle and preference issues that are of interest to transportation researchers are not exceedingly sensitive in nature. Nonetheless, care should be taken when asking personal questions, even those that may not seem sensitive in nature.

3.3 Data Analysis

One advantage of qualitative data collection techniques is that it results in a rich and detailed contextual description of the phenomenon under investigation. However, this strength of qualitative data is also a drawback. The output of a qualitative inquiry is fundamentally different in nature from quantitative data. As such, analysis of qualitative information can be a difficult and arduous process. The sheer volume of information generated from techniques such as in-depth interviews, focus groups, and participant observation can seem intractable. Findings are often suspected of undue influence of the investigator bias and interpretation. However, proponents argue that qualitative methods can have the same rigor and credibility as quantitative methods provided that researchers follow a systematic process, paying attention to validity, consistency, and reliability issues during data collection and analysis (Miles and Huberman, 1994).

As part of the analysis, qualitative data typically need to undergo a process of reduction that selects, distills, simplifies, and transforms them into a format that can be more readily managed. The research questions and a conceptual framework based on a theoretical foundation should provide guidance in determining what concepts and variables are of interest. This initial step is a formative part of the analytic process. As Miles and Huberman (1994: 11) state, “The researcher’s decisions – which data chunks to code and which to pull out, which patterns best summarize a number of chunks, which evolving story to tell – are analytic choices.”

Drawing conclusions from qualitative data is not an end step of analysis; rather it is an on-going activity. “From the start of data collection, the qualitative analyst is beginning to decide what things mean – is noting irregularities, patterns, explanations, possible configurations, causal flows, and propositions” (Miles and Huberman, 1994: 11). As with quantitative data, the conclusions drawn from an analysis of qualitative data should be verified and validated.

Another advantage of qualitative inquiry is that participants are often expressing their feelings and thoughts in their own words or revealing their actions directly to the investigator. The decision to undertake qualitative research is driven by the desire “...to search out what people were seeking, hearing, and feeling; to look at them and listen to them in their own words...” (Poulenez-Donovan and Ulberg, 1994: 2). Care must be taken then to ensure that the investigator understands the meaning and intent of the participants’ expressions so that skillful and reliable interpretation results. This is particularly relevant when the study participants and the researcher come from different cultures, have had different experiences, or speak different native languages.

Qualitative research is often characterized by a lack of documentation and reporting. The steps a researcher takes during a research project are rarely explicitly and systematically explained. For example, one researcher describes the process of data analysis as follows:

The process of analysis looks absurdly simple. The researcher takes a set of interviews on a topic and reads them through several times, identifying major themes, and marking on the margins of the typed interviews where material relevant to these themes appears. The researcher then takes a set of marked interviews, cuts them up according to themes, arranges the pieces in thematic piles, and writes a report summarizing, with a few quotations, what people had to say about this or that.
(Peattie, 1983: 232)

Another researcher describes it this way: “As interviews are conducted, initial insights emerge about the phenomenon that is being studied.” (Kram, 1985: 254) Statements such as these are commonly found in research papers and texts on qualitative research. But, little guidance is offered as to how these insights emerge, what process a researcher should use to draw conclusions, how one can test the validity of one’s results. Future researchers lack a precedent on which to follow up or repeat a study and a basis to evaluate a research process. This ambiguity in how analysis is performed and how conclusions are reached leads some to claim that qualitative methods are too open to subjective interpretation.

Steps taken in data analysis need to be documented throughout the research process and explicitly reported in publications. Too often qualitative researchers are vague about the steps taken in the analysis stage because they are complex. This task is further hindered because qualitative methods lack a conventional vocabulary with which to describe this process, in contrast to quantitative methods. Skillful and consistent use of existing conventions can work to illuminate the invisible parts of qualitative work and enhance its visibility, validity, and acceptance.

3.4 Time and Monetary Costs

Qualitative research is often praised for the quick pace and inexpensive means, relative to quantitative data collection (Peattie, 1983). While qualitative inquiries can be less costly and provide a faster means of data collection than quantitative methods, this is not always the case, especially when qualitative research is done well. The assumption that qualitative techniques are quick and cheap may contribute to sloppiness on the part of researchers. Several factors contribute to the costs of doing qualitative research and should be considered when choosing a research method.

First, qualitative research requires a considerable investment of time, the length dependent upon the nature and setting of the research. Understanding the particulars of a situation, developing connections with informants, and gaining trust as an outsider requires attention and care and are critical to ensure the reliability of data.

Second, the recruitment of participants may take substantial time and creativity. Depending on the target population, survey research firms or marketing research firms may be able to recruit the required number of participants. Certain segments of the population are more difficult to reach and recruit. Researchers often rely on agencies and organizations that serve these population segments and on the "snowball technique" where initial recruits provide names of other possible participants.

Third, financial or other significant incentives may be needed to successfully recruit the required number of participants. These techniques require significantly more time on the part of participants than standard survey techniques, from an hour or two up to an entire day. It is not unusual to pay focus group participants \$40 to \$50 per hour.

Fourth, data collection requires persons with considerable knowledge about the issues being investigated and skill in interviewing, facilitating focus groups, or observing phenomenon. Employing persons with these skills can be costly and entail extensive training.

Fifth, reducing data for analysis can be laborious, particularly when interviews require transcription and/or translation. In cases where there are a large number of informants or the researcher interviews the same informants numerous times, the volume of information collected can be daunting to organize and analyze.

3.5 Acceptance and Training

The use of qualitative methods for transportation research is on the rise. These techniques lend themselves to the current questions and issues facing transportation professionals. Although these techniques have much to offer, there are several salient issues specific to their application and use in a transportation planning and policy setting that should be addressed.

First, although qualitative methods have been employed in transportation research, the field has been predominantly entrenched in a quantitative paradigm for some time. This is not surprising given the historical dominance of the science and engineering disciplines in shaping the field of transportation studies. For this reason, qualitative methods may be given less credence in transportation applications. Transportation professional organizations and institutions should take the lead in promoting qualitative research as a valid mode of inquiry. Academic journals must recognize the contribution of qualitative research in the transportation field.

Second, given the traditional focus on quantitative methods, transportation researchers may lack the training and skills to conduct qualitative research. In response to this deficiency, the curricula in transportation programs must incorporate qualitative techniques into research methods courses. The next generation of transportation professionals will need to be well versed in a full array of complementary research methods. For today's transportation researchers, workshops and mini-courses can provide training in qualitative methods typically lacking in transportation curricula.

4. CONCLUSIONS AND RECOMMENDATIONS

Qualitative studies of travel behaviour have produced important insights and challenged standard assumptions in the following areas, although more remains to be done in each of these areas:

- The sets of choices considered in decision making about travel and activity participation.
- Factors beyond the basic demographic variables that significantly influence choices about travel, including attitudes, preferences, habits.
- Connections between different choices about travel, including short-term choices about activity participation, destination, mode, timing and long-term choices about residential location choice and vehicle ownership.

- The unique travel needs and constraints of specific population segments, including low-income households and the elderly.
- The interaction between household members, including the interdependence of their choices and the organization and coordination that takes place within the household.
- The implications of transportation choices for quality of life, including the costs and benefits that households accrue and the compromises and sacrifices they make.

Thanks to the qualitative research that has been done, we know more about what research we need to do. We know that behaviour isn't always rational in the way that rational behaviour is usually defined. We thus need further research directed toward an understanding of the logic behind travel choices. We know that people are amazingly adaptive and inventive when it comes to their travel behaviour. We thus need further research directed toward more creative techniques for predicting responses to change. We know that attitudes and preferences are important predictors of travel behaviour. We thus need further research directed toward an understanding of the formation of attitudes and preferences that influence travel behavior.

Qualitative techniques help us unravel the complexities of travel behaviour to better assess the sources of the problems and predict the impact of future trends. Many current and emerging issues in transportation demand a qualitative approach: aging populations in car-dependent environments, growing levels of motorization in developing countries, planning contexts that are increasingly multi-cultural, the impact of telecommunications and information technology on travel, growing levels of non-work travel, and so on. Dramatic demographic shifts, advances in technology, the globalization of the economy – the unprecedented changes in today's world mean that our standard assumptions about travel behaviour must all be revisited.

Our recommendation is simple: do more qualitative research, but do it well. Carefully designed qualitative research can be a powerful complement to carefully designed quantitative research, and it can be a valid and potent mode of inquiry in its own right. Increasing the quantity and quality of qualitative research in transportation requires two things:

- an increase in the acceptance and appreciation of these techniques, and
- an increase in training in their use among travel behaviour researchers.

Recognition of what qualitative research has contributed to the field so far is a starting point. We believe that without more widespread use of qualitative techniques in travel behaviour research, we will make little meaningful progress towards improving our fundamental understanding of travel behaviour.

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