A Qualitative Survey Technique to Explore Decision Making Behavior in New Contexts

by

Shomik Raj Mehndiratta
Charles River Associates Inc.
200 Clarendon St., Boston, MA 02116
Voice (617) 425-3373 Fax (617) 425-3132
Email: srm@crai.com

Rosella Picado
Parsons Brinckerhoff, Inc.
303 Second Street, Suite 700, San Francisco, CA 94107
Voice (415) 243-4635 Fax (415) 243-9501
Email: picado@pbworld.com

and

Christoffel Venter*
CSIR Transportek
PO Box 395, Pretoria, 0001
South Africa
Email: cventer@csir.co.za

* corresponding author

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ABSTRACT

Much research on travel behavior has been based on theoretical constructs that oftentimes reflect more the decision framework of the researcher than that of the traveler. This can lead to important travel behavior determinants being simplified or even ignored, especially when established modeling structures are applied to new contexts or transferred from developed to developing societies. The purpose of this paper is to illustrate the use of qualitative surveys based on semi-structured open-ended interviews to explore poorly-understood aspects of travel behavior.

Exploratory qualitative research is becoming increasingly commonplace in transportation research, both as a precursor to a traditional, quantitative study, and for the insights it offers by itself. We describe a survey technique that combines the strengths of several existing techniques, including diary methods, gaming, and unstructured interviews, to explore respondents' decision-making framework from their own perspective. We give methodological guidance using a set of substantive examples of successful application of the technique to unconventional travel behavior problems. The paper shows how these surveys can help the researcher to refine their hypotheses and model structures prior to undertaking large-scale surveys and statistical validation.
1. Introduction
Much research on travel behavior has been based on theoretical constructs that oftentimes reflect more the decision framework of the researcher than that of the traveler. Paradoxically, while it is readily admitted that travel decisions are the outcome of complex decision processes, in practice researchers sometimes cling to well-worn ideas, overlooking issues that are considered too difficult to explore using traditional survey techniques. In the process, important travel behavior determinants are often simplified or even ignored.

This can be particularly pertinent when travel behavior models are transferred from developed to developing countries — a procedure often consisting of re-estimating the same model structure on new data. Important underlying differences in decision-making behavior due to cultural or historical factors are often not examined.

In response, qualitative research techniques are increasingly being applied in transportation research, both as the first step of a mixed method study, i.e. as a precursor to a traditional, quantitative study, and for the insights they offer by themselves (Schofer et al. 1997, Rhoades et al. 1994, Kurani et al. 1994).

In this paper we show how a survey technique based on open-ended interviews can be used as the qualitative step of a mixed method research design to explore poorly-understood aspects of travel behavior. In these interviews, respondents are asked to describe a recent travel experience, to identify decisions or choices they made in the context of that experience and the factors that influenced them, and to identify what they would have done differently under alternative hypothetical scenarios. We show how interview results were used to specify and refine behavioral models, which were then calibrated using standard large sample data collection and analysis techniques. We argue that open-ended surveys of this type are an invaluable tool for the study of behavior as complex as human activity patterns, and that they are a necessary first step towards improving quantitative approaches and the hypotheses on which they are based.

2. The Case for Exploratory Research and Open-Ended Interviews
To understand the role and appreciate the importance of exploratory qualitative research as a precursor to a formal modeling effort, it is useful to take a step back and consider the dynamics of model formulation in the study of complex systems such as human activity patterns.
To formulate a modeling framework for the analysis of systems as complex as human activity patterns, we need to identify a set of relevant elements of structure and rules of process. This can be viewed as a two step process:

- **Abstract from the real world the salient physical, technological, institutional and social structural elements relevant to the context in question.** In transportation, distances, travel times, travel costs, route structures and schedules make up the bulk of the physical and technological structure. Rules of policy and relationships among actors and organizations comprise the institutional structure. Social structure includes income and education levels, household composition, occupation, age, role in household etc. Transportation researchers have done considerable work on these elements (perhaps less so on the institutional roles, however), and though some problems in measurement exist (real incomes, the actual price at which a car is bought, etc.), specification of the elements supporting activity analysis research is fairly advanced and robust.

- **Abstract rules of process** that characterize and explain the behavior of individual agents in the modeled context, and the fundamental rules governing interactions among agents. Much less of a science than the first stage, much more complex, success in this effort has been partial, and efforts are ongoing to better understand human behavior. There is substantial agreement that some rules adequately approximate the underlying basis for human behavior in many contexts relevant to human activity analysis: utility maximization behavior, cost minimization, sequential choice structures are examples. However, it is recognized that these rules are merely approximations, and in some cases maybe inaccurate representations of human behavior. For example, by itself, utility maximization precludes philanthropy. In the transportation context there is growing evidence that in many circumstances humans act not as utility maximizing agents, but rather as satisficing agents who are 1) creatures of habit, and 2) uninformed, and unwilling to bear the search costs of finding an optimal solution, content instead with one that is good enough (Bell et al. 1988).

Because this second step involved in the formulation of a model system – establishing the rules of process – is in need of additional development, exploratory research plays an invaluable role. In particular, when the focus of a research study is on the development of a new model framework rather than analysis using an established model formulation, exploratory research can play several important roles. It can help to:

- **Verify the applicability of hypothesized behavioral axioms in the new research context;** for example, whether or not utility maximization is a reasonable approximation of behavior in the context under question.
Explore whether the theory developed \textit{a priori} is consistent with individuals’ stated preferences and revealed behavior. For example, starting from the behavioral axiom of utility maximization, researchers theorize that travelers value higher frequencies of transit service. Before a formal quantitative analysis is undertaken to quantify (measure) the consumer valuation of an incremental improvement in service, qualitative surveys of the population under consideration can be used to confirm that the theoretical insight is indeed consistent with preferences and behavior. For example, qualitative research might reveal important decision-maker specific influences – for instance that the population under question works in shifts, is completely unable to use transit because of requirements for auto use on the job, and consequently would derive no value from increases in transit frequency – that would influence the modeling strategy adopted. In this example, the revelation might influence the researcher to choose an appropriate mixed model specification to estimate.

Stylized as this example may seem, it points to another, related role that qualitative research can play as an exploratory tool. To the degree that a research study concentrates on some limited aspect of a complex system, researchers focus on structural elements which they feel are key to the effects they are investigating. When the modeling context is new, qualitative surveys can help ensure that the researchers do not ignore structural elements that can have significant confounding effects on the phenomena they are trying to model.

Indeed, in many ways the technique we explore complements a rich ongoing effort in the travel behavior research community to develop “rules of process” to develop quantitative models of rule-based activity scheduling and trip scheduling models, of which recent examples are Kulkarni and McNally (2001) and Weets et al. (2000). A principal goal of these studies has been to reproduce the activity and travel patterns observed in activity surveys in order to develop formal predictive models. Some of this work has made use of in-depth interviews, similar to our complementary approach, to develop an understanding of the context and of traveler behavior within the context.

### 3. Description of Technique

#### 3.1 Qualitative Survey Techniques

A variety of techniques have been applied to the collection of travel behavior data. These include (Figure 1):

- Diary methods: A reliable means of collecting factual disaggregate travel and activity data (Richardson et al, 1995), diary methods are commonly administered to large samples. The travel diary is time consuming and expensive to collect, and of limited value for developing new hypotheses. Because its questions need to be relevant to people in many different contexts, the diary can address context-specific issues only in limited ways. Computer-based or internet-
based surveys, however, have the potential to reduce costs as well as to customize questions to each participant. Efforts are on-going to use these technologies to collect household activity scheduling data (Lee et al, 2000).

- Gaming and Simulation: Participants are asked to make choices in simulated decision making situations. Interactive games (such as the household activity scheduling games of the 1970s/1980s) (Jones, 1979) and stated preference experiments are examples. Although exploratory in nature, these methods need to be structured by a prior hypothesis on behaviour.
- Unstructured Interviews: A descriptive sociological approach that allows respondents to describe their behavior and motivations in their own words (Jones, 1981). It is restricted to small samples.
- Focus groups: Favoured in the social sciences for exploratory investigations of consumer attitudes (Krueger, 1994), focus groups require small groups of participants to gather at one time and place. Both small sample sizes and high costs can be problems.

Each technique has its strengths and its weaknesses, suited to a particular research objective and respondent group size. Semi-structured, open-ended exploratory interviews combine some of the characteristics of all of these qualitative techniques. They therefore provide more flexibility than any one of these methods can offer on its own. They can be used for the collection of both factual data and information regarding attitudes and perceptions, and can combine closed- and open-ended questions as well as gaming and hypothetical experiments. The contact established over the course of an interview offers the researcher the opportunity to customize questions, and ask for responses to issues too complex to lay out in any other survey method.
Figure 1: Typology of survey techniques used in travel behavior research

Semi-structured exploratory interviews will typically be conducted on a one-on-one basis, allowing the interviewer a large amount of flexibility to customize the interview to the situation of each respondent. The interviewer consequently needs to be either extensively trained or well-versed with the subtleties of survey issues. Personal interviews are time intensive, which in practice limits samples to fairly small sizes. Potential applications are thus limited to research contexts where a small sample size is acceptable in exchange for a range of exploratory, qualitative insights.

3.2 Methodology

Notwithstanding the researcher’s discretion to tailor the open-ended interview to the aims and constraints of each situation, we suggest four common elements to such surveys:

1. DESCRIPTION: The respondent is asked to describe an example of a particular behavior of interest. This can include, for instance, a record of activities and travel for a certain time period, or the relevant decisions made regarding a single event (such as the purchase of a car, or the making of an inter-city trip).

This exercise lays the foundation for the interview by recording in qualitative and quantitative terms the behavior of interest. As an opening exercise it puts the respondent at ease, and prepares them for the more exploratory questions to follow. Visual aids, such as diagrammatical maps representing...
travel patterns, or tables listing activities in an activity diary, have been found to be very useful as a means of recording the information given.

2. EXPLORATION: The researcher asks the respondent a series of open-ended questions that seeks to explore the reasons and trade-offs underlying the choices made by the respondent. Even though the underlying research question is why, it is best to avoid why questions directly as respondents find them hard to answer. Questions framed as what or how questions are usually easier to answer (Kvale, 1996).

3. GAMING: The respondent is asked how their choices would have differed if certain parameters were modified from their actual values for the travel behavior they have described. The purpose of this section is to provide a more substantive test for the behavioral hypotheses that have been identified, and to identify additional issues that have been neglected.

The respondent is drawn into a number of hypothetical what-if games. The situation(s) described in the first section are revisited, with some of the parameters that have been identified as critical in the previous section, modified. The researcher is thus required to be able to apply the hypotheses previously generated to choose the parameters to be varied, and the degree of variation to be introduced.

The researcher does not have to be concerned with the statistical properties of the games, as the results are not destined for statistical analysis. The flexibility of the games actually allows the researcher to explore hypothetical situations too complex to lay out using more structured survey methods, and to customize the complexity of the game according to the abilities of the respondent.

4. VALIDATION: The researcher poses the main qualitative findings of the interview, to be validated and discussed by the respondent. This is done as a quality check on the hypotheses that emerged from the interview, to ensure that the researcher’s interpretation of the interview is correct.

5. ANALYSIS: The researcher assembles all of the interviews and analyzes their implications. Formal discourse analysis techniques can be used to analyze responses, though none of the illustrative studies described in this paper used any formal discourse analysis techniques (see Lemke, 1998).

3.3 Sample Selection Issues
Because the exploratory interviews are time and labor intensive, the subject sample is seldom chosen randomly. It is futile with a small number of cases to seek for representativeness, because there is no way that the cases could capture the whole range of complex behaviors that the researcher is interested in understanding. Moreover, the incidence of any particular outcome or behavior pattern in itself is rarely important, since these surveys are not of use to quantify effects in
the population, but rather only to understand them better. For that reason, the researcher is best served by looking for exemplary situations, and by avoiding cases that appear to be unique, unless there are strong countervailing reasons to include them.

In many cases the characteristics desired of respondents can be easily derived from the objective of the study. For example:

- In a study of work trip timing choices, subjects were required to be full-time workers who commute by car to a common location. Work day length and time-of-day differences in travel supply were identified a priori as important confounding factors, hence by controlling these factors through the sample selection the researcher reduced or controlled their effect into the range of behaviors observed.

- In a study of inter-city travel, only frequent travelers were considered, since these were known to be responsible for a large proportion of all business travel. Moreover, only people who had undertaken a trip within the last month were chosen, as it was important that they would remember certain details of their trip.

- In a study comparing activity-planning patterns across disabled and non-disabled tripmakers, the disability status of the respondent was used as an a priori screening factor.

In addition to controlling characteristics of the subjects' trips, other stratifying criteria should be applied to ensure that the sample is diverse with respect to factors hypothesized to affect the travel decisions under study. These may include gender, life-cycle stage, job type, income, and trip purpose among others.

There are no objective rules to decide the size of the sample. At the very least, one should include a few (four or five) or more individuals that share each key characteristic. This has typically resulted in sample sizes that range between 10 and 20 people. For example, in a sample of 20 people one may have 10 time-based workers and 10 managers, 5 single people, 12 who have young children and 3 whose children don't live at home anymore, and so on. In actuality, because the researcher's focus is typically rather narrow, the marginal contribution of additional subjects is likely to diminish considerably after 20 or 25 people, if not sooner. Again, as long as the interviews succeed in eliciting a rich set of responses, size and statistical validity take a secondary role.
4. Illustrative Examples

4.1 Time-of-day effects in intercity business travel

4.1.1 Problem Statement
This study was designed to understand the manner in which travel decisions of intercity business travelers are influenced by time-of-day effects. Our hypothesis was that at appropriately high levels of activity classification, individuals’ normal daily time use patterns can be characterized by a stable and invariant schedule composed of three elements – sleep, work and leisure – such that business travelers scheduled intercity trips to minimize disruption in this schedule. Ultimately we wanted to understand the relative value travelers place on different parts of their day in the context of an inter-city business trip.

Initial work revealed several issues that needed to be resolved before empirical work could commence. For example, in what terms are individuals’ normal schedules most appropriately characterized? All three defined activities have both a spatial and a temporal dimension: you sleep at night and at home, your leisure is maybe oriented about particular spaces at particular times such as a yoga lesson or a squash game, or could well be independent of both, such as with reading. Given these possibilities, what (if any) elements of their normal schedule do travelers try hardest to preserve? How much of traveler behavior can be systematically explained as an attempt to minimize disruption to their normal schedule? The explanatory research was designed and conducted to inform the process of defining the research hypotheses and designing the follow-on empirical research.

4.1.2 Application
We interviewed a sample of 10 “exemplars” – individuals exhibiting “typical” characteristics or representing key “types” of business travelers. While representing a wide variety of demographic situations, all of the interviewees were relatively frequent travelers who made multiple short duration trips in a year.

We asked the interviewees for detailed information about a particular recent business trip, including information about the trip schedule, and their discretion in choosing this schedule. Participants were also asked a series of gaming questions that asked them how their choices would have differed if certain parameters such as the travel time, the common carrier schedule, and the meeting duration had been different. In addition, interviewees were asked questions about the stability and variance in their normal daily schedule.

4.1.3 Findings
The exploratory research produced three salient findings that helped to refine the hypothesis and design quantitative research:
• Validation of underlying assumptions. At the level of the individual respondent, the assumptions underlying the research seemed reasonable. First, the cycle defined by sleep, work and leisure adequately described the normal daily schedule of all of the respondents. Though there was (sometimes considerable) variation across days in what it was that work or leisure constituted, the temporal boundaries defining the time regimes were relatively stable. This was true even in cases where respondents had considerable latitude and flexibility in selecting their schedule. We found that respondents indicated more of an interest in and a willingness to take advantage of flex-time privileges to establish their regular schedule, than to vary their schedule in the short term. Second, we found that respondents exercised several choices in determining their final schedule for on business trips, many of which were indeed made to avoid disrupting their normal schedules as far as possible.

• Issues for quantitative survey design. Even with the limited sample size it was clear that for purposes of follow-on quantitative survey work, there was significant variation across the population of interest in the times of change in the time regime. Sleep typically started between 10 PM and 1 AM until a time between 5 AM and 8 AM. Work timings also varied significantly. Similarly there was significant variation in how people spent their leisure, generally people with family tended to have more regular, stable schedules oriented about their homes. In response to this variation, in follow-on surveys (stated preference trade-off surveys) we presented respondents with customized scenarios that anchored off of the temporal boundaries of their personal daily normal schedule (see Mehndiratta (1996) for details).

• Refinement of study hypothesis. The exploratory research allowed us to refine our hypothesis about the manner in which time-of-day considerations interact with considerations such as travel time and cost to affect intercity business travel behavior. Table 1 presents some of the hypotheses.

Table 1. Refined hypotheses: Time-of-day effects in intercity business travel

<table>
<thead>
<tr>
<th>Utility Determinant</th>
<th>Refined understanding</th>
</tr>
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<tbody>
<tr>
<td>Cost</td>
<td>Not an issue for most business travelers since their travel is paid for. Most travelers made choices completely ignoring the cost implication, concentrating instead on issues of schedule convenience.</td>
</tr>
<tr>
<td>Destination work schedule</td>
<td>Sometimes determined independent of traveler - traveler has no input into destination schedule. However, oftentimes destination schedule is not exogenously determined. Then it is jointly determined with travel schedule. Indeed, both the timing and length of the final work schedule could be determined by travel related</td>
</tr>
</tbody>
</table>
Sleep valuation

It is very important to isolate the effects of sleep activity versus sleep location. Indeed, travelers often trade-off some amount of sleep in exchange for the ability to sleep at home. People with families value sleep location highly. **Sleep activity is a very important determinant of travel schedules. Travelers don’t mind trading off some amount of sleep in order to shorten the length of the trip, or lessen the disruption caused by the trip to their work schedule. Some travelers are very sensitive to sleep disruption, and schedule their trips to avoid sleep disruption as far as possible.**

Leisure time valuation.

The value of leisure time is very strongly linked to location. Individuals with families value leisure time at home very highly. Conversely some travelers have little value for leisure time when they can not be at home.

Work time valuation

Work location does not seem to matter. In the short term, travelers, successfully work around location problems- using laptops, and telephones at airport lounges, airplanes etc. Work time lost during a trip is more important to individuals defining themselves as ‘managers’ than other professionals.

4.2 The Effect of Non-Work Activities on the Scheduling of the Work Trip

4.2.1 Problem Statement

The purpose of this study was to measure the influence of non-work constraints vis-a-vis travel congestion and work rules on commuters' departure time decisions for work travel. Prior studies on the problem of departure time decisions have typically focused on workers who have a well-defined work start time and little to no work scheduling flexibility. Under these circumstances non-work activities were assumed to play a small, if any, role and thus were routinely ignored. The notion of a travel time to work schedule delay tradeoff became conventional wisdom to understand work departure time decisions for the majority of workers, ignoring that in fact many do have some flexibility to schedule their work. As was found by research into flexitime, when given the opportunity to choose their own work schedule, people cite many non-work, non-congestion factors as important determinants, including child care and school schedules, carpool arrangements, and personal preferences for sleeping schedules among others. The question that we set out to answer was how people consider these non-work constraints, in addition to the better-studied congestion and work constraints, in their departure time decisions.

In doing so, several conceptual issues emerged: What do people understand for work scheduling flexibility and how should it be measured? What kinds of non-work activities, if any, influence people's work scheduling decisions? What are key characteristics that identify these types of activities? These issues needed to be resolved in order to formulate a closed-ended survey questionnaire. We chose to use exploratory interviews as a means to understand the nature of work and non-work scheduling flexibility.
4.2.2 Application
We focused on employees of the University of California, both faculty and staff, who commute to the Berkeley campus daily. Subjects were screened on the basis of the following criteria: residence location, commute mode, gender, presence of young children in the household, and occupation. The final sample consisted of 13 people. The first two criteria were used to ensure that all subjects were commuting on the same travel corridor, so that they faced similar travel conditions. The other criteria were hypothesized to be indicative of varying work and non-work scheduling flexibility, and so they were used to ensure that all key subject types were represented in the sample.

Subjects were asked to describe verbally their morning and evening commutes: departure time, travel time, arrival time, stops on the way, travel route, travel companions. This left open the opportunity to give interval as opposed to point estimates, and in fact many people responded that way. It also allowed them at the onset to stress habitual differences by day of the week. They described, to the extent that they knew, travel conditions at the times they usually travel and at alternative commute times. They were asked to describe their job tasks and responsibilities as well as their work schedules, in addition to the work-related rules that led to their particular work arrangements. They were then asked about their typical weekday non-work activities: activities they engage in before going to work, and activities they engage in after leaving work. The focus was not on a single day but instead on activities considered ordinary. Follow-up questions included the frequency of engagement as well as the time and scheduling requirements of such activities. If appropriate they were asked whether other people in their household could fulfill some of these activities.

4.2.3 Findings
- It was found that several different factors were required in order to fully describe a person's work scheduling flexibility: some people need to comply with a known schedule but others don't; some are required to arrive on time (whether they chose their schedule or not), while others don't; some can work at home; for some the ability to vary their arrival time within a 30 minute interval is considered flexible, while for others schedule flexibility means being able to vary their arrival time on a day to day basis as they please or need to. It was quite clear that to simply ask, do you have the ability to vary your work arrival and/or departure times? or a similar question would be wholly inadequate as far as understanding the amount of flexibility available to any given person in concerned. These insights were used to devise a series of questions that could be used in a closed-ended questionnaire, which eventually led to a composite measure of work scheduling flexibility through the use of factor analysis (see Picado (1999) for details).

- It was found that traditional "mandatory" activities such as dropping off children at school are not the only ones that affect workers' schedules. Some subjects fit their work schedule around voluntary activities such as volunteer work, fitness classes and other activities typically
considered discretionary, even at the expense of additional travel during congested hours. Instead of the usual mandatory/discretionary dichotomy, characteristics such as the scheduling requirements of a given activity, or even people’s unwillingness to forgo their activities, were found to be more important factors in determining their work hours. This meant that the traditional activity diary is insufficient to determine whether a given non-work activity represents a work schedule constraint. Instead, in our subsequent design of a large-scale survey, the activity diary was combined with a short interview designed to elicit information exclusively about the scheduling characteristics of non-work activities.

- The study allowed us to formulate three behavioral mechanisms or rules that explain the time-of-day choice for work travel. As expected, workers with little discretion to choose work hours plan their trip so that they arrive at work early or on time. But, contrary to conventional wisdom, workers with flexible schedules do not always choose arrival times that allow them to avoid congestion: only those who choose to or are not required to engage in non-work activities tend to travel during congestion-free times. For the other flexible workers, the scheduling requirements of the non-work activity supersede the desire to reduce their travel time to the extent that the latter is but a distant secondary objective. We went on to prove, through the use of a large-scale survey, that flexible workers who face non-work constraints have commutes which are not significantly shorter than the average commute of workers with little work scheduling flexibility (see Picado, 1999).

4.3 The Effect of Advance Planning on Activity and Travel Patterns

4.3.1 Problem Statement
The focus of this study was on exploring the mechanisms for advance planning of activities and travel, in order to understand how observed travel patterns are impacted by the amount of time available for advance planning. Advance planning was of interest as it is one of the critical factors affecting the ability of ADA-eligible disabled people to access paratransit services that require advance reservation of trips a day or more before travel. The study thus set out to understand which factors affect people’s ability to plan activities and trips in advance, and how long in advance planning does occur. A secondary goal was to compare in a qualitative way the planning behavior of disabled and non-disabled people.

4.3.2 Application
Ten interviewees – five disabled and five non-disabled – in the San Francisco Bay Area were selected using a snow-ball sampling technique. Each respondent completed an activity and travel diary for the past two days, including times, locations, and travel modes, recorded on a paper form. The respondent was then prompted with more in-depth questions regarding each activity, including whether the activity was regarded as a regularly repeated activity, and when the decisions regarding
the final location, timing, and travel mode associated with each activity had been made. In this manner, the planning lead time for each activity was identified. Respondents were also prompted for the reasons behind each chosen lead time – such as the need to make an advance appointment for the activity, or a deadline imposed by a travel companion.

In the gaming part of the interview the researcher chose a subset of recorded activities and placed the respondent in a hypothetical situation where the constraint governing the stated lead time of each was relaxed. The respondent was asked if they would plan the activity earlier or later, under such circumstances.

4.3.3 Findings

- Each respondent reported engaging in a range of planning behaviors. Lead times for activities and travel varied between almost zero (for “spontaneous” activities) to weeks in advance (for activities thought of as “regular”). Lead times were sometimes the result of conscious choice, and sometimes determined by external constraints. The interviews revealed that the choices and constraints could be related to three sets of factors, namely: those relating to the characteristics of the activity, those relating to the trip needed to access the activity, and those relating to the respondent’s personal characteristics. The results are summarized in Table 2. These results were used to formulate specific hypotheses around lead time behavior, which were subsequently validated using determinant analysis on a larger sample (see Venter, 1998).

Table 2. Factors associated with particular planning behaviors: results of exploratory survey
The gaming exercise brought the interesting insight that respondents differ in a fundamental way with regard to their preference for advance planning. Respondents reacted differently to the hypothetical removal of constraints. Some would prefer to keep activities as “flexible” as possible until the last moment -- were they not forced by external circumstances to make firm plans, they would have had very short planning lead times for all activities. Others, again, preferred a predictable activity pattern, and therefore planned most out-of-home activities several days in advance, regardless of the external constraints imposed.

The exploratory research did not indicate any relationship between these inherent preferences and the disability status of respondents. To be sure, most disabled interviewees did tend to undertake more advance planning of their activities, but the gaming showed this to be related more to the many external restrictions on their travel and activity needs, than to any fundamental preference.
5. Conclusions

This paper illustrates the value and role of an exploratory research technique that relies on semi-structured interviews with a small sample of respondents. For the study of travel behavior in new contexts, the use of even a small sample of in-depth open-ended interviews can provide several benefits in the initial stages of hypothesis formulation and model development:

- **Validate the underlying basis of the modeling framework.** For example, in the case of intercity travel, the interviews helped to show that disruption to the normal daily schedule is an important consideration when making these travel decisions, thus validating a modeling framework that considers time and cost tradeoffs within time-of-day regimes.

- **Refine the research postulates and sharpen the hypotheses.** For example, in the case of advance planning, the interviews helped to formulate hypotheses about the effect of specific activity, travel and personal characteristics on advance reservation lead times.

- **Outline the constraints and opportunities for more precise quantitatively oriented research.** For example, the interviews showed that for the study of commute travel, a relevant non-work activity characteristic is the availability of alternative schedules to fulfill the activity and the frequency of engagement. This information was then used in the design of a survey questionnaire for a subsequent, quantitative study of non-work activity effects on commute times.

Methodologically, we found it useful to structure the interviews broadly around five steps: description, exploration, gaming, validation, and analysis. The description step was found to anchor the interview by obtaining useful information on actual behavior, which the following steps could probe through exploratory questions and games. It is particularly useful to focus on a particular travel experience – attempts at anchoring interviews in terms of typical experiences tended to yield less rigorous results.

Because the interviews allow an in-depth exploration of travel contexts, the method is furthermore quite valuable to obtain insights about how best to frame questions for travel behavior data collection. While it is well known that questions about choices need to be framed within the context of each survey participant, it is not always clear what exactly characterizes this context. The interviews can help to uncover these relevant characteristics. To use one final example from our studies, it is not particular clock times that were important, but times with respect to a key event: the regular wake-up time, the time at which each person's commute is longest, for example. Thus in the second stage of the research the presentation of alternative travel schedules, as well as the study of revealed choices, pivoted off of these key events. At a minimum, this ensures that the
questions are meaningful to the participants, and helps to avoid ascribing effects (or lack of effect) to the factors being studied.

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7. References


Mehndiratta, Picado, Venter


