Travel diaries
An annotated catalogue

Working Paper

Draft
Travel Diaries: An Annotated Catalogue
2nd Edition

K W Axhausen .

Institut fiir StraBenbau und Verkehrsplanung
Leopold-Franzens-Universitat
Technikerstr. 13
A - 6020 Innsbruck

Tel. : +43-5 12-507 6902
Fax.: 43-S 12-507 2906
EMail: k.w.axhausen@uibk.ac.at

June 1995

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TRAVEL DIARIES: AN ANNOTATED CATALOGUE
2nd EDITION

K W Axhausen

Centre for Transport Studies
Department of Civil Engineering
Imperial College
London SW7 2BU

ABSTRACT

The travel diary is the central survey instrument for the travel behaviour research. In its current form it reflects forty years of development This paper discusses the current and possible contents of the travel diary against the background of a rapidly changing transport policy and transport modelling environment.

In its first part the paper traces the development of the travel diary over the last forty years in term of content and presentation. It highlights the shifts in emphasis over time, e.g. the reemergence of parking as a concern.

The second part assesses the items currently employed and suggest some new items reflecting the new policy concerns. Examples are environmental impacts, information technologies, or activity scheduling.

The need for new research and for the use of new technologies are stressed in the concluding outlook.

1 AUTHOR'S NOTE

This is a second version of a paper, which still requires more time and effort before it can be judged complete'. In particular, the sample of travel diary forms used below needs to be enlarged beyond the current 108 and checked for their representativeness. In spite of this lack of finish I have made this version available because I do hope that it will help to stimulate the discussion about the future development of the travel diary. I would be grateful for any information, comment and critique and especially diary forms as they will certainly help to improve the paper and my understanding of the development of the travel diary, past and future.

2 INTRODUCTION

The travel diary is a central data source for the understanding and measurement of the travel behaviour of individuals and households and therefore essential to the comprehensive planning and monitoring of transport policy, operations and infrastructure*. Surveys approximating the intent of today's travel diary have been conducted regularly for fifty years[3] (Martin, Memmott and Bone, 1961[4], Weiner, 1988 or Easa, 1993; but see also London Transport Executive, 1950 and 1956, reporting its 1949 and 1954 surveys). As the boundary between them is fluid, this paper will include Origin-Destination (OD)-surveys[5].

The travel diary can be defined today as follows:

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[1] This version is based on the following papers: Axhausen and AIves, 1994, and Axhausen, 1994a, 1995a and 1995b

[2] Hattgen (1992) might be right, that they are dinosaurs bound for extinction because of their comprehensiveness and costs, but this author doubts that they can be replaced in the research for an improved understanding of travel behaviour, which is required to guide the "agency-friendly travel surveys" advocated by Hartgen.

[3] There are some precursors in the form of non-home based OD surveys in the 19th century in conjunction with the planning of railroad stations in London and in conjunction with road building in the first part of the 20th century in the USA.

[4] Martin et al. (196 1) list as the earliest examples 1944 OD surveys in Little Rock, AR, Denver, CO, Atlanta, GA, Savannah, GA, Fort Wayne, IN, Council Bluffs, IA, Kansas City, KS, New Orleans, LO, Lincoln, NE, Charlotte, NC, Oklahoma, OK, Tulsa, OK, Greenville, SC, Memphis, TN, Nashville, TN, Milwaukee, WI. These were conducted with and for federal funding (Easa, 1993).

[5] Ortuzar and Willumsen (1990) define the travel diary as "a special type of household survey which requests similar kind of information as the O-D survey but in greater detail" (p.76).

The travel diary is a survey instrument designed to record all movements of a person over a given period of time with all relevant detail for the relevant modelling time horizons. It will consider travel and non-travel as two distinct classes of activities.

It consists of:

- the diary proper recording all movements sequentially during a specific period of time
- the person instrument recording person specific information
- the household instrument recording relevant household based information
- the resource instrument recording the relevant details about the physical and social means available to the household. Examples are cars and other motor vehicles, bicycles, public transport season tickets, telephones, telematics equipment etc.

The content of a specific travel diary is a compromise between many interests, which have to be accommodated within the survey budget of the sponsor and within the time, which the respondents are willing to give to the survey. There is the wish to obtain an accurate picture of travel in the study area for either a transport operator or' a transport regulator, although each will focus on different issues. There is the need to provide the data items required for the transport modelhng planned, which in turn has to be able to answer the policy questions raised. There is the desire to match earlier travel diaries for comparison across time and to match other concurrent surveys for weighting and comparison. There are also national and market-research firm specific traditions and preferences. Finally, the method of survey administration has to be accommodated, which will shape the content by making certain things easy and other difficult.

At this time nearly all of these influences and actors are themselves changing rapidly after a period of slower change. The population seems to be generally less willing to provide time for any type of survey, decreasing the time available and therefore the amount of detail possible in travel diaries. Home interview surveys are becoming impossible to conduct in some countries, because of security concerns for the survey personnel. Survey budgets are becoming smaller, as public expenditure is being cut. The roles of the transport operator and the transport regulator are shifting as the result of the privatisation of transport services and infrastructure. This shift creates new data requirements, e.g. the need to survey fates paid when such information is considered commercially sensitive by the now private public transport provider. Transport policy has adopted new policy instruments - pricing, telematics etc. - reflecting new policy concerns, such as environmental pollution, social exclusion of particular groups of travellers (elderly, handicapped, young children etc.), European integration, congestion and other externalities. These new concerns and new policy instruments require changed transport modelling tools and approaches. New technologies are changing survey administration rapidly: software technologies such as, computer-aided telephone interviewing (CATI), computer-aided self-interviewing (CASI),

geographic information systems, or hardware technologies, such as hand-held computers, global positioning systems (GPS) or various other sensors.

The only seemingly static element, at least in comparison, is the content of the travel diary. The pressures naturally acting on the design process of any one survey keep the pace of change slow: the wish to be compatible with past surveys, the lack of time to test (radically) new designs or question items, the lack of money to run the old and new survey in parallel during a transition phase, the risk of failure in terms of response rates and data quality due to a new design or new administration method, the past investment in specific survey designs by market-research firms. The natural mode of development is therefore incremental and tied to particular market researchers and scientists, who conduct travel diary surveys regularly. Non-incremental change seems generally the result of either substantial investment, or of a "new" survey for a task/area not covered before. Both conditions were met for the KONTIV-design, one of the last major innovations, for which the German Ministry of Transport provided substantial development funds, as it was the first time that a national survey of travel behavior had to be conducted.

This divergence between the speed of travel diary development and the speed of change in the policy environment needs to be resolved by investment into the development of new survey contents and survey administration methods. This investment should be guided by a thorough discussion of past developments and current needs. This paper wants to contribute to this discussion by providing:

- a review of past change in travel diary contents
- a critical discussion of those contents critically against the background of current knowledge
- the identification and discussion of the new data needs arising from the current policy concerns:
  - environmental assessment
  - assessment of improved information provision and information technology use
  - assessment of policies to internalize transport externalities, especially congestion pricing **and traffic** calming
  - improved monitoring of transport equity
- a proposal to structure those data needs into modules allowing their successful collection in a survey
- a discussion of new technologies and their potential to improve the survey conduct and data quality

The structure of the paper follows this outline, but for two additional elements. The next section will present a set of definitions required for the further discussion. The discussion of the historical development of the travel diary will be supplemented by an Appendix illustrating the development with a series of survey forms from the last forty years.

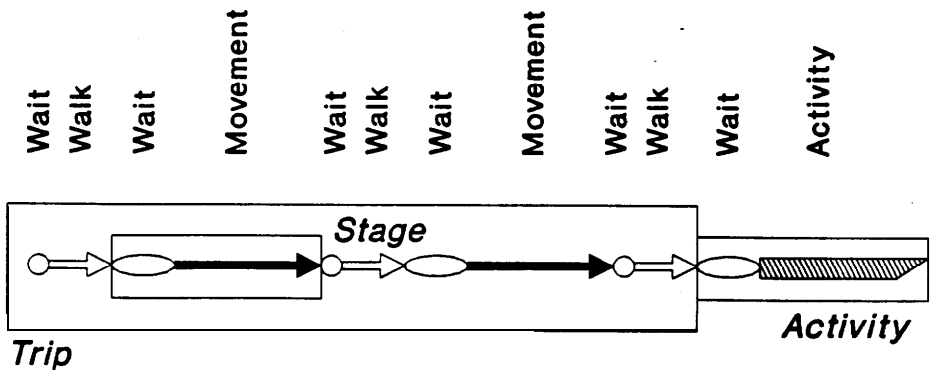
3 DEFINITIONS

3.1 Definitions used

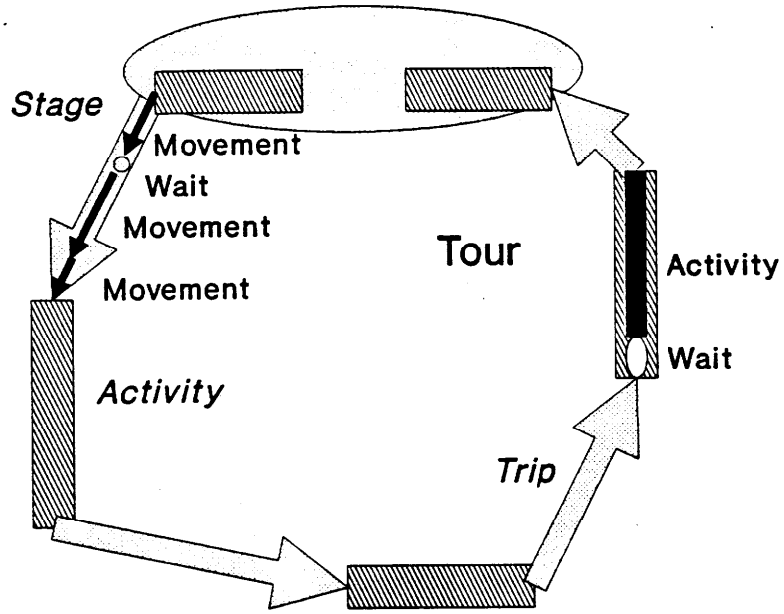
Given the long history of travel diary it is not surprising, that there are a multitude of different terms to describe the different elements of the movement and activity chain of a person. The following definitions will be used here (see also Figure 1 and Figure 2):

- ***An activity*** is the main business carried out in one spatial setting while interacting with the same group of relevant people or being alone. It includes any waiting time before the start of the activity proper.
- ***Stage*** is a continuous movement with one mode including any waiting times before the start of or during the movement.
- ***Trip*** is a sequence of one or more stages between two activities.
- ***Tour*** is a sequence of trips starting and ending at the same location.
- ***Journey*** is a tour starting and ending at home.

Figure 1 Elements of the movement/activity chain



. Figure 2 Definition of a tour



3.2 Comments

The two definitions for activity and stage impose a structure on the reality of the traveller, which is rather less clear cut in reality. The reality is a bundle of activity streams (As, 1978) of which some are more dominant then others at any one time. In the work context the stream might be for example working alone, communication with others, listening to a talk at a meeting, talking on the telephone, planning one's weekend; these will alternate - rapidly. This change is even more obvious in the home context, where various streams, such as observing the children, supervising the roast in the **oven,** or glancing at the tv for the replay of the goal, cooking or cleaning alternate. Travel is also ambiguous, as the movement itself is regularly combined with a second activity, such as listening to the radio, talking to somebody or in the case of public transport even working. In some extreme cases, such as having a meeting on a train, this second activity might become the only purpose of the movement. From a transport perspective, it is not apriori obvious, which of the many activity stream determines where the respondent is at any one time or why.

The designer of the survey instrument has to impose a structure to give the respondent the possibility of formulating an answer. The structure has to describe, which activity classes the respondent should distinguish and how to group the activity streams into units or episodes. The travel diary instructs the respondent:

- to distinguish between the two classes of "activity in one spatial setting" and "movement including waiting at a fixed location"
- to classify the activities defined by two occurrences of "movement" according to a list of categories provided by the survey designer. The provision of a "change mode" activity purpose distinguishes the stage-oriented from the trip-oriented travel diary (see below for further discussion)

It asks at first: Where did you go next ? Later adding questions about the why and how.

The time budget surveys, the main alternative to travel diaries, asks the respondent:

- to consider the activities as one class
- to classify the activities according to a set of categories provided explicitly with a list of activity codes or implicitly by examples given in the instructions.

It asks at first: What did you do next ? or: What did you do in the next x minutes ?. Later adding questions about where and how (Gronmo and Harvey' 1982; Szalai, 1972).

Traditionally transport planners were not interested in the sequence of activities within one location connected by walks, where one location could be as large as a down-town area, shopping malI or industrial complex. This was in keeping with the lack of interest in walking as a mode. The recent transport planning interest in in-home activities (Jones and Salomon, 1993) or activity-sequences in large sites, e.g. visits to various shops and offices in a shopping mall or work places, cafeterias and other facilities in a work site, creates problems for the travel diary, as the definition of spatial setting has to be become more precise then in the past. In the case of the in-home activities "Paid work" and "Other in-home" for example, the rearrangement/redefinition of a kitchen or living room into a work space would have to be defined as a change of spatial setting.

The definition chosen above allows for the differentiation of such in-home or within-site activities by including the "spatial setting" as a constituent of the activity definition. The exact formulation of that aspect in any particular survey is a question for the designer.

Exkurs: The design problem

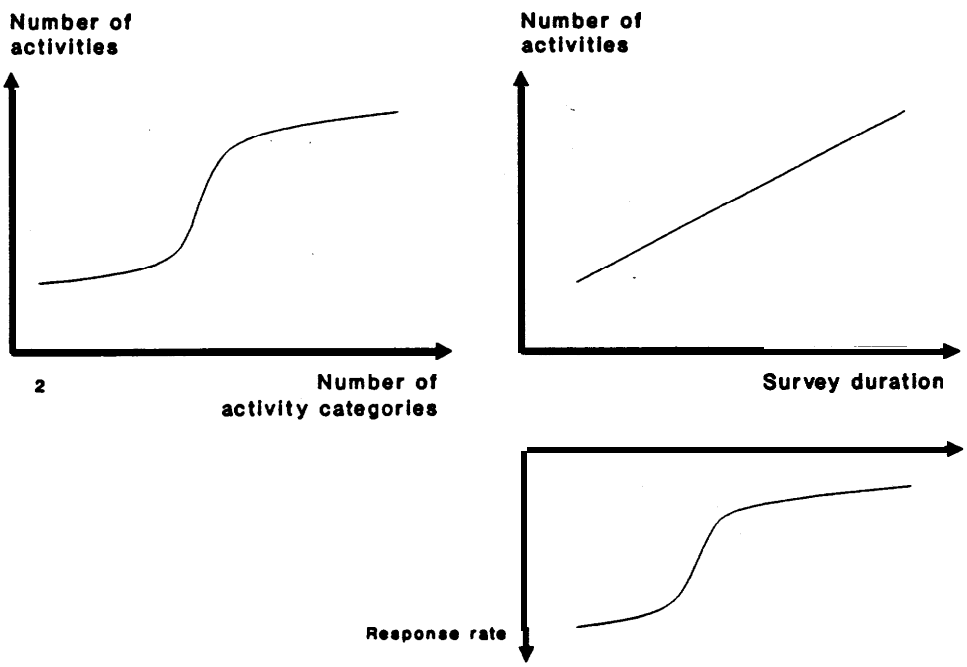
The designer has three key variables each in the travel diary and in the time budget survey to determine the prospective work load of the respondent and thereby the response rate and quality of the data collected. The assumption made is that an increase in survey duration or complexity will have a negative impact on the willingness to participate, i.e. response rate, and on data quality, i.e. through reduced attention to each item. The variables are:

- For the travel diary
  - the tightness of the definition of spatial setting
  - the number of activity categories provided
  - the number of supplementary items for each activity unit and trip
- For the time budget survey
  - the duration of the reporting interval
  - the number of activity categories provided or suggested
  - the number of supplementary items for each activity

At the moment we can only make suggestions about the functional relationships between these variables and the response rate and quality of data collected, as to the knowledge of the author they have never been the subject of study in a transport context.

For the travel diary the left panel of Figure 3 suggests that the response rate will drop exponentially with the number of activity categories provided, as it influences the number of activities/trips reported. Starting from the minimum of two categories ("being at home" and "being somewhere out-of-home") the number of activities reported will first increase faster then linearly,' as the respondent can identify more and therefore faster changing activity episodes. After a certain number of categories the increase will slow to less then linearly, as the majority of new categories is irrelevant to the respondent and his activities. The response time will grow linearly with the number of trips/activities and the number of items asked for each. The growth might be slowed to less the linearly, if activities at the same location are recorded (right panel of Figure 3). The right panel also indicates possible response rates based on an assumed survey duration-response rate function.

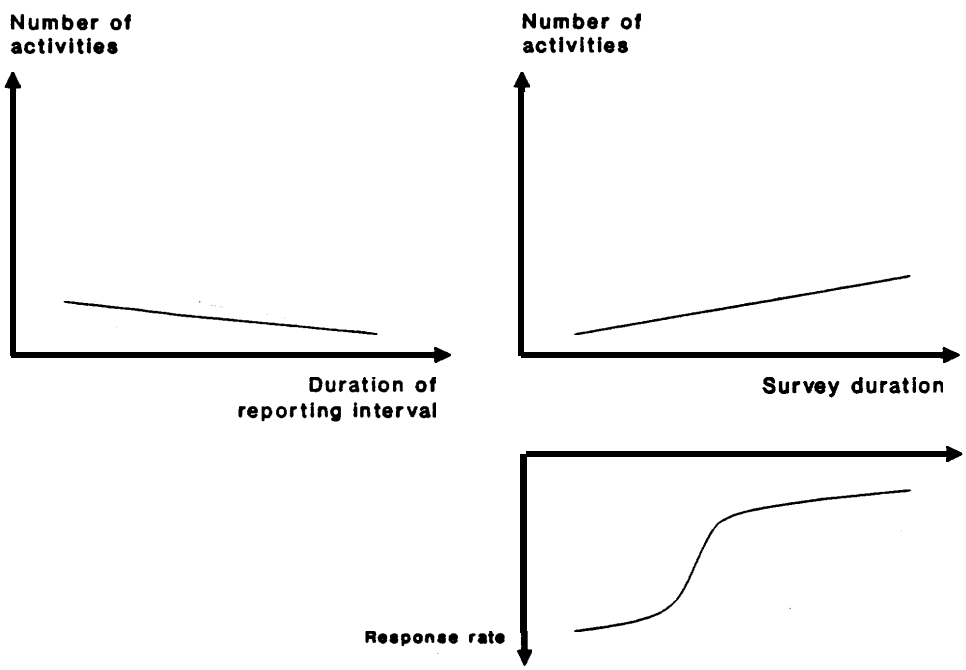
Figure 3 Travel diaries: response rate as a function of the number of activity categories



To restate, under the assumptions made the designer of a travel diary will have to accept a quickly growing non-response rate as he tries to increase the detail of his survey, either in terms of the number of activity categories or items per activity. The critical number of activity categories is not known at the moment, but this author would assume that it is reached, when the activities undertaken at one location are detailed finely, e.g. in-home activities are broken down.

The designer of a time budget survey, who adopts a fixed-interval reporting format (What did you in the next five/ten/... minutes ?) is aced with a different set of functions. The shortening of the reporting interval will lead to a less then linear increase in the number of activity episodes reported, as the majority of the newly created intervals will just show a continuation of the previous interval. In the case of an open question format, the number of activity categories used is a problem of the coder, not of the respondent. It will therefore have no influence on the response rate. Only an increase in the number of items asked per activity can increase the survey duration and therefore decrease response rate. It is therefore not surprising that time budget surveys are in comparison to travel diaries very restrictive in the number of items per activity (See, the two panels in Figure 4).

Figure 4 Time budget surveys: response rate as a function of the duration of the reporting interval



The discussion has shown that travel diary and time budget surveys have unique niches and that a true merger of the two - a survey providing both a detailed activity breakdown and numerous items of information for each - will result in unacceptably low response rates in a mail-back survey. The situation might be different in a telephone interview. The design problem for the future is to find ways of increasing detail, while keeping the increase in survey duration small, i.e. keeping the increase in non-response manageable.

This definition implies that we are not interested in secondary and/or parallel activities, such as listening to the radio at work, the taking of telephone calls while cooking, brief interruptions by people entering and leaving the room or the supervision of children while ironing. The activity categories (purposes) will focus on those types of activities, which we consider to be the main business of an activity episode, i.e. the one which provides its meaning.

The suppression of within-site trips, which is traditionally stipulated in travel diaries, is not implied in these definitions. For certain research questions it might be desirable to enquire about such trips, such as visits to cafeterias in large building complexes, or visits to different shops and service providers in shopping malls. The difficulty of defining them properly to the respondents will then have to be overcome by the survey designer.

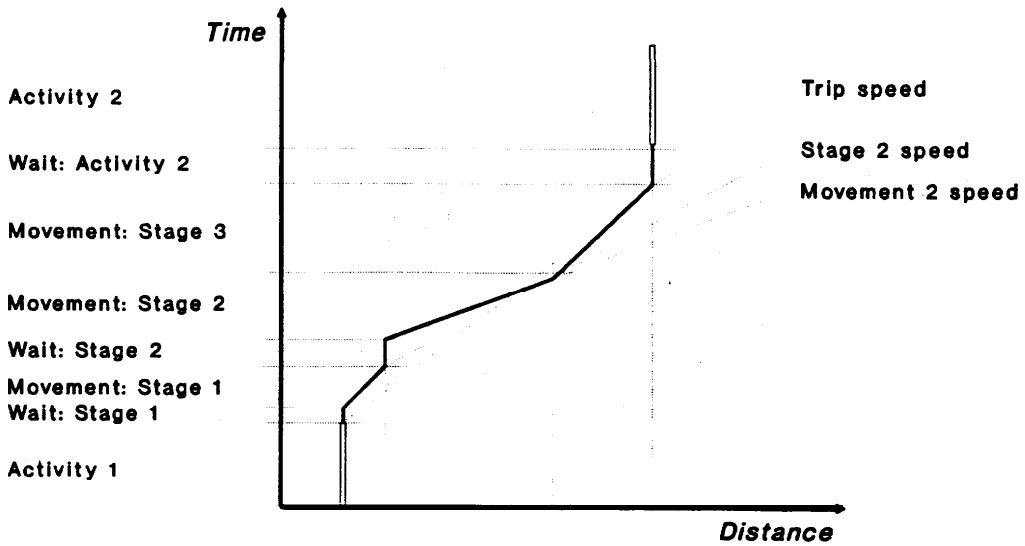
The waiting times are highlighted in the definition. The reason is their potential to distort the estimates of travel speed substantially (see Figure 5). A travel diary should raise the awareness of the respondents for these times and ask him to account for them as precisely as possible. Figure 1 shows waiting times before every movement episode and every activity episode. The waiting times before the start of a walk stage are, for example, those times required for-a group of people to get ready to leave, or the times required to unpack a vehicle after a extensive visit to the shops. The waiting times before a movement are, for example, those times spent waiting for the arrival of a bus, but also those spent preparing a car for departure. The waiting times before an activity are normally the result of the early arrival of the respondent eager to assure the participation in the activity. The importance of this “schedule delay” has been established in numerous studies of the choice of departure time, but not really been studied with travel diary instruments.

3 3 Typology

Figure 1 showed the sequence of movements, waiting times and activities, which the travel diary attempts to observe and measure. The way, in which this sequence is divided for the purpose of the survey, defines the type of the travel diary. Four ways are regularly used and a fifth one is theoretically possible (see Figure 6):

- ***Stage-based*** (unlinked trip) approach, which uses the stage as the building block to construct the whole trip. It covers the final walk to the activity as an item outside its schema by establishing it separately (see Figure 7 for a recent example of this approach). It gives equal importance to the questions: Where did you go next to do something ? and Where did you go next to change your mode ?

. Figure 5 Speed estimates at various levels of trip disaggregation



- ***Trip-based*** approach, which establishes the trip as a whole and then disaggregates it into stages. The amount of stage information can vary from information about the different modes used to detailed timing information (see for Figure 8 a recent example of this detailed approach). It asks first: Where did you go next ? and then second "Tell me about the trip"

  The level of detail requested about the trip varies from:

  - ***the main mode,*** mostly defined as the mode used to cover the longest distance
  - a ***list of modes used,*** without an indication of the order of use and therefore the number of stages
  - the ***sequence of modes used,*** i.e. stages
  - the last two expanded by ***mode*** or ***stage detail,*** mostly distance covered or time needed

- ***Activity-based*** approach, which focuses its questions on the activity first and then establishes the trip details as additional information (see Figure 9 for an example). It asks "What did do next?", as a time budget survey would, but it, remains a travel diary by maintaining the activity/movement distinction. It normally establishes only the activity start and end time, but not the travel times.

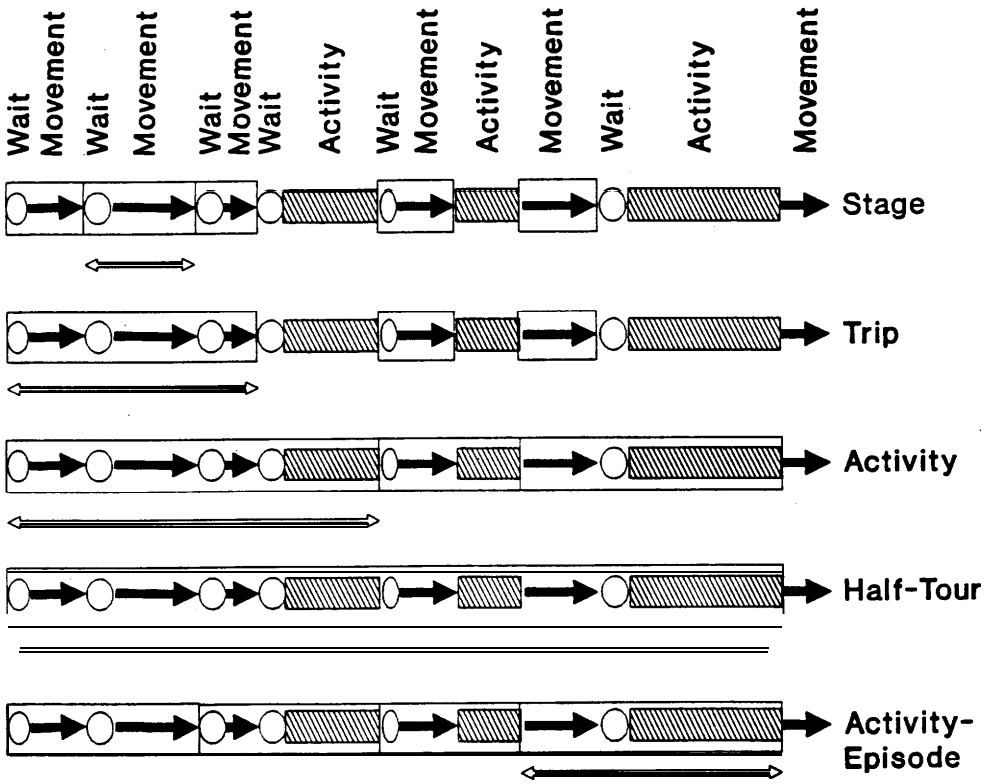
- ***Half-tour*** approach, which allows the respondent to specify the travel to the furthest point of the tour including any interruptions along the way (see Figure 10 for an example). It is an approach favoured for studies of aggregate characteristics, such as VTMT or gas consumption, where a detailed breakdown of the activities is not required.

- Theoretically possible is ***the activity-episode*** approach, which treats each wait-walk-wait-movement/activity episode as one unit. It has theoretical appeal, but its wastefulness on

traditional paper forms has stopped this approach from being implemented in practice. This might be different in a telephone interview context, where it could provide for a merger of the time budget and travel diary approach. It would ask "What did you do next ?" and ask specific sets of further questions depending on the activity class, i.e. movement or activity.

Two recent surveys, derived from an activity-based design, have nearly implemented this approach by combining a stage-based with an activity-based approach (See Section A.21). The key component was the adoption of a purpose category "Bus Stop, Car pool, Park + Ride etc. activities". The lack of a "Parked car" category is the reason, that the approach is not fully implemented. It should be noted though, that both surveys were conducted in parts of the US, where the number of segmented trips is very low (Detroit and Dallas/Fort Worth).

Figure 6 Types of travel diaries



4 REVIEW

This section of the paper will review the development of the travel diary using a non-random sample of 108 travel diary forms. The sample is non-random, because it was collected from colleagues of the author's acquaintance. While the author is confident, that all important types of survey forms have been covered, at this time it is impossible to say' if the sample is representative of the survey forms used, as no list of all surveys conducted in the study period and study area exists. All conclusions **are**

therefore preliminary and require confirmation with a larger, true random sample of diaries to be collected in the future. Table 1 lists the surveys included into the sample.

Figure 7 Example: Stage-based design

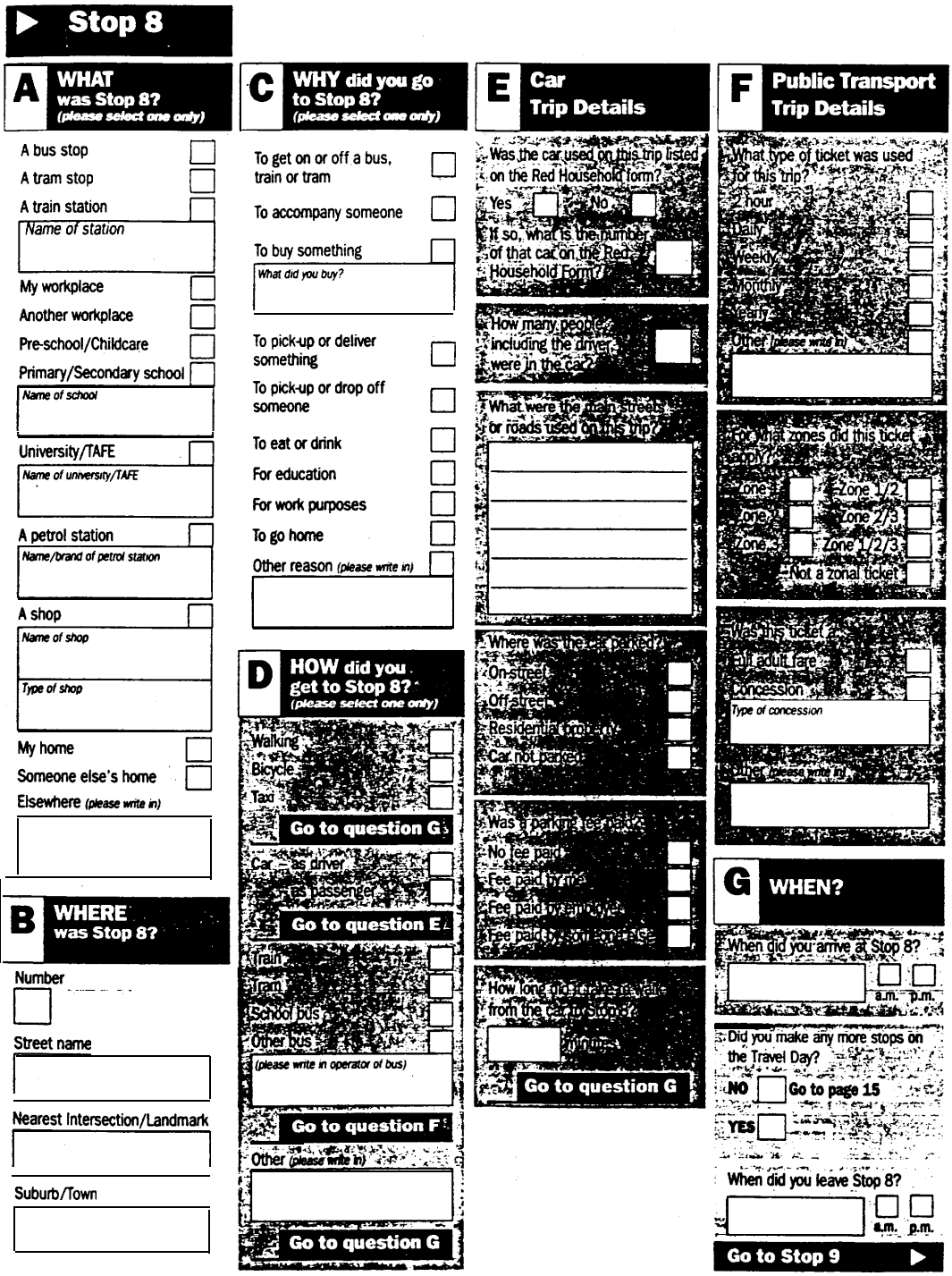
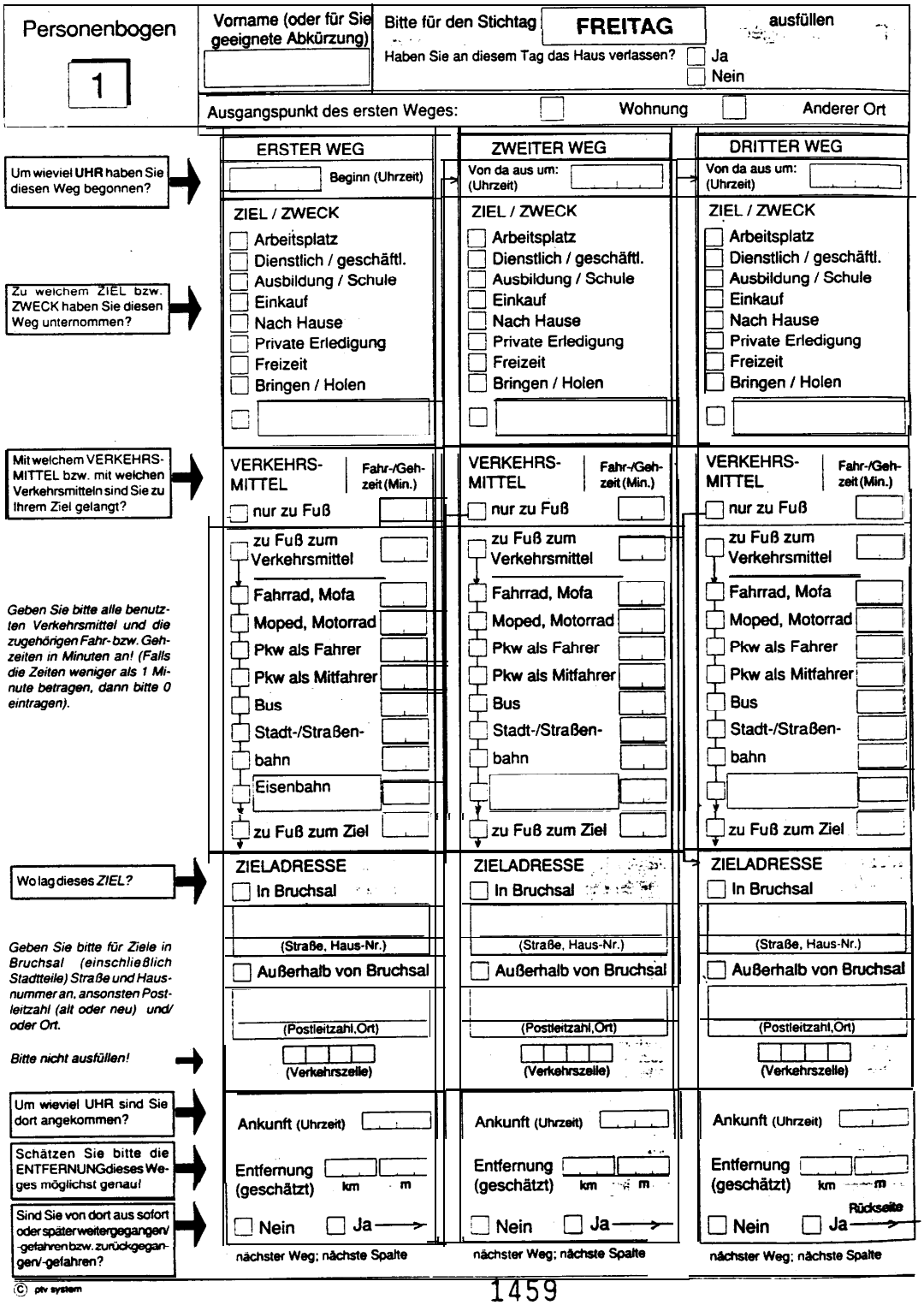


Figure 8 Example: Trip-based design



. Figure 9 Example: Activity-based design

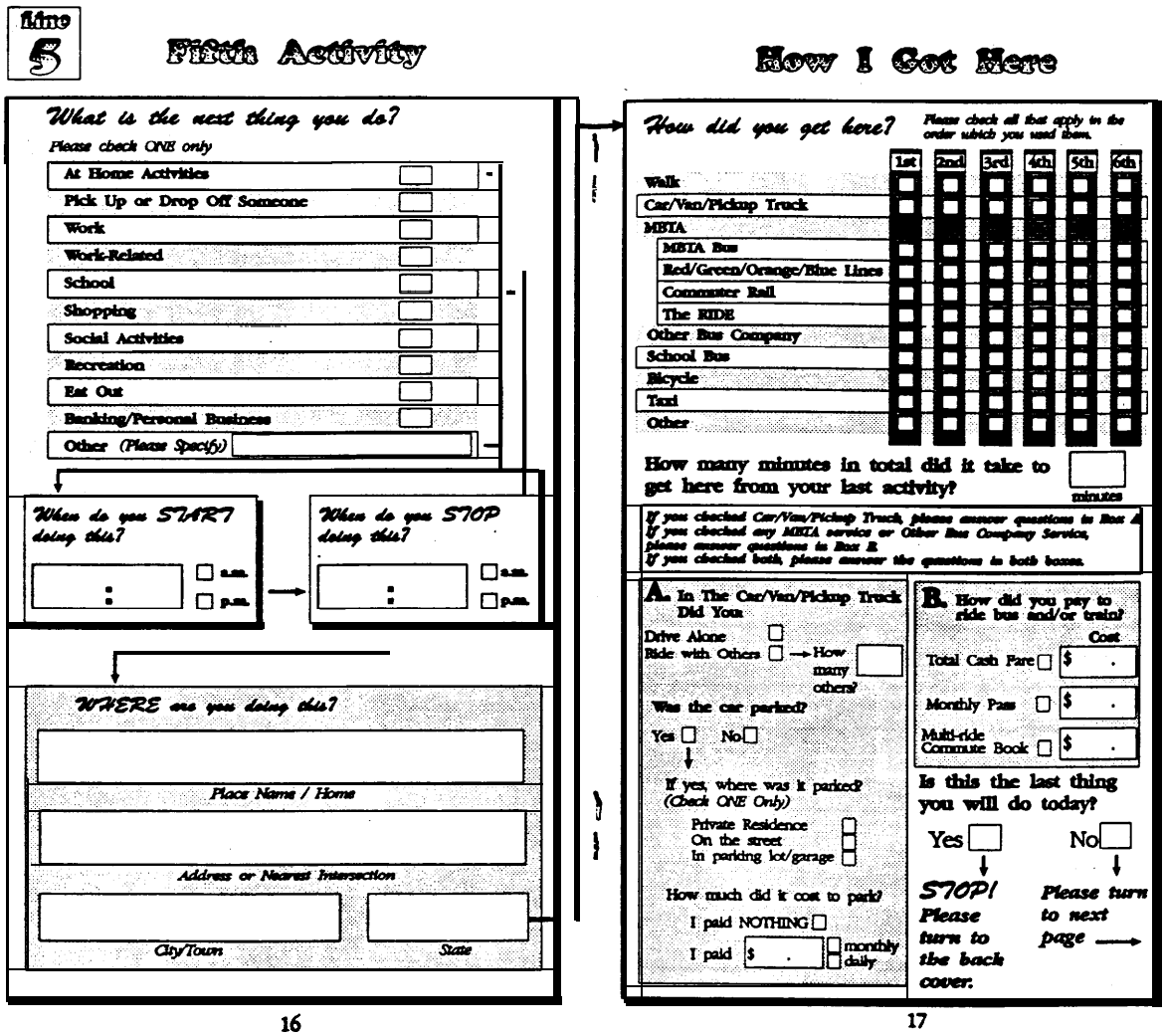
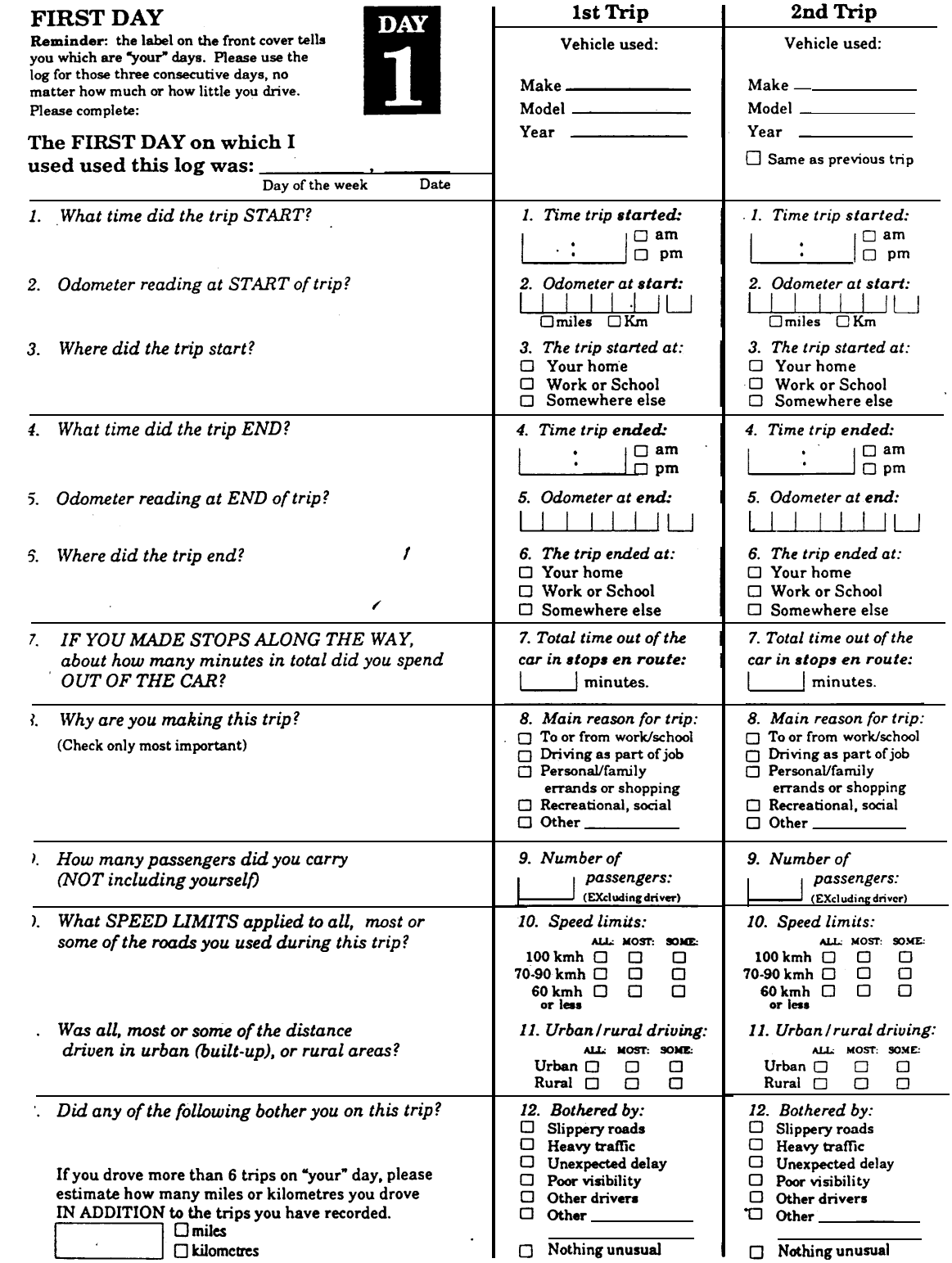


Figure 10 Example: Half-tour-based design



FIRST DAY

Reminder: the label on the front cover tells you which are "your" days. Please use the log for those three consecutive days, no matter how much or how little you drive.
Please complete:

The FIRST DAY on which I used used this log was: _____ , _____
Day of the week Date

DAY 1

	1st Trip	2nd Trip
	Vehicle used: Make _____ Model _____ Year _____	Vehicle used: Make _____ Model _____ Year _____ ☐ Same as previous trip
1. *What time did the trip START?*	1. *Time trip started:* [:] ☐ am ☐ pm	1. *Time trip started:* [:] ☐ am ☐ pm
2. *Odometer reading at START of trip?*	2. *Odometer at start:* [ ][ ][ ][ ][.][ ] ☐ miles ☐ Km	2. *Odometer at start:* [ ][ ][ ][ ][.][ ] ☐ miles ☐ Km
3. *Where did the trip start?*	3. *The trip started at:* ☐ Your home ☐ Work or School ☐ Somewhere else	3. *The trip started at:* ☐ Your home ☐ Work or School ☐ Somewhere else
4. *What time did the trip END?*	4. *Time trip ended:* [:] ☐ am ☐ pm	4. *Time trip ended:* [:] ☐ am ☐ pm
5. *Odometer reading at END of trip?*	5. *Odometer at end:* [ ][ ][ ][ ][.][ ]	5. *Odometer at end:* [ ][ ][ ][ ][.][ ]
6. *Where did the trip end?*	6. *The trip ended at:* ☐ Your home ☐ Work or School ☐ Somewhere else	6. *The trip ended at:* ☐ Your home ☐ Work or School ☐ Somewhere else
7. *IF YOU MADE STOPS ALONG THE WAY, about how many minutes in total did you spend OUT OF THE CAR?*	7. *Total time out of the car in stops en route:* [ ] minutes.	7. *Total time out of the car in stops en route:* [ ] minutes.
8. *Why are you making this trip?* (Check only most important)	8. *Main reason for trip:* ☐ To or from work/school ☐ Driving as part of job ☐ Personal/family errands or shopping ☐ Recreational, social ☐ Other _____	8. *Main reason for trip:* ☐ To or from work/school ☐ Driving as part of job ☐ Personal/family errands or shopping ☐ Recreational, social ☐ Other _____
9. *How many passengers did you carry (NOT including yourself)*	9. *Number of passengers:* [ ] (EXcluding driver)	9. *Number of passengers:* [ ] (EXcluding driver)
10. *What SPEED LIMITS applied to all, most or some of the roads you used during this trip?*	10. *Speed limits:* ALL: MOST: SOME: 100 kmh ☐ ☐ ☐ 70-90 kmh ☐ ☐ ☐ 60 kmh or less ☐ ☐ ☐	10. *Speed limits:* ALL: MOST: SOME: 100 kmh ☐ ☐ ☐ 70-90 kmh ☐ ☐ ☐ 60 kmh or less ☐ ☐ ☐
11. *Was all, most or some of the distance driven in urban (built-up), or rural areas?*	11. *Urban / rural driving:* ALL: MOST: SOME: Urban ☐ ☐ ☐ Rural ☐ ☐ ☐	11. *Urban / rural driving:* ALL: MOST: SOME: Urban ☐ ☐ ☐ Rural ☐ ☐ ☐
12. *Did any of the following bother you on this trip?*	12. *Bothered by:* ☐ Slippery roads ☐ Heavy traffic ☐ Unexpected delay ☐ Poor visibility ☐ Other drivers ☐ Other _____ ☐ Nothing unusual	12. *Bothered by:* ☐ Slippery roads ☐ Heavy traffic ☐ Unexpected delay ☐ Poor visibility ☐ Other drivers ☐ Other _____ ☐ Nothing unusual

If you drove more than 6 trips on "your" day, please estimate how many miles or kilometres you drove IN ADDITION to the trips you have recorded.
[ ] ☐ miles ☐ kilometres

Table 1 List of the travel diaries considered

	Area/Location	Year		Area/Location	Year
A	Wien	1986, 1991	NZ	New Zealand	1989/90
AUS	Sydney	1981	S	Uppsala	1971
AUS	Adelaide	1986	S	Stockholm	1985/86
AUS	Cairns	1986	SG	Singapore	1981, 1988/89, 1991
AUS	SE Queensland	1992	T	Bursa	1991
AUS	Victoria	1994	UK	London Transport	1949, 1954, 1992
B	Belgium	1986/87	UK	London Area Transport	
B	Charleroi	1989/90		Studies (LATS)	1962, 1971, 1981, 1991
B	Brussels	1990/91	UK	Leicester	1963
CAN	Hamilton, Ontario	1978	UK	Cullen&Phleps	1974
CAN	Canada	1979/88	UK	UK	1975/76, 1985/86
CAN	Quebec	1985/86	UK	S Yorkshire	1988, 1991
CAN	Ontario	1988	UK	Swindon	1990/91
CH	Switzerland	1984, 1989	UK	West Midlands	1993
CH	Northwest Switzerland	1991	UK	RAC-Survey	1994
CH	Cantons Zurich & Zug	1992	USA	BPR	1954
Chile	Santiago	1992	USA	Detroit/SEMCOG	1955, 1994
D	Hamburg	1956	USA	CATS	1956, 1970, 1991
D	Castrop-Rauxel	1962	USA	Bay Area	1965, 1981, 1990
D	Bruchsal	1964, 1993	USA	Baltimore	1976
D	Pforzheim	1967	USA	Michigan	1976
D	Chemnitz	1968	USA	Houston-Galveston	1984
D	Karlsruhe	1968, 1986	USA	CA Telecommute	1988
D	Stuttgart	1968	USA	Boston	1991
D	Germany	1973, 1989	USA	S California	1991
D	Stuttgart	1981	USA	West Davis	1992
D	Duisburg	1984/85	USA	Wasatch, Utah	1993
D	Kreis Unna	1986	USA	Dallas/Fort Worth	1995
D	Mühlacker	1986	USA	New York MTC	1995
D	Leverkusen	1988	USA	Oahu	1995
D	Essen	1989			
D	German car use survey	1989			
D	Münster	1990, 1994			
D	Hagen	1991			
D	SrV	1991			
D	Karlsruhe Panel	1992			
D	Übach-Palenberg	1992			
DK	Denmark	1975, 1986, 1992/94			
F	Grenoble	1976, 1985			
F	France	1993/94			
N	Trondheim	1990			
NL	Western Netherlands	1966			
NL	Netherlands OVG	1981, 1985, 1990, 1993, 1994			
NL	Dutch panel	1987			
NL	Dijst & Vidakovic	1992			

This section does not want to provide a full history of the travel diary, but it wants to focus on identifying, where possible, trends in the contents of the diary sample available (See Hartgen, 1992, for a discussion of the sample sizes and survey approaches over the last forty years in the USA). The items used in the sample diaries are listed in tables in Appendix B. The results of a similar exercise undertaken for Australian travel diaries at the end of the 1970's are also shown in the Appendix (Dumble, 1979). Items specific to a particular survey and attitudinal items are not included in the tables. (See also Purvis, 1989, for information on a further collection of surveys).

The review will not discuss the changes in survey administration methods. The main changes here are the general shift from personal household interview surveys, the preferred methods for the early surveys, to mail back and telephone surveys and the shift from recall to prospective surveys. The shift to telephone interview surveys implies also a changing role for the survey forms reviewed here. They become an expanded memory jogger to which the respondent refers to during the telephone interview. The complete record is only created during the interview, when the CATI-supported interviewer requests any missing information, as prompted by the logic checks built into the CATI-interview program. The telephone interview also opens up the possibility of asking for items not indicated on the form, although the extent of this practice can only be established from the telephone interview protocols, which were not available to this review.

The review will not discuss memory joggers. Originally they - cards of A5 or 1/3 A4 size - were supplied to give the respondents a place to record their movements or activities during the day. Some recent surveys have not used them, but have rather reduced their format to a size, where the actual form could be carried by the respondent, often but not all always combined with a reduction of the set of items to the bare minimum. Some others incorporate the memory jogger into the survey instrument to provide the respondent a place for structured note taking. Unfortunately. in these examples they were placed inside the survey booklet instead of at the back, where they would be easy to find. The backs were mostly used for a reminder of the survey date.

At least one survey has provided its respondents with a list of activities to encourage recall of short activities, such as buying a newspaper or dropping a letter in the letter-box. This and other recall improvement strategies will not be discussed further.

The sample of diaries is skewed towards the 1980's and 1990's. Only about a third are early examples. Fortunately, the Australian sample of Dumble stems from the 1960's and 1970's and can therefore be used to supplement this sample. With regards to countries the US, the UK, Australia and Germany

make up three quarters of the sample while the rest of the world is represented by the remaining quarter.

4.1 Approach and Design

The American, British and Australian examples adopt nearly exclusively and from the beginning a stage-based approach, while the German examples adopt equally from the beginning a trip based approach. This is surprising, as German practice was in the 1950's heavily influenced by the American example.

Three trends in survey design are visible in the sample. The first is the adoption and adaptation of the KONTIV-design since its development in the early 1970's (Brag, Meyburg and Wennuth, 1983), a development which was supported by a series of comparative studies (e.g. Brag, Fallast, Katteler, Sammer and Schwertner, 1988). Still, one should ask to what extent it is possible to adapt a design developed for a nationwide survey to the demands of a local survey (See Figure 8 or Section A.6). The 1991 CATS even transformed the trip-based KONTIV-design into a stage-based design by the introduction of a "Change Mode" purpose.

The second trend is the increasing use of booklets of less then A4 size intended to be carried by the respondents during the day. They complement and replace the memory joggers, which are used for the same purpose. These surveys pay for the handiness of their smaller format by a reduction in the detail they can establish No results of a formal study of the implied quality trade-off are known to the author.

The third trend is the increasing use of activity-based surveys in the US. It is interesting to note, that this is combined with a departure from the earlier American tradition of stage-based surveys as the majority of those activity-based surveys at least in the sample use a trip-based approach to the movement details. While the forms reviewed try to recover as much stage detail as possible - at least the order of the stages is requested - there is less detail then before.

4.2 Movement

There are no clear trends in the number of categories offered to the respondents to describe their trip purpose or mode, other then the end of the practice of excluding the slow modes from consideration after 1970. The request to indicate the number of persons in the car is now standard, but it is surprising that the cost implications of these additional persons are not established. In particular, there are only a few surveys, which asked, if a car pooling arrangement was in operation. Some recent surveys have asked for both household members and non-members among those in the vehicle, which is an useful additional bit of information, but without cost information not as useful, as it could be.

Nearly standard is the request to identify the vehicle used among those of the household. This link is used in environmental assessments, especially if the vehicle description allows the estimation of emissions.

In keeping with the basic approach, there are again and again attempts to establish the shares of particular time elements within the complete movement (e.g. search, queuing, transfer etc.). It **would** be useful to compare these attempts and their accuracy, as the differential weights of the time elements in the total cost of travel are now well known.

Specific reporting biases are possible for either the stage- or the trip-based approach. Recording individual stages might lead to too high trip times due to rounding at the stage level, while the distribution of a fixed trip time in the trip-based approach might lead to the suppression of stages or the improper allocation of shares due to their unequal cognitive weight. Both will be strongly affected by the tendency to report round numbers for the start and end times (0, 5, 15 etc.) (See for example Kitamura, 1994).

The recent recognition of the special importance of parking and parking costs on mode choice has resulted in an increasing amount of detail about parking in current travel diaries. This is a return to the beginnings of the travel diary, when parking detail was prominent.

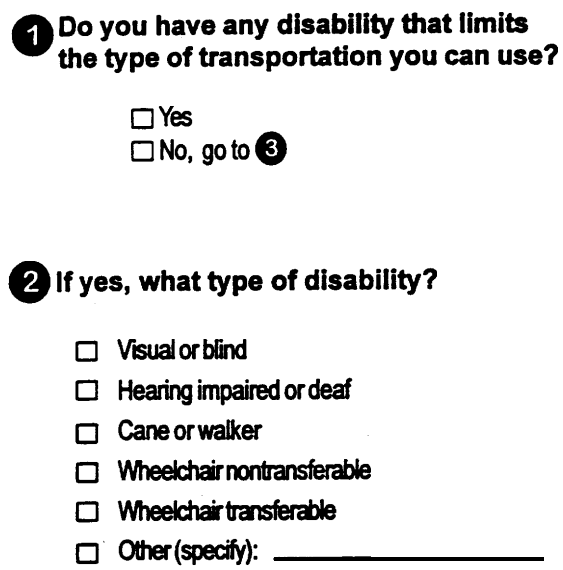
The lack of interest in situational handicaps is startling given that their crucial importance for mode and destination choice has long been established (e.g. Br6g and Erl, 1983). The group of Australian surveys identified by Dumble (1979) are certainly an exception.

4.3 Person

The set of questions about each person in the household has remained remarkably stable over the last forty years. The omissions are the interesting aspect of this set of question. The ownership of a season ticket or other form of public transport discount instrument[6] is established less frequently than its impact on mode choice would warrant. The same holds for the private ownership of bicycles and drivers licences.

Matching the reluctance to query situational handicaps is the reluctance to ask for permanent handicaps. It is unclear, whether the large number of possible handicaps and the attendant difficulty of measuring the severity of the handicap is the reason for this omission, or the assumption, that specialist surveys will fill the gap. Probably reflecting the recent ***Americans with Disabilities Act*** a group of recent American surveys has broken this pattern with a set of two questions (Figure 11).

Figure 11 Establishing personal handicaps



Source: AMPG survey for New York MTC, 1995

[6] In the UK, Germany and Austria, for example, rail users can buy discount passes, which give them a 30-50% discount on all or many fares for a year.

4.4 Household

The description of the household is rather poor in travel diaries and has stayed so since the earliest examples in the sample. This is in spite of the vast changes in household and family structures during the last forty years (see for the UK Buck. Gershuny, Rose and Scott, 1994). It focuses on the number of people in the household and the size of the vehicle fleet. Household and personal income questions are standard in the US and UK, while they are missing in Germany. In Germany the socio-demographic characteristics of the persons are used as dummies for income instead. The German surveys use, in particular, the level of educational achievement, which is missing in most American surveys.

4.5 Vehicle

The interest in a detailed description of the vehicles seems to have peaked in the 1980's. The examples from the 1990's so far are less exacting in this respect. Matching the increasing interest in parking at the movement level, there is a slight increase in recent surveys in the number of questions related to parking at home and the work place.

There is no consensus about how to associate vehicles with persons in the household, if it is attempted at all. If is attempted at all, there is a preference to establish the legal owner. The "main user" is sometimes used alternatively.

4.6 Conclusions

What is surprising about the travel diary content is the lack of major change over the last 40 years. While presentation, survey administration methods, range of movements surveyed have changed, the questions asked have not. New and different questions were included in some surveys, but none **of** them have been incorporated into the standard set of questions asked. This lack of change is noticeable in the description of the movement, although there are items of interest which could be included in response to the insights and requirements from transport modeling and in-depth survey work (information about situational handicaps, car pooling, other costs of travel, precise waiting times etc.). Still, the required minimum of information is obtained. The lack of change becomes therefore acceptable. It is less acceptable in the description of the persons, vehicles and households. Here the social and economic changes of the last forty years have been so momentous, that they should have led to changes. The absence of such changes can only be explained with an unthinking desire for comparability with the past, which irrelevance to the present is not acknowledged.

5 ITEM DISCUSSION

In light of the widespread stagnation identified above it is necessary to discuss current and possible future items for their suitability in future diaries. It should be clear that a survey containing all the items discussed below would be too long for any practical application. It is the task of each survey designer to select those items necessary for the task, in particular modelling task at hand. The hypotheses underlying the modelling should be identified before the survey construction to allow the inclusion of the relevant and the exclusion of the interesting but irrelevant items. The following item by item discussion will try to reflect the various current demands:

- support for monitoring by the regulator
- support for modelling at different time horizons
- support for dynamic modelIing
- support for models of activity participation and scheduling
- information about the use of information technology
- more detailed time and cost accounting
- better accounting of environmental effects of transport
- consistency with Census definitions or other official statistics used from weighting and cross-checking

The needs of researchers interested in transport safety and travelIer attitudes will be ignored in this paper.

5.1 Household

The number of items regularly asked about the household as whole is relatively small, although it can be extensive, when the travel diary is, for example, part of longer survey on housing. The items fall into six groups:

- public transport accessibility
- Telecommunication links/information sources
- Location/kind of residence
- Household income
- Number of vehicles
- Number of household residents

The questions related to parking, which sometimes are included among the household questions, will be discussed separately below.

Most surveys assume that all persons living at the same address are one household. This is not necessarily the case. It is therefore necessary to establish the actual number of households at the address in a first step ideally using the methods and definitions of the national census'.

Public transport accessibility

The questions about public transport accessibility establish either the spatial/temporal distances to the n-nearest stops of any mode of public transport or the shortest distances to n-different modes of public transport. The choice between these formulations depends on the level of public transport provision with the modelling aims kept in mind.

In the case of modelling the awareness of public transport availability either formulation will suffice, although just establishing spatial/temporal distance is not sufficient given the need for the awareness of service levels. Certainly for use in mode choice/departure time contexts these formulations might be either incomplete or misleading. Incomplete, as they do not establish the awareness of service levels or timetables, and misleading as the relevant stop could be the n+i nearest stop, which is possible due to differences in service levels in dense public transport networks. A further stop might provide more relevant lines, a smaller headway or a lower fare.

A better formulation might be to ask the respondents to indicate those public transport services (lines) they know of in the vicinity of their home and where they would try to board them. In the definition of vicinity the designer would have to judge the maximum distance/time people are willing to walk to a public transport service. This limit is known to change for different classes of service, e.g. bus versus Underground. A limit in terms of the n-most used services might be used to limit the survey time required. The formulation should also let the respondents to indicate services they have never used, but are aware of, if they cannot name n services they have used. In this formulation it would also be reasonable to make this question person specific. It might also be supplemented by time-of-day specific questions about service levels and prices.

The distance/walking time duration estimates are interesting in their own right, especially if they can be compared with true shortest distances within a GIS-system. The focus of analysis should be on establishing the degree of misperception, although one should keep in mind, that the users might choose to walk longer distances for other reasons. Without such an analysis the use of these estimates

[7] From a European perspective one can only hope that the Census offices will develop a common definition.

can be seriously misleading, as it is well established that time and distance estimates are skewed (Bovy and Stem, 1990). The analysis could be enriched, if the respondents were asked to indicate, how often they have used each service within the last x days or weeks.

Telecommunication links/information sources

At the moment travel diary surveys only collect information, if at all, about the presence of a telephone in the household. An exception was the 1993/94 French National Survey, which established telephone use during certain types of journeys. In telephone-based surveys this question is or should be replaced by a question about the number of telephones in the household to allow the proper weighting of the results This narrow focus needs to be widened in the context of the introduction of ever more travel-related information services.

At the household level the emphasis should be on resource availability and not on actual use, which should be covered at the activity/movement level. Depending on local circumstances the presence of the following could be checked:

- Television
- Teletext, Minitel or a similar service
- Radio
- Local newspaper
- Pagers
- Number and type of telephones (mobile versus fixed)
- Home computer
- Access to a computer-based information service, such as CompuServe, America On-Line or similar

Type of residence/household income

Household income is an essential variable in most transport models. Unfortunately there must always be doubts about obtaining it by survey. The item non-response is normally large requiring the imputation of the value for the non-respondents. In addition, the definition of income has to be chosen very carefully, as various monetary and non-monetary transfers can change the true income of a household or person even assuming that persons are willing to report the income truthfully. It would certainly be fruitful and may be even necessary to crosscheck the results of the rather simple-minded income questions in travel diaries with the results of surveys dedicated to the inquiry of household income and expenditure patterns, such as the UK Family Expenditure Survey.

Type of residence in terms of type of building, type of tenure, size of accommodation has been used as a dummy for income and life-style. Their measurement should be less faulty than the measurement

of income. This might balance their crudeness in modelling contexts especially if further indicators of consumption could be added (number of long-distance holidays, type of vehicles, number and type of household appliances, existence of second homes etc.). In the case of home owners it might be useful to establish the age of the mortgage to obtain an idea of the financial load on the household budget. This would be in addition to "duration of residence", as these two items do not have to be identical (council house sales, change from renting to owning)

Number of household residents/Number of visitors

These items are mostly used as controls for the detailed person and vehicle instruments later. Although in a number of cases they contain the only information obtained about the younger members of the household.

The role of visitors in travel diary surveys is ambiguous. Some surveys include them and request that they fill in travel diaries, while other ignore them completely, although it is probable that they will influence the schedule of the household in question. From an activity-perspective it would be recommendable to at least establish their presence and even better obtain a travel diary from them to account for their influence on the behaviour of the others. In this context, it would be necessary to establish whom among the household members they are visiting.

Other items

For the modelling of destination choice it might be useful to obtain information about the length of residence at the current location and at other locations in the area. This could be a useful indicator variable for the level of familiarity with the local activity opportunities and the transport networks.

Some of the recent US-surveys in the sample included a question about the number of visit to the home by non-household members, in particular delivery services. While not strictly subject of a travel diary, this question is interesting for the analysis of the trade-off between in-home and out-of-home activities.

5.2 Person

The description of the person in the travel diary is relatively rich, but rather frozen in time in its assumptions about the relevant attributes. Some of this inertia seems to be due to the need to match the secondary statistics used for weighting purposes. The items can be grouped as follows:

- personal characteristics
- work details
- transport access
- usual travel arrangements

Personal characteristics

This group of items places the person within its socio-economic context. Sex is nearly always established in practise and should actually always be established given the large influence of gender on the social roles of the person[8].

Most recent surveys have used "Year of Birth" to establish the age of the respondent. From a comparative perspective this is clearly preferable, as year of birth does allows a precise identification of cohorts, while age can lead to problems when two related surveys are conducted at different times of the year. There is also empirical evidence that formulating the question as "Year of Birth" decreases non-response and improves accuracy. In addition, the increased flexibility in entering retirement reduces the importance of knowing the exact age of the respondent. This now matches the ambiguities arising from using age to determine the type of school young adults are attending in the differentiated school systems of Europe and elsewhere, in particular where students can be asked to resit whole school years.

If exact placement in cohorts is desired, then it would be better to establish, whether the person was party to the defining event. An example would be a shift in the minimum age for the acquisition of a driving licence [9].

Year of birth should always be established exactly. The survey should not use age bands for the original recording.

Race or nationality is a rarely asked item, although all surveys in this sample come from countries where race or nationality can play a significant role in the determination of income and social role quite independently of the potential language difficulties in filling out the survey form. While translated versions of the instruments are used in European and American surveys to overcome language problems, it could not be established from the original literature, if in the non-European cases the race/nationality impacts were subsumed in the income variable or in location specific dummies added

[8] This obviously ignores the possibility of a mismatch between biological sex and socially adopted gender role.

[9] Other, non-transport, examples are: abolition of the draft (UK or US), changes in the beginning of the school year (Germany), reduction in the length of military service (Germany, France or others), shifts in minimum retirement age etc.

by the analyst. If included, the use of the national census definitions for ethnicity seem to be the easiest and most productive approach for the travel diary, as it allows the use of the secondary statistics, although the usefulness of these definitions in identifying groups with common experiences can be doubted. In addition, they will not be comparable internationally.

The secular trend towards smaller households simplifies in many cases the identification of the relationships within a household. But other trends create complex patterns of household organisation, which current travel diaries are ill equipped to capture. The problems are confounded in panels (Hill, Servais and Solenberger, 1992). Examples are: increased youth unemployment and divorce rates leading to young adults never leaving or returning to the family home; shared housing occupied by unmarried couples, groups of friends, quasi-boarding houses or many other arrangements. The identification of the degree of resource sharing and time coordination is crucial to the modelling of both long run and short run travel decisions.

The question about the relationships within the household might be formulated as:

You are . . . . of the person in the first column:

- the spouse/partner
- grandparent
- father/mother or other senior relative (aunt, uncle, in-laws etc.)
- the son/daughter or other junior relative (in-laws, niece, nephew etc.)
- the grandchild
- flat/housemate
- a short-term visitor (a week or less)
- a long-term visitor (more then a week)
- other, please specify:

The results from this formulation can be ambiguous as it does not fully specify the relationships between the persons in the other columns of the questionnaire, but it remains relatively simple. An unambiguous formulation would require the time consuming identification of all relationships within the household, maybe using fewer categories (See Figure 12)

A subletter will normally constitute a separate household.

The exact marital status of each household member should be requested in a separate question.

The level of education achieved by the respondent is regularly requested by surveys in Germany and other continental European countries as a further dummy for income and social status. From an activity-scheduling perspective past schooling is not as important as a current commitment to further

Figure 12 Capturing all relationships in the household

Relationships

Spouse or partner	**Sibling (brother or sister)**
Parent	**Other kin**
Child	**Not related**

Relationship of:	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7	Person 8
person 1 to								
person 2 to								
person 3 to								
person 4 to								
person 5 to								
person 6 to								
person 7 to								
person 8 to								

THANK YOU FOR ANSWERING THESE QUESTIONS

Source: RAC, 1994

education. It seems therefore advisable to separate the question into up to three parts:

- Which of the following certificates/qualifications do you hold":
  - None
  - Primary school diploma, Hauptschulabschlut3 or equivalent
  - Junior secondary school diploma/GCSE's/Mittlere Reife or equivalent
  - Highschool diploma/Abitur/A-levels/Baccalaureat or equivalent
  - Vocational training certificate/Gesellenbrief/NCVQ's or equivalent
  - BTech, Meisterbrief or equivalent
  - BA/BEng/BSc or equivalent
  - Diplom/MSc/MA/MEng or equivalent
  - Other, please specify
- Are you currently studying for a qualification ?
  - No
  - No, but I am attending continuing professional education courses

[10] From an international and comparative perspective it would be useful, if the categories were explained in the reports in detail, e.g. in terms of minimum years of full-time schooling, share of practical work, degree prerequisites etc.

- Yes, part-time (daytime)
- Yes, part-time (evening)
- Yes, full-time
- Yes, distance-education course
- Yes, in the following other way:

- You are studying for:
  (Repeat the list from above)

In line with the questions about information access for the household as a whole, it could be useful to establish, if a person carries devices such as:

- Message pager
- Mobile phone
- Palmtop computer with modem

Work details

Traditionally travel diaries have tried to capture the work status of a respondent by offering a selection along the following lines:

- Retired
- Housewife
- Full time work
- Part time work
- Unemployed
- Student

combined with a question about the type of work, often mixing profession with legal status by offering:

- Self-employed
- Blue-collar
- White-collar
- Farmer
- Help in family business

It is doubtful, if this approach is still suitable, as the definitions of work are changing and as many persons are engaged in multiple commitments, which become relevant to transport modelling. Any approach should therefore disentangle:

- Whether the respondent has paid work or not
- Whether the respondent is looking for (further) paid work
- How many hours the respondent has committed to different types of activity (first job, second job, volunteer work, education, homework/child care), but without an attempt to establish a complete budget
- Number of employers, the number of hours worked for each and the hours worked
- Level of timing flexibility for paid and unpaid work (fixed, shift etc.)
- Type of work/profession for each job held and role in each (employed/self-employed)

. The exact wording and presentation of this set of questions requires extensive testing. While it is more complex, it avoids the simple-mindedness of the traditional approaches, which can seriously misrepresent the complexity of the situation of a respondent with regards to timing constraints. Part of the testing should be the testing of a suitable definition of the time frame for the answer. The words "normally", "regularly" should be avoided and replaced by "during the last month" or "this week".

It is tempting to try to establish further fixed out-of-home commitments, such as church attendance, bridge afternoons, sport etc., but their inherent flexibility and their possibly large number advises against this attempt.

A small number of surveys requests information about personal income instead of asking for household income. The problems outlined above apply.

Transport access

A clear understanding of the modes of transport accessible to each traveller in the long and short term is crucial to the successful modelling of transport decisions. Unfortunately, the concept of "car availability" has long bedeviled the design of transport diaries. While this idea has intuitive appeal, it is very difficult to define and therefore problematic in its measurement. For example does vehicle availability mean:

- I could have taken the car any time I liked for what ever time I liked
- I could have taken the vehicle for the duration of the planned activity the moment I wanted to leave without asking anybody else in the household or
- I could have taken the vehicle for a while 30 minutes after I had wanted to leave without asking anybody else or
- I could have taken the vehicle for an hour after five minutes discussion with the other members of the household and for three hours after ten minutes discussion or
- I could have used a vehicle now for an hour, if I had asked yesterday etc.

It is clear, that for the short-term modelling of vehicle use only the first two definitions have any value, but this places the question about vehicle availability into the context of the trip/activity. In the context of the decision making at the day level the concept of availability becomes too complex for operationalization due to the dependence of the interval of availability on the time-of-day and the amount of within-household negotiation.

Still, where possible the survey should find out, which options can be excluded. The questions related to the different vehicles and the access to them will be discussed in detail below. The one main question under this heading is then the ownership of driving licences. Depending on the legal

framework, the survey should establish all types of vehicle licences held. This would mean in Germany: moped, mokick, motorcycle, car, truck and bus, while other countries might offer only a general driving licence. The number of licences could act as a useful indicator of the commitment to motoring and therefore mode choice. The duration of licence holding, a rarely requested item, could provide a similar indication in countries, which do not offer a widely differentiated set of driving licences [11]. The new standard European driving licence will simplify comparison within Europe.

The travel diary should equally establish, if the person is able to use a bicycle.

Many surveys establish the regular mode to work and the expected characteristics of the average journey, sometimes extending this questioning to the possible alternative modes. While such data is not useful for the modelling of mode choice at the daily level, it is useful for the modelling of the longer-term car ownership, season ticket ownership decisions which are based on the expectations formulated in the answers to these questions. As above, the expectations should be specific to a time period specified by the survey: “The average travel time of the last month ?". Experiments are required to clarify, whether this approach is worthwhile and workable.

The other main question is the presence of any permanent mobility handicap. A small number of surveys has included this question mostly by asking about the difficulties experienced in the access to particular modes. In addition, there have been a number of specialized surveys focusing exclusively on mobility handicaps. It would be worthwhile to experiment with different sets of questions to identify the most parsimonious one required to delimit the strength of the mobility handicap (preferably including time-of-day specific handicaps such as night blindness). But see Figure 11 above for a simpler approach.

5.3 **Vehicle**

The level of detail with which vehicles have been described in travel diaries varies greatly, as does the placement of these questions in the overall design of the instrument. Given the number of questions about the vehicle it seems prudent to place them into a separate instrument in line with the person or household instrument. The questions can be grouped into four areas:

[11] The duration of licence holding has additional historical value, as it allows to study the establishment of the motorized society during the postwar period (Axhausen, 1991).

- technological detail
- information sources
- ownership and funding
- access and use

Bicycles, season tickets, discount passes, membership in car sharing schemes or regular car/van pools should be covered in the same way, as they also provide mobility to their owners and users.

Relevant vehicles

The definition of the vehicles, which the respondent should include is not selfevident as there are different sets of vehicles, which are of potential interest to an analyst (See Figure 13):

- the vehicles ***owned outright*** by the respondent, i.e. those for which the respondent is the legal owner
- ***the vehicles controlled*** by the respondent, i.e. those owned and those made available to the respondent
- ***the*** vehicles ***fully/partially paid*** for by the respondents', i.e. those to which the respondent has made/is making a contribution towards the fixed and/or variable costs, but excluding commercial rental cars, but including cooperative car-sharing arrangements.
- ***the*** vehicles ***available/accessible*** to the respondent, i.e. those which could have been used by the respondent from those owned or controlled by the respondent, household members, family, friends or colleagues without an obligatory contribution by the respondent towards the fixed or variable costs
- ***the*** vehicles ***driven*** by the respondent during the survey period or during the survey period and some time before
- the vehicles ***used*** by the respondent during the survey period or during the survey period and some time before, i.e. used as driver or passenger
- the vehicles ***parked overnight*** at the home address, which might or might not include all non-operative vehicles
- or any combinations of these sets

These sets do not necessarily form a series of supersets and subsets, as vehicles can for example be on permanent loan to a child living elsewhere, can be owned by a grandparent living elsewhere etc.

From a choice modelling perspective one is interested in the available/accessible vehicles, but the term available/accessible requires a very stringent definition to be useful, in particular in households, where a vehicle is shared or for cars owned cooperatively'*. The definition would have to specify the level of necessary prior notification of the other stakeholders/users of the car, the time frame of availability (starting time and duration) and the trade-off possibilities within the group of stakeholders/users (times:

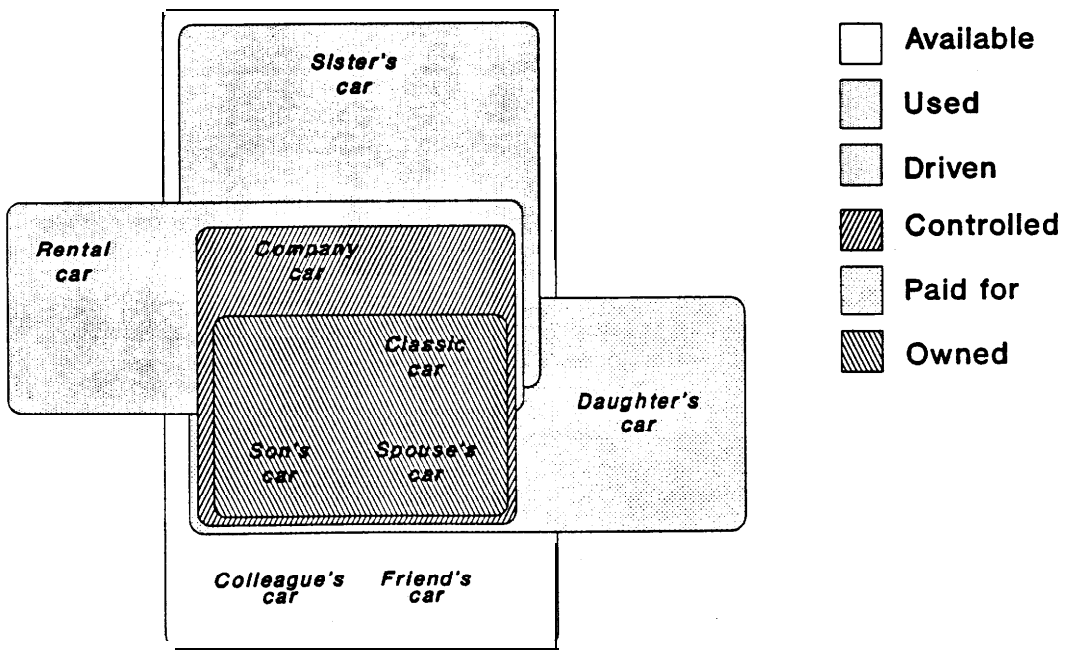
[12] In Germany, Austria and Switzerland, but also Canada, a growing number of cooperatives operate car-sharing arrangements, which function as low-formality rental car agencies, but require the drivers to own a share of the working capital or to make a substantial deposit. In addition, there must be a large, if unknown, number of informal car-sharing arrangements among groups of friends or relatives.

"You can have the car now, but then not this afternoon", tasks: "If you want the car this evening, then you will have to pick up the parcel at the store", goodwill: "You can have the car this weekend, but. we will remember this next time"). While it would be interesting to research this issue, it seems to require excessive effort in the context of a travel diary.

The issue is now to define the second best approach to capturing the choice set of the respondent. It is obvious, that the respondents should list all vehicles they have driven during the survey period. A requirement to provide the full details for all those used, i.e. including those used as a passenger would be asking for too much, as the respondent is unlikely to know all the required details. A full description should be requested of those owned and driven and a partial one of those used a passenger.

While the list of vehicles driven during the survey period gives an idea of the available vehicles, it might indicate too small a number. To cover this wider set, the respondent could therefore be asked to list also the vehicles driven in some period prior to the survey (one week, one month etc.). A period of one week is suggested as this period of recall should avoid any serious memory lapses.

Figure 13 Different sets of vehicles of interest



In addition the survey should establish the vehicles owned, whether they are currently registered, where they are currently located and whether they are ready to use, which is especially important for bicycles and motorcycles.

Technological detail

The amount of technological detail asked will depend on the type of emission or noise model to be used in the impact evaluation and on the type of car ownership modelling. Typical items would define the value and the technology of the vehicle:

- make
- model
- body type
- number of passenger seats
- year of production
- year of acquisition
- type of fuel used
- total mileage
- mileage since acquisition
- motor size (cc, number of cylinders, power)
- weight
- odometer reading at the begin of the survey period
- odometer reading at the end of the survey period
- VMT during the last year
- presence of catalytic converter
- date since last tune-up/inspection

Further items could be included, if required by the models to be used.

Information sources

In parallel with the household and person questions the survey should include questions about the information technologies available in the car, such as a car-phone, a car-radio with and without RDS-TMC (Radio Data System-Traffic Message Channel), a fax or the type of route guidance system.

Ownership and funding

The survey should identify the legal owner and/or the person to whom the vehicle is legally assigned. The literature is unambiguous in identifying the costs of vehicle use as one of the central factors for mode and destination choice. Unfortunately, the cost definitions vary considerably between studies. But there is agreement about the need to collect the costs carefully. Compounded with the question of costs is the question of ownership and funding, especially in the case of company cars. While there is agreement about the need to distinguish between fixed and variable costs matching the time horizon

. of the decision, there is no agreement about how to divide these two categories further. A possible list of cost categories, which requires testing, is:

- Fixed
  - Purchase price
  - 'Leasing costs
  - Interest costs
  - Costs of major repairs
  - Costs of minor repairs
  - Insurance
  - Tax
- Variable costs
  - Fuel
  - Tires
  - Oil and other consumables
  - Cleaning and similar routine maintenance
  - Tolls
  - Parking fees ,
  - Parking tickets and similar items

It would be ideal, if for each of these items one could determine the share of each contributor:

- for the fixed costs:
  - employer
  - all persons in the household (e.g. parents for their children)
  - persons outside the household (e.g. grandparents, partners)
- for variable. costs:
  - employer
  - owner
  - user
  - members of the car pool
  - others, such as parents

In addition, it might be worthwhile to find out, if the taxpayer contributes to the costs through tax rebates, such as the German income-tax mileage allowance for commuting, or through the recognition of the vehicle costs as business expenses.

In spite of this rather comprehensive approach there remain ambiguities; for example: the informal understandings between employers and employees, that the fuel costs of all family vehicles and not just of the company car are claimable or the willingness of friends to undertake repairs for free in their leisure time.

Useful from a dynamic perspective and as a further indicator of the attitudes towards motoring the survey could request information about the status of the vehicle as either a replacement for a previous vehicle or as an additional vehicle [13].

Access and use

While a generalized availability question is too open to be useful, it is possible to use sharper defined terms to capture some of the same information. The first is the right of access of each household member to the vehicle, i.e. which members are allowed to use a car, motorcycle or bicycle in principle, if not in fact. In some countries insurance regulations limit this number of persons by requiring that they are explicitly named in the insurance contract.

The second is the actual use of a vehicle during a specified period, e.g. the last week or month. In contrast to the subjective assessment of availability actual use indicates actual availability, although underestimating it. The actual use can be measured at different levels of detail each allowing better informed assumptions for mode choice modelling:

- Extent of use
  - use or non-use
  - number of miles driven
  - number/share of hours of control (i.e. driving times and activity times)
- Timing of use
  - by type of day-of-week (week day or weekend)
  - by day-of-week
  - by time-of-day
  - by type of day-of-week and time-of-day
  - by day-of-week and time-of-day

Clearly, there is a requirement to test where the trade-off point is between level of detail, amount of model improvement, response rate and data quality.

5.4 Movement

The measurement of the amount and circumstances of out-of-home movements and their associated activities is the core of the travel diary. The different approaches to this measurement have been described above. The choice of approach will depend on the geographical range of the survey and on the intentions for its use. For a national survey with a descriptive perspective a trip-based approach

[13] A full history of vehicle holding would be interesting, but normally excessive

could be best, whereas for a local survey with a modelling perspective a stage-based approach could be better.

The activity-based approach has so far mostly been combined with a trip-level description of movement. The evidence pointing to better reporting of trip numbers makes this approach attractive, but the lack of movement detail can be a disadvantage for a local survey. Experiments combining activity-based memory joggers and/or activity-type checklists with stage-based movement reporting might be of interest.

The non-recording of activities. because they were not undertaken beyond a certain distance, should not be adopted, as it must disturb the recall of the activity chain and will destroy the logic of the day.

It is interesting to note that the movements towards activities, which had to be dropped because of a lack of parking or time have not been recorded by any of the surveys in the sample. The number of these might be small overall, but significant for certain locations and times. It would be interesting to attempt to capture them[14].

The items related to movement can be grouped as follows:

- time and space
- modal detail
- information use
- company and situational handicaps
- parallel activity

Time and space

Start and end times of the movement are asked in all recent surveys covering all modes. A proper explanation of what the respondent should include here is essential to avoid the possible ambiguities. Special efforts should be made to discourage the rounding to the nearest five minutes, in particular if the data is going to be used for the estimation of speeds and environmental assessments. Equally, waiting times need to be clearly identified.

Local surveys tend to request the detailed address of the destination, while national/regional scale surveys tend to request a crude location indication in combination with a travel distance estimate or odometer reading. While the use of network models to supply the distances travelled for modelling

[14] The purpose could be described as "I travelled there just to turn around, because I had to drop the activity I had planned to do"

avoids the known biases in distance estimation, it does not avoid the danger of understating distances especially if the survey is not careful enough in establishing brief minor activities which can involve . detours (e.g. the stop at the laundry or the posting of a letter).

The address is normally specified as a street address. This seems excessive and might discourage respondents from participating. It would be useful to adopt more widely question wordings, which request the highest level of precision known to the respondent. This could be the street address, the nearest street comer, the name of the store, the name of bus stop or tube station, a local landmark. The analyst would have to match these descriptions with external databases about the study area. The extra costs of this step should be balanced by improved response rates and reporting accuracy.

Some surveys establish the land-use of the trip destination, which can serve as a useful reminder of the movement to the person, especially if primary land-use and activity purpose did not match exactly.

The further subdivision of a movement by its characteristics, e.g. search versus non-search[15], congested versus free-flow, freeway versus arterial etc., has been attempted in the past. While this level of detail would be useful for many purposes, the quality must be doubtful, in particular if there is a large time lag between the experience and the recording. For this purpose half a day or even one hour could already be a large gap. A listing of the main roads taken, common in early travel diaries and used again recently, could be a substitute approach for the last two divisions listed above.

Modal detail

The items grouped together under this heading concern the modes used and the attendant details of their use. The type of mode is mostly established using a number of predefined types plus an open "Other" category. The number of types varies substantially between countries and surveys. Some surveys even offer different lines of the public transport system as a predefined model. [16] The description of the public transport modes is especially difficult due to the large variability in operating regimes, technologies and markets served by the different forms of public transport (See Vuchic, 1981 for a classification attempt).

[15] The inclusion of parking search would open up a whole set of further questions. See for example Axhausen, Polak, Boltze and Puzicha (1994)

[16] In international comparisons this variability leads to a small and crude set of comparable categories, especially as the information about the different modes necessary for a finer classification is never spelled out in the original reports as it is common local knowledge.

The typical details asked for public transport stages are ticket type or fare and line or stops used. The determination of the exact fare is always desirable. the knowledge of the ticket type and line/stops is only of interest for local surveys. The longer term commitments of season tickets or other discount tickets should be covered at the person level.

While parking details (discussed below) are the most important details for private vehicle journeys, the travel diary should collect information about tolls, other payments and about the exact ID of the vehicle used. It should also request information about car pooling and its arrangements.

Information use

Data about the information sources available and actually consulted during a trip/activity will become more important as information systems spread (See also Claisse and Rowe, 1993, for the current situation). Unfortunately, the large number of different systems will require a crude classification for national level surveys, while local surveys will be able to explore the issue in more detail. A list of categories might include among others:

- Radio
- Telephone
- Route guidance system
- Variable message signs, e.g. for parking guidance
- Booking systems for parking spaces
- Time-table information systems
- Public transport route guidance systems
- Pagers

Company and situational handicaps

Travel diaries now regularly ask for the total number of persons in the vehicle. This information is interesting on its own, but not as informative as maybe thought, as it does not inform us about the social relations within that group of people or about their characteristics. Four adults in a car forming a regular car pool results in different costs and obligations than a random group transported home after a party. It would be too cumbersome to inquire about each person in the car and its association with the respondent, but it should be possible to distinguish between the number of household and non-household members.

Situational handicaps do influence mode and other travel choices. They should therefore be recorded at the movement level. It will be necessary to experiment with possible classification schemes, as current practise has mostly ignored this item. A possible list is:

- heavy cases, bags or equipment
- wearing clothes requiring special attention, such as a suit or evening gown
- an animal
- a baby (under 2 years)
- small child (over 2 years)
- other persons requiring attention or support

Parallel activity

Time in transit is used for other activities, which are conducted in parallel with driving or travelling. These activities influence the disutility we experience from travel. It seems therefore useful to obtain information about the type and extent of these secondary activities.

5.5 Parking

There can be no doubt that parking, its availability and price, has a disproportionate influence on mode and destination choice over the daily and sometimes even longer time horizons. For this reason, as noted earlier, recent surveys have given more attention to parking. Unfortunately there are multiple ways to collect the relevant information Parking can be attached to a car, as the main family car in the garage of the family home, to the person, as in the case of the company car park, and to each movement. The level of detail required to understand the situation varies between different parking locations especially as the funding arrangements change.

It seems most parsimonious in terms of the time required to establish parking at home as an attribute of each vehicle, parking at work as an attribute of the person and the remaining parking as an attribute of the stage/trip. The items requested should be:

- type of parking (off-street/on-street, protected/unprotected, or a different more detailed scheme)
- ⍰□·♦
- sources of funding
- walking distance/duration to the destination
- legality of the parking space

5.6 A c t i v i t y

Currently travel diaries provide only one item about the activity at the end of the trip, the activity purpose. This is consistent with the dominant modelling perspective, which is primarily interested in the movement leading to the activity and which assumes that the observed patterns reflect an optimal

plan established at the beginning of the day. The growing interest in modifying the balance between in-home and out-of-home activities or in changing the activity schedules of the travellers throughout the day requires a better understanding of the constraints of the activity allocation and scheduling process.

The difficulties of including activity categories, which would allow the differentiation of in-home and at-work activities, such as eating, homework, child care, watching tv, talking on the phone etc., have been discussed above. The main problem lies in the non-linear growth of activity episodes. It seems unlikely that this problem can be addressed in the context of the travel diary with its distinct activities.

Nevertheless, it would be interesting to introduce "Sleeping" or "Resting" as a separate activity category to allow an assessment of the population at risk from noise at different times of the day; just as some recent surveys have divided the time at home between work and non-work time.

Still, there are a number of aspects of the activity performance, which could be established and which would improve our understanding of the decision process of the travellers and of the potential for change. They are:

- Time window: possible earliest and latest start times for the activity on the current day
- Original activity timing: start and end time of the activity as planned at the beginning of the day or when first planned since
- Importance: priority of the activity in relation to the other activities of the daily activity programme
- Commitment: level of commitment to the other persons participating in the activity or rely on it
  Substitutability: ability to replace the activity with a different one of the same overall purpose at this moment
- Flexibility: ability to forgo the activity at this moment
- Planning interval: time since the traveller planned to engage in this particular activity (see for a recent example of this: Dijst, 1994)
- Execution horizon: time before which the activity has to be executed
- Frequency: number of activity episodes per time interval
- Regularity: commitment to engage in the activity in a fixed rhythm
- Money spent on or during the activity (entry fees, expenses, shopping expenditure)
- Assessment of success of the activity (share of shopping list accomplished; activity as expected, better then, worse then expected)
- Size of the party, may be split between household- and non-household members
- Resources available for the activity and trip, in particular vehicles

This set covers an important part of the data needs of the scheduling models currently under development (Axhausen and Gärling, 1992 or Axhausen, 1995). The matching set about the prior assumptions about planned activities goes beyond the scope of a standard travel diary. The prompt for

this set is “What activities have you got planned for the rest of the day/week ? and what do you now think with regards to ... ".

In parallel with movement, the use of the different available travel information sources should be checked.

6 MODULES OF A FUTURE TRAVEL DIARY

The discussion of the last section has indicated the need for a substantial number of items to be added to the current set of items. It is clear that it will be impossible to ask of all of these all respondents all of the time. There will have to be a selection reflecting the purpose to which the results are going to be put. Ideally, we would like to be able to match these purposes one-to-one with subsets of items discussed, allowing us to put a surveys together from pre-tested modules. The remainder of this sections tries to divide the questions into modules and to associate specific purposes and modelling perspectives to them. It should be taken as a first attempt to stimulate discussion.

Beforehand, the possible perspectives to the data need to be classified into a small number. Otherwise the exercise would be impossible. The main dimensions of this classification are:

- the perspective of the ***survey user.*** A regulator is likely to stress a descriptive perspective, the need for longitudinal consistency and the wish to evaluate past and current policies, whereas a service provider will stress a marketing perspective, the need for consistency with the current situation and the wish to model future policies. The perspective of the former will stress the size and distribution of the impacts of different policies, while the later will stress the financial and market share implications”.

- the perspective of the ***survey*** use, which is either directed towards the description of the status-quo and the development which lead to it, or the modelling of future choices?

- ***the time horizon*** of the modelling perspective. The choices and plans of the travellers have different time horizons. Some address the task immediately in front of the person: Whether to walk or to take the bus to the next activity ? Others address commitments over longer time periods: Where do we want to live ? Do we want a car or not ? Still others fall in between, such as the allocation of tasks of the week within a household or the arrangements for the only household car.

[17] The provider of public goods, such as most roads, is in the contradictory role of being a service provider, while having to achieve regulatory aims.

[18] The limitations of revealed preference data for such modelling, especially of yet unobserved alternatives, should be kept in mind.

While each decision and resource has its own timetable and time horizon, it is useful to use just three:

- ***short term*** referring to choices at the stage, trip and journey level by the traveller given the resource constraints of the day
- ***medium term*** referring to choices at the daily and weekly level, some of which are individual decisions, while others are joint decisions of the household.
- ***long term*** referring to plans and choices committing the household/person over longer then weekly periods, in particular with regards to household resources.

Table 2 to Table 7 list the suggested items for a comprehensive travel diary. The selection of items is guided by current practise and by the current modelling approaches, which consider travel behaviour as a function of the generalized cost of travel, the socio-economic make-up of the persons and the constraints of the time-space environment. Frameworks other then utility maximisation, which is the current standard, might include different items, but which is not clear at this time and they have therefore been omitted.

The discussion of the items describing the movement of the respondents distinguishes between items relevant to the stage, trip and journey level. While some of the items only make sense, if asked in a stage-based or trip-based design, the are others, which refer to items which independent of approach remain constant for the whole of the trip or journey. For example, the availability of a vehicle or season ticket has to match the duration of the particular journey or trip. It can only be established at the start of that journey or trip.

Table 8 suggests a core survey made up from modules related to household, person, vehicles, movements and activities. This core represents the author's assessment of a what a travel diary should contain to provide a minimum description of the trip making within the survey area. The other modules - short-term, medium-term, long-term and environment - would have to be added to permit a richer description or modelling. As these suggestions reflect the author's assessment of data needs for different types of models, it is clear that they need to best tested - and changed in the light of the results of these tests.

. Table 2 Suggested items for a comprehensive travel diary: Household

Item	Description
Location	Home address
Size of residence	Some measure of the size of the accommodation, such as number of rooms, square feet of usable space and of garden, plot size etc.
Type of building	detached, semi-detached, terraced, flat: private, subsidized but privately owned, public sector controlled, public sector operated
Tenure	
Duration of residence	
Duration of ownership	
Age of mortgage	
Number of members	
Number of visitors	
Relationships	Matrix of relationship between all members of the household, plus an indication of the persons visited by the visitors
Parking spaces	Number, kind, location and cost of the parking spaces owned or rented by household members
Communications	Inventory of the media available (number and type) to the household (daily newspapers, telephones, pagers, television, teletext, ...).
Income	Indication of disposable income of the household as whole
Visits	Number of visits to the residence, especially for the delivery of goods or service provision (preferable with an indication of the access modes)

Table 3 Suggested items for a comprehensive travel diary: Person

Item	Description
Sex	
Year of birth	
Marital status	
Education level	
Profession	
Ethnicity	Indication of ethnicity using the national Census-standard
Language	Self-assessed level of proficiency in the relevant languages of the survey area
Commitments	Indication of the firm commitments of the respondent current during the survey period; at minimum work status (working, searching for work, not working) and participation in education. Ideally indications of further firm commitments
Paid jobs	Number and type of paid positions
Hours worked	Number of hours contracted for and average over the last month in each
Working hours	Contractual time table(s) for the survey day
Flexibility	Level and type of flexibility of the working hours (Flexitime, shift work etc.)
Mode to work	Most common mode to work location(s) during the last week/month ..
Travel times	Expected travel times for the modes used during the last week/month ..
PT accessibility	n most frequently used public transport services in the vicinity of the home (or work place) stop, distance (min/m), service number, destination used for
Car pooling	Indication of participation in a car pool and the cost, sharing arrangements
Parking	For employer/school-provided parking: type, location and cost; otherwise most common type, location and cost over the last week/month...
Education	Type of current course
Driving licence	Types and length of ownership of the different licences held
Cycling	Indication of the ability to cycle
Vehicles & tickets	Cross-reference to all household vehicles owned and used
Income	Indication of the disposable income and its sources (wages, retirement pensions, disability pensions, parental allowance, transfer payments, i.e. grants, welfare, housing benefit etc.)
Handicap ,	Types of mobility handicap, both temporary and permanent
No mobility	Indicator of why no out-of-home activities were performed on a survey day
Start location	Location at the beginning of the first survey day (e.g. at 3:00 a.m.)

Table 4 Suggested items for a comprehensive travel diary: Vehicles

Item	Applicable	Description
Make	ODU	
Model	ODU	
Body	ODU	Type of body (saloon, estate etc.; touring bike, mountain bike etc.
Seats	ODU	Number of regular seats
Year of production	0	
Year of acquisition	0	
Replacement status	0	Indication, if the vehicle replaced an earlier one or was an additional purchase
Fuel	0	Type of fuel required
Motor	0	Indication of motor size: cc, number of cylinders, power
Weight	0	
Converter	0	Presence of a catalytic converter
Current mileage	0	Odometer reading at the start of the survey period
Mileage	0	Odometer reading at the end of the survey period
VMT	0	VMT during the last year
Check up	0	Date of last inspection of the motor
Information sources	0	Types of information sources attached to the vehicle (radio, RDS-TMC, telephone, route guidance systems etc.)
Owner	ODU	Reference to household member or outside institution
Responsible	0	Reference to the legally responsible household member
Users	0	List of users among the household members and their level of use
Fixed costs	0	Distribution of fixed costs between the different persons and institutions involved; maybe broken down by further categories
Variable costs	ODU	Distribution of variable costs between the different persons and institutions involved; maybe broken down by further categories
Home location	0	Indication of where the vehicle was located during the last week/month
Parking	0	Which, if any, of the household parking spaces is allocated to this vehicle for overnight parking

0 Vehicles owned by household members
D Vehicles driven, but not owned by household members (associated with person form)
U Vehicles used, but not owned by household members (associated with person form)

Table 5 Suggested items for a comprehensive travel diary: Season tickets and similar

Item	Applicable	Description
Type	**OU**	Type of ticket
Area	0	Area covered by the ticket
Validity	0	Period of validity of the ticket
Date of acquisition	0’	Month
Replacement status	0	Indication, if the ticket replaced an earlier one or was an additional purchase
Owner	OU .	Reference to household member or outside institution
Users	0	List of users among the household members and their level of use
Fixed costs	0	Distribution of fixed costs between the different persons and institutions involved
Loan	0	Availability and amount of a season ticket loan
Variable costs	OU	Distribution of variable costs between the different persons and institutions involved

0 Tickets owned by household members
U Tickets used, but not owned by household members (associated with person form)

Table 6 Suggested items for a comprehensive travel diary: Movement

Item	Applicable	Description
Start time	ST	End of last activity
End time	ST	Start of next activity - end time of movement
Start wait	S	Duration of wait before the start of the movement
Waiting time	T	Amount of waiting and transfer times during the trip
End location	ST	
Mode	S	
Mode sequence	T	
Route	ST	Indication of route by major facilities used (bridges, tunnels, motorways, Public transport lines etc.)
stops	T	Public transport stops used
costs	ST	Total amount spent on tolls or fares and share covered by respondent
Parking	ST	Type, legality and location/distance to destination; total cost and share of respondent: cross reference to employer parking or parking space at the home
Company	ST	Size of company and break down by household and non-household members
Situational handicap	ST	Type of situational handicap
Parallel activity	ST	Type of parallel activity engaged during travel (reading, working, phoning etc.)
Availability	TJ	Cross reference to all household vehicles/season tickets available for the duration of the trip/journey including the ensuing activity
Information sources	ST	Type of information sources available during the movement
Information used	ST	Type and usage cost of information sources used during the movement

S Applicable at stage-level (see discussion in the body of the paper)
T Applicable at trip-level (see discussion in the body of the paper)
J Applicable at journey-level (see discussion in the body of the paper)

Table 7 Suggested items for a comprehensive travel diary: Activities

Item	Description
Purpose	
Land use	Type of environment
Time window	Earliest and latest possible start time
Start time	Arrival time at the activity location
End time	End of activity
Wait time	Time spent waiting before the start of the activity
Importance	Importance relative to the other activities of the day
Success	Degree to which the expectations for the activity were fulfilled
Commitment	Level of commitment to other persons participating in or depending on the activity
Substitutability	Ability to replace the activity with a different one
Flexibility	Ability to forgo the activity at the time of arriving at the destination
Planning interval	Time since the traveller planned to engage in the activity
Execution horizon	Time before the activity has to be executed
Frequency	Number of activities of this type per week/month..
Regularity	Presence of a fixed rhythm for the activity
Expenses	Amount of money spent during the activity by the respondent
Company	Size of party divided by household- and non-household members
Situational handicap	Type of situational handicap encountered during the activity
Information sources	Information sources available during the activity
Information used	Information sources used during the activity and their costs

Table 8 Suggested modules

Core	*Short term*	*Medium term*	*Long term*
Household	*Household*	*Household*	*Household*
Location	Parking spaces	Parking spaces	Size of residence
Number of members	Communications	Communications	Type of building
Number of visitors		Visits	Tenure
Relationships			Duration of residence
Income			Duration of ownership
			Parking spaces
			Communications
Person	*Person*	*Person*	*Person*
Sex		Commitments	Marital status
Year of birth		Paid jobs	Profession
Education level		Working hours	Ethnicity
Hours worked		Flexibility	Language
Parking		Mode to work	Commitments
Driving licence		Travel times	Paid jobs
Cycling		PT accessibility	Working hours
Vehicles & tickets		Car pooling	Flexibility
Income			Mode to work
Handicap			Travel times
No mobility			PT accessibility
Start location			Car pooling
			Education
Vehicle	*Vehicles*	*Vehicles*	*Vehicles*
Seats	Information sources	Users	Year of acquisition
Current mileage	Users	Variable costs	Replacement status
Mileage	Variable costs	Parking	VMT
Owner	Parking		Fixed costs
Responsible			Variable costs
Home location			Parking
Season ticket	*Season tickets*	*Season tickets*	*Season ticket*
Type	Users	Validity	Validity
Area	Variable costs	Date of acquisition	Date of acquisition
Owner		Replacement status	Replacement status
		Users	Users
		Variable costs	Fixed costs
			Loan
			Variable costs
Movement	*Movement*	*Movement*	
Start time	Stops		
End time	Parallel activity		
Start wait	Availability		
End location	Information sources		***Environment***
Mode/Mode sequence	Information used		
Costs			*Vehicle*
Parking			Make
Company			Model
Sit. handicap			Body
			Year of production
Activity	*Activity*	*Activity*	Fuel
Purpose	Time window	Time window	Motor
Land use	Start time	Start time	Weight
Start time	Importance	Importance	Converter
End time	Success	Success	Check up
Company	Commitment	Commitment	
Sit. handicap	Substitutability	Substitutability	*Movement*
	Flexibility	Flexibility	Route
	Planning horizon	Planning interval	
	Execution horizon	Execution horizon	
	Frequency	Frequency	
	Regularity	Regularity	
	Information sources	Expenses	
	Information used		

that the sources and types of error will change, but not necessarily increase. For example a mostly iconic interface could allow functionally semi-literate respondents to participate successfully in the survey, which would have joined the non-response group for a paper-based instrument.

The item discussion has shown that the travel diary needs substantial updating and therefore a matching development and design effort. It is hoped, that the large transport studies, which will be undertaken over the next years to evaluate the effectiveness of the forming transport policy consensus, will be combined with a matching effort to bring the travel diary into the 1990's.

This research should focus on:

- translation of the data items into question items and the test of respondent understanding in different survey contexts
- estimation of the functional relationship mentioned above between number of activity categories, number of activities reported, number of items per activity and response rate and data quality
- development of measures of survey complexity, i.e. the difficulty of understanding the items, and their relationship to survey quality
- tests of the modular survey instruments, in particular their ability to work on a "mix and match" - principle
- tests of new survey administration instruments, i.e. palm top computers
- tests of merging passive survey methods, such as GPS, with active methods, such as a travel diary

8 ACKNOWLEDGEMENTS

The author would like to thank those who provided him with comment, travel diaries or both, but in particular: Stephan Algers, Mario Alves, Liz Ampt, Werner Brög, Günther Förschner, Thomas Haupt, Max Herry, Martin Lee-Gosselin, Wilhelm Leutzbach, Brian Martin, Solveig Meland, Elaine Murakami, John Polak, Chuck Punvis, Phillipe Toint, Eric van Berkum, J.L. Madre, G. Moritz, M. Dijst.

7 CONCLUSIONS AND OUTLOOK

This paper has sketched the development path of the travel diary during the last forty years and has assessed its items against the background of the current trends in transport policy and transport modelling.

The discussion of a small, non-random sample of travel diaries has shown that the travel diary has remained surprisingly stable in its content and presentation. While there are trends in the content, e.g. the recent increase in interest in parking related questions, the main differences are associated with the approach used to capture the movement of the respondent. The design of the survey forms has been refined within these traditions, but no complete break has taken place. The innovation of the activity-approach to the collection of the travel diary data has so far not been widely adopted.

The discussion of the items suggested changes to a few well established current items and suggested a large number of additional ones. The main critique was directed at the collection of information about the vehicles and their costs and of parking at its costs. The new items concern the availability and use of information technology and the planning detail of activity participation still understood as a sequence of discrete activities.

It is clear that the result of any change will be an increase in survey complexity and respondent work load. It is likely that these changes cannot be accommodated in one paper-based design without a further reduction in the response rate, which is already decreasing in general. It will be necessary for the designer to select either a subset relevant to the immediate concerns of the study area and project or to spend more on non-response conversions and on the ease-of-use of the survey forms. The modular structure suggested above should help designer in this task.

Still, the complexity of the full instrument might stretch the capacity of a self-completion paper-based instrument beyond its limit. It would be worthwhile to investigate the possibilities of currently available computing technologies, such as palm-top pen-based computers. Their potential for on-the-spot consistency checking, intelligent routing, item sampling (i.e. ask certain items only at a subset of the possible occasions) and sophisticated help systems is attractive”. Their obvious disadvantage of substantial hardware costs and the loss of a well defined survey day have to be held against them. It is not a priori clear that the use of these devices will increase the total measurement error. It is certain

[19] There are some experiences with computer-based diaries in the context of complex Stated-Preference designs.

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10 DESIGNS AND THEIR AUTHORs

The copyright situation of the travel diary designs presented here is mixed, as some of them have been published explicitly as examples for emulation, while others are specific expressions of the general idea and therefore subject to copyright protection. The list below gives the contact addresses for those designs reproduced here:

L. Ampt
Transportation Research Centre
University of Melbourne
AUS - Parkville, Victoria 3052

Applied Management and Planning Group
12300 Wiltshire Blvd., # 430
USA - Los Angeles, CA 90025

Chicago Area Transportation Study
300 W Adams Street
USA - Chicago, IL 60606

Harloff Hensel
Kackertstr. 20
D - 52072 Aachen

M. Lee-Gosselin
Universi te Laval
CAN - Ste Foix, Quebec GlK 7PA

Metropolitan Planning Commission (MTC)
101 Eight Street
USA - Oakland, CA 94607

John Polak
Centre for Transport Studies
Department of Civil Engineering
Imperial College
UK - London SW7 2BU

PTV System
Pforzheimer Str. 15
D - 76227 Karlsruhe

Socialdata
Hans-Gr%ssel-Weg 1
D - 8 1375 Mtinchen

P. Stopher
Louisiana Transportation Research Center
University of Louisiana
4101 Gourrir Ave

USA - Baton Rouge, LO 70808

Taylor-Nelson Research Ltd
44-66 Upper High Street
UK - Epson, KTl7 4QS

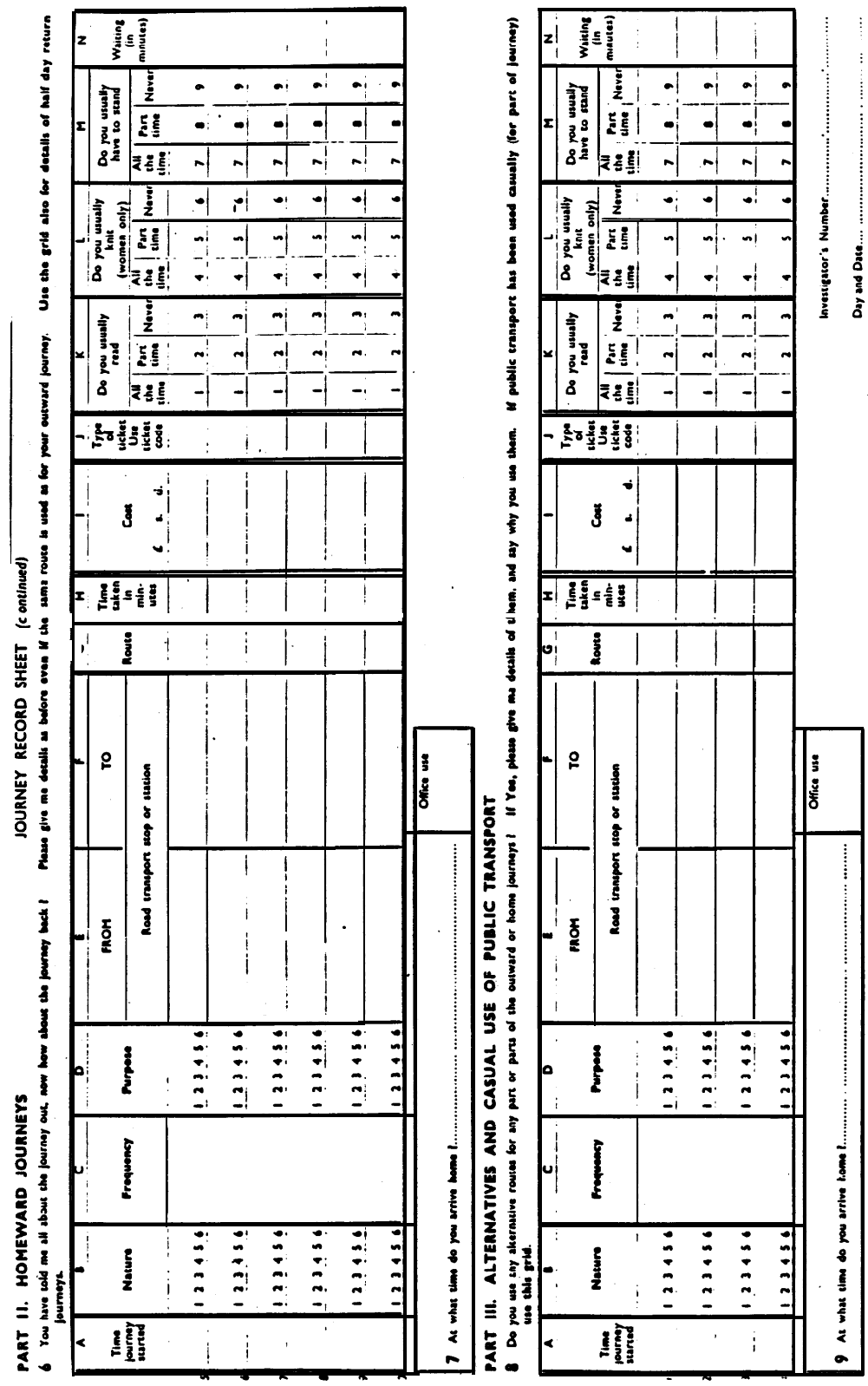
APPENDIX A SELECTED EXAMPLES

This selection concentrates on self-completion forms, as they are the most interesting and difficult one from a design point of view, but some interviewer forms are included.

A.1 London 1949

Name	London Transport Study
Year	1949
Approach	Stage-based, public transport only
Format	A4 Landscape
Administration	Home interview
Comments	This is an example of a proto-travel diary, i.e. one establishing some but not all movements, here public transport movements only and those not in sequence. It focuses in line with many similar later car-based surveys only on the main journey, i.e . the journey to work. The level of detail is as you would expect, but note the questions about the use of the travel time, in particular the question about knitting. The knitting question was omitted in a similar exercise 5 years later.
Source	Research Services Ltd (1949)

Figure A.1 Diary form: London Transport Study 1949



JOURNEY RECORD SHEET *(continued)*

PART II. HOMEWARD JOURNEYS

6 You have told me all about the journey out, now how about the journey back ! Please give me details as before even if the same route is used as for your outward journey. Use the grid also for details of half day return journeys.

A Time journey started	B Nature	C Frequency	D Purpose	E FROM Road transport stop or station	F TO Road transport stop or station	G Route	H Time taken in minutes	I Cost £ s. d.	J Type of ticket Use ticket code	K Do you usually read All the time	K Part time	K Never	L Do you usually knit (women only) All the time	L Part time	L Never	M Do you usually have to stand All the time	M Part time	M Never	N Waiting (in minutes)
5	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
6	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
7	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
8	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
9	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
10	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	

7 At what time do you arrive home ?.....

Office use

PART III. ALTERNATIVES AND CASUAL USE OF PUBLIC TRANSPORT

8 Do you use any alternative routes for any part or parts of the outward or home journeys ? If Yes, please give me details of them, and say why you use them. If public transport has been used casually (for part of journey) use this grid.

A Time journey started	B Nature	C Frequency	D Purpose	E FROM Road transport stop or station	F TO Road transport stop or station	G Route	H Time taken in minutes	I Cost £ s. d.	J Type of ticket Use ticket code	K Do you usually read All the time	K Part time	K Never	L Do you usually knit (women only) All the time	L Part time	L Never	M Do you usually have to stand All the time	M Part time	M Never	N Waiting (in minutes)
1	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
2	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
3	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	
4	1 2 3 4 5 6		1 2 3 4 5 6							1	2	3	4	5	6	7	8	9	

9 At what time do you arrive home ?.....

Office use

Investigator's Number.....

Day and Date.....

A.2 BPR 1954

Name	Bureau of Public Roads
Year	1954
Approach	Stage-based
Format	A4 Landscape
Administration	Home interview
Comments	This form has been extremely influential, as it was included in the official manual for home interview studies published by the Bureau. It therefore defined the reference standard for content and approach for federally funded projects. Note the absence of walking and bicycling and motorcycling as modes, but the detailed car parking information. Note the inclusion of the minimal person detail on this form. This style of form design reoccurs again and again in the following decades.
Source	Bureau of Public Roads (1954)

Figure A.2 Diary form: Bureau of Public Roads 1954

INTERNAL TRIP REPORT

SHEET .... OF ....

CARD 2 TRACT BLOCK SAMPLE No. SUBZONE DAY OF TRAVEL

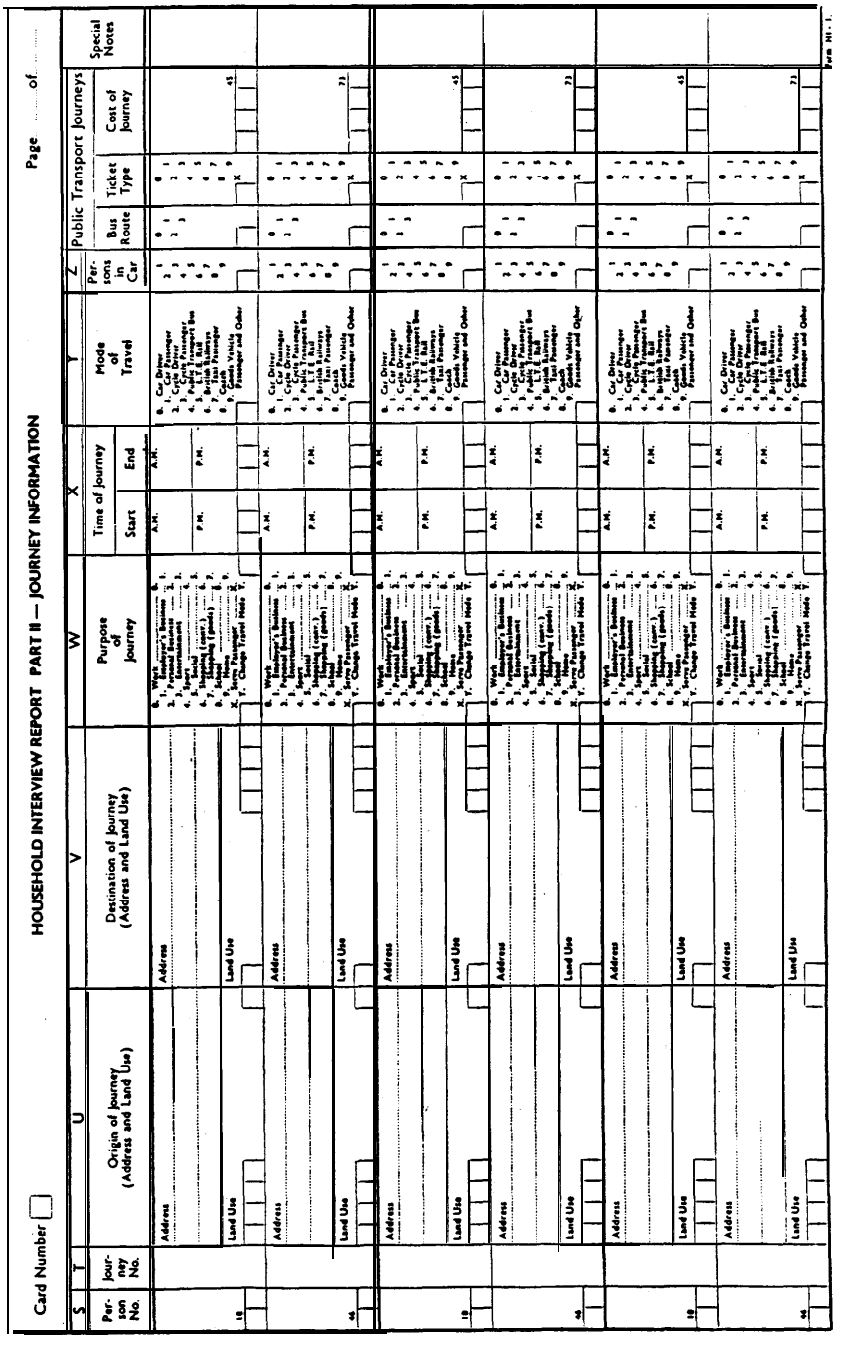
1	2	3	4	5	6	7	8		9	10	11
Occupation and Industry	Person No.	Trip No.	Sex and Race	Where Did This Trip Begin?	Where Did This Trip End?	Mode of Travel	Time of— Starting	Arrival	Purpose of Trip From To	No. in Car Including Driver	Kind of Parking
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social. Rec...... 5 6..Ch. Travel Mode...6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social. Rec...... 5 6..Ch. Travel Mode...6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social. Rec...... 5 6..Ch. Travel Mode...6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social. Rec...... 5 6..Ch. Travel Mode...6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social. Rec...... 5 6..Ch. Travel Mode...6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked
			1 2 3 4 5 6	City	City	1 Auto Driver 2 Auto Pass. 3 Street-car-Bus 4 Taxi Pass. 5 Truck Pass.	A. M. P. M.	A. M. P. M.	1....Work............ 1 2..Business............ 2 3....Med.-Den........ 3 4..School............ 4 5....Social, Rec...... 5 6..Ch. travel mode. 6 7....Eat meal......... 7 8..Shopping.......... 8 9....Serve pass...... 9 0..Home............. 0		1 Street free 2 Street meter 3 Lot free 4 Lot paid 5 Garage free 6 Garage paid 7 Service or repairs 8 Res. property 9 Cruised 0 Not parked

Revised: October 1954

A.3 London 1962

Name	London Traffic Survey
Year	1962
Approach	Stage-based
Format	A4 Landscape
Administration	Home interview
Comments	This form is clearly derived from the BPR example, but is adapted to London conditions: • consideration of motorcycle drivers and passengers as different modes • more public transport alternatives • inclusion of public transport details, such as bus route, ticket type and fare Walking and cycling are excluded. The distinction between convenience and goods shopping is interesting, especially as similar classifications have recently been suggested again after decades of simple "shopping trips".
Source	Freeman, Fox and Partners, Engineering Service Corporation and Wilbur Smith and Associates (1964) London Traffic Survey, **1**, London County Council, London.

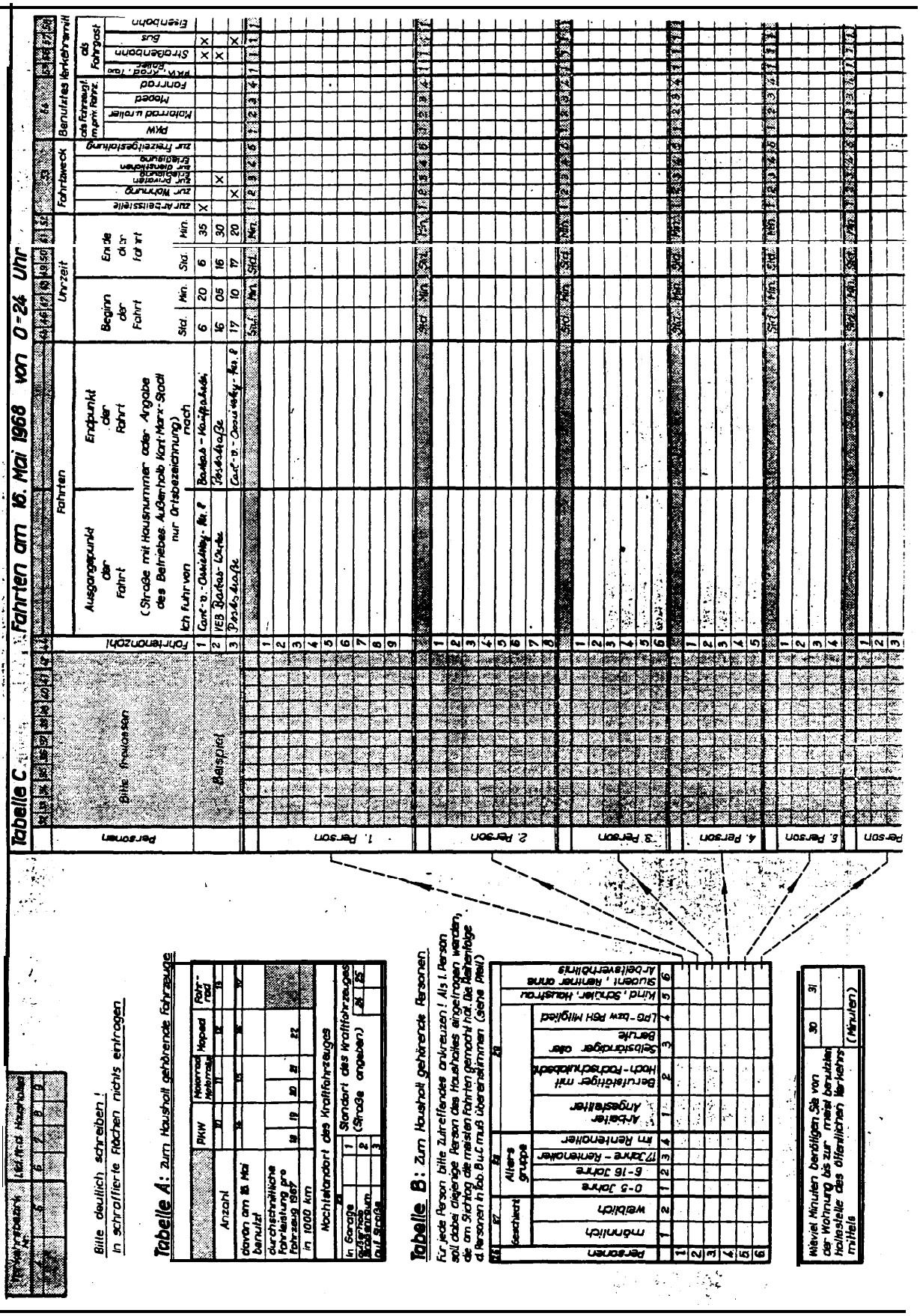
Figure A.3 Diary form: London 1962



A.4 Chemnitz 1968

Name	Chemnitz (Karl-Marx-Stadt)
Year	1968
Approach	Trip-based
Format	A4 Landscape
Administration	Self-completion
Comments	This German example of a trip-based form is one of a series of forms, which were tested by the survey designers. The form is a development of earlier German forms for which the authors does not have copies of the whole form. "Tabelle A" records the vehicles of the household, their numbers, annual VMT and parking location at home. The classification allows for cars, motorcycles, mopeds and bicycles. The person details (sex, age and work status) are recorded in "Tabelle B". The majority of the form is dedicated to the recording of the trips of all household members, as there is no minimum age. Bicycling is included, while walking is not.

Figure A.4 ‘Diary form: Chemnitz (Karl-Marx Stadt) 1968



A.5 Uppsala 1971

Name	Uppsala Study
Year	1971
Approach	Trip-based
Format	A4 Portrait
Administration	Interview/Self-completion
Comments	This survey form reflects the unique design of this study. The study was unique for its duration: 35 consecutive days in the spring of 1971. Given this duration the respondent load had to be finely balanced. While the travel detail is low, it does request an unusual items, the expenditure on the activity performed. It is also unusual in requesting all distinct activities at one location to be listed in an open format. Please note the special treatment for the return home trip at the bottom of the page.

Figure A.5 Diary form: Uppsda 1971

CONFIDENTIAL

Household Travel Survey
Uppsala, Sweden - 1971

Name Jan Svensson

Date 16 / 4 1971

When did you leave home? 750 hours

Is this a continuation from another sheet? Yes No

Stop number 1 | Did you plan to make this stop when you left home? (Yes) No

Means of Travel: 1 foot 2 bicycle 3 bus (4) car (driver) 5 car (passenger) 6 taxi 7 moped 8 other

Were you accompanied by someone from your household? Yes (No) If yes, by how many?

Where did you make this stop? (please give address) V. Ågatan New?

When did you arrive at this place? 755 hours When did you leave this place? 1205 hours

What did you do at this place? 1) Worked
2) took a coffee break
3)
4)

Expenditure: 1:00

Stop number 2 | Did you plan to make this stop when you left home? (Yes) No

Means of Travel: (1) foot 2 bicycle 3 bus 4 car (driver) 5 car (passenger) 6 taxi 7 moped 8 other

Were you accompanied by someone from your household? Yes (No) If yes, by how many?

Where did you make this stop? (please give address) Drottninggatan 12 New?

When did you arrive at this place? 1210 hours When did you leave this place? 1255 hours

What did you do at this place? 1) ate lunch with an associate
2)
3)
4)

Expenditure: 8:-

Is this trip continued on the next sheet? (Yes) No

If No, fill in the section below.

When did you return to home? hours

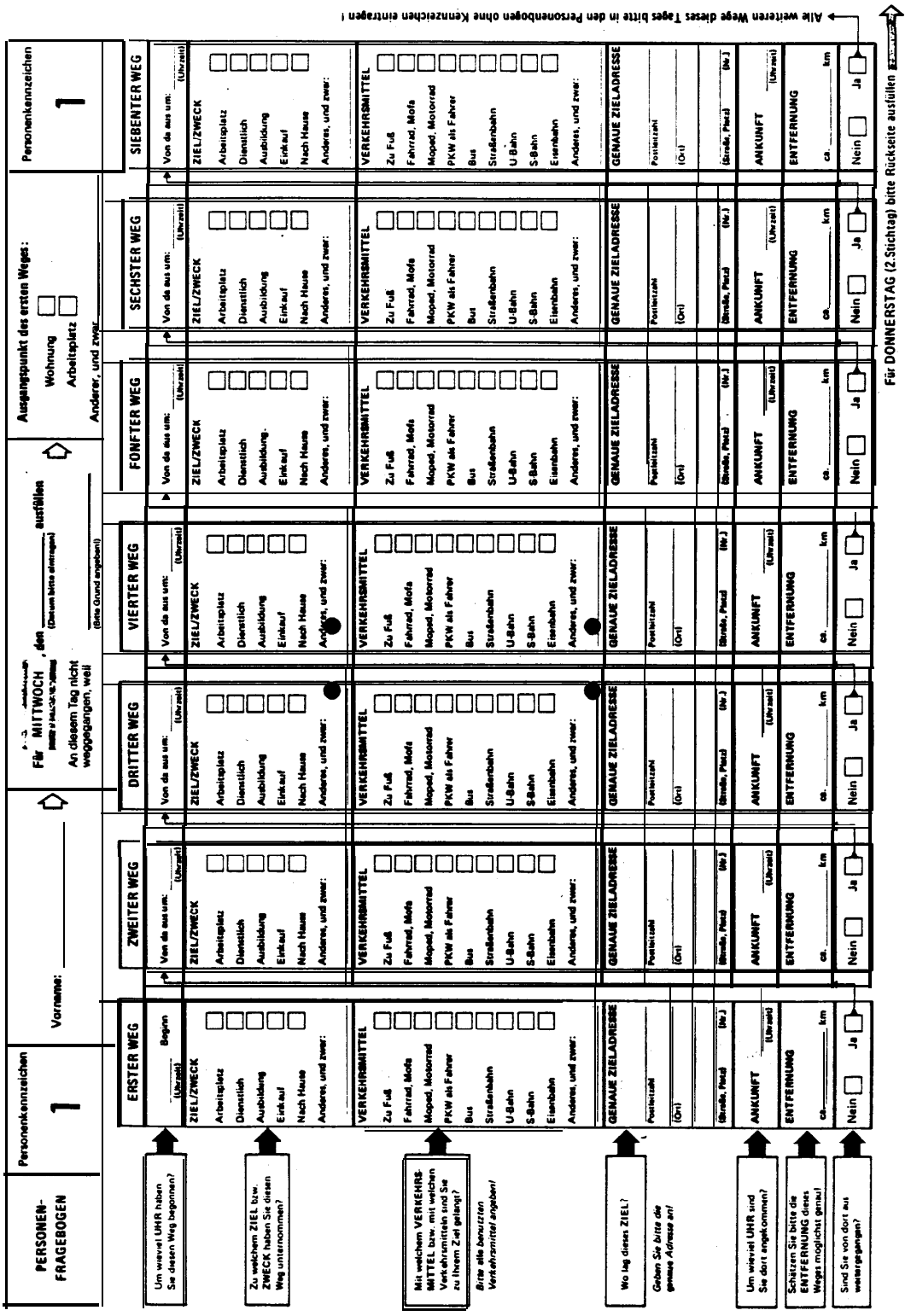
Means of Travel: 1 car 2 bicycle 3 bus 4 car (driver) 5 car (passenger) 6 taxi 7 moped 8 other

Were you accompanied by someone from your household? Yes No If yes, by how many?

A.6 KONTIV 1973

Name	KONTIV
Year	1973
Approach	Trip-based
Format	A4 Landscape
Administration	Self-completion
Comments	This original and highly influential KONTIV form was developed for the first West-German travel survey intended to measure travel behaviour and trip making on a national scale. One of the design innovations was the separation of the trips into distinct columns to improve the ease of filling in the items. Walk trips were included into the recording. The only stage detail available is the use of different modes, no order and number of use can be established. The "Other" categories for mode and purpose allowed to keep the number of categories small.
Source	For background see Brög, Fallast, Katteler, Sammer and Schwertner (1988) or Brög, Meyburg and Wermuth (1983)

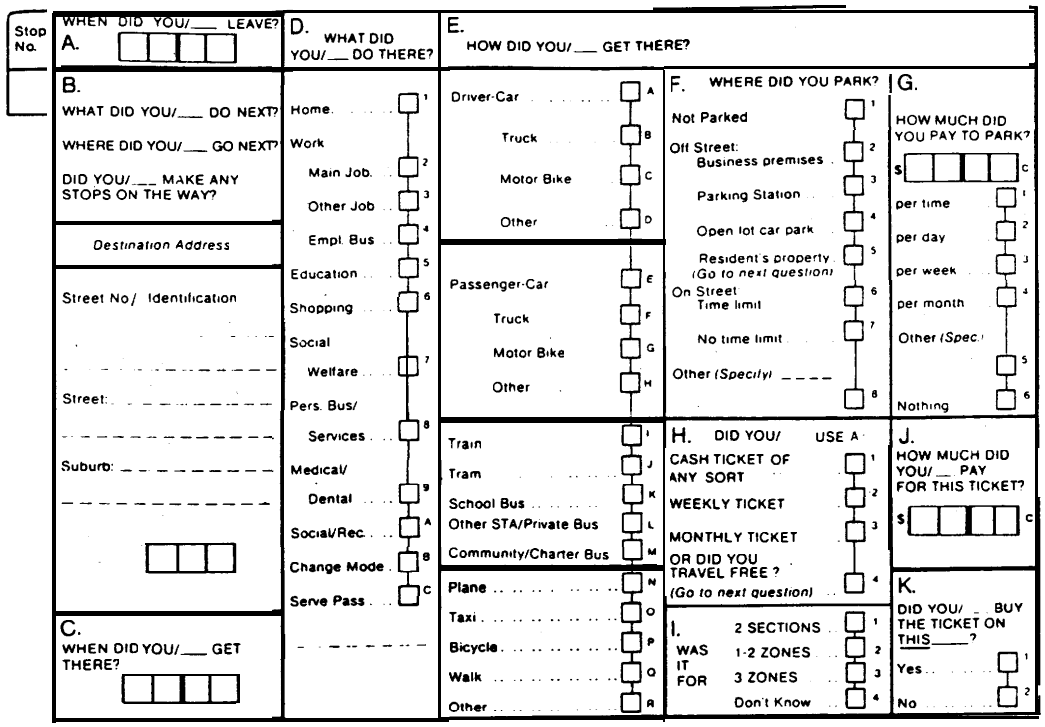
Figure A.6 Diary form: KONTIV 1973

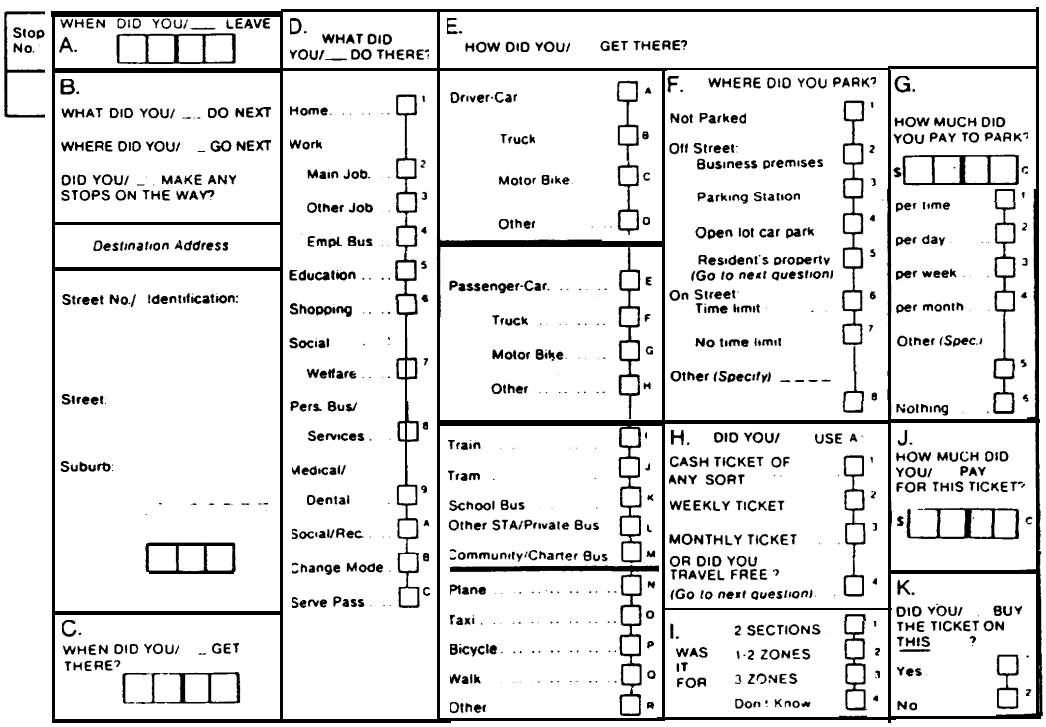


A.7 Adelaide 1986

Name	Adelaide
Year	1986
Approach	Stage-based
Format	A4 Portrait
Administration	Home interview
Comments	This form is a development of the original BPR-form in response to an increasing amount of modal detail (type and cost of parking, type and price of public transport ticket) Walking is now included in line with the theoretical developments of the field. Note the question for minor stops along the way.

Figure A.7 Diary form: Adelaide 1986

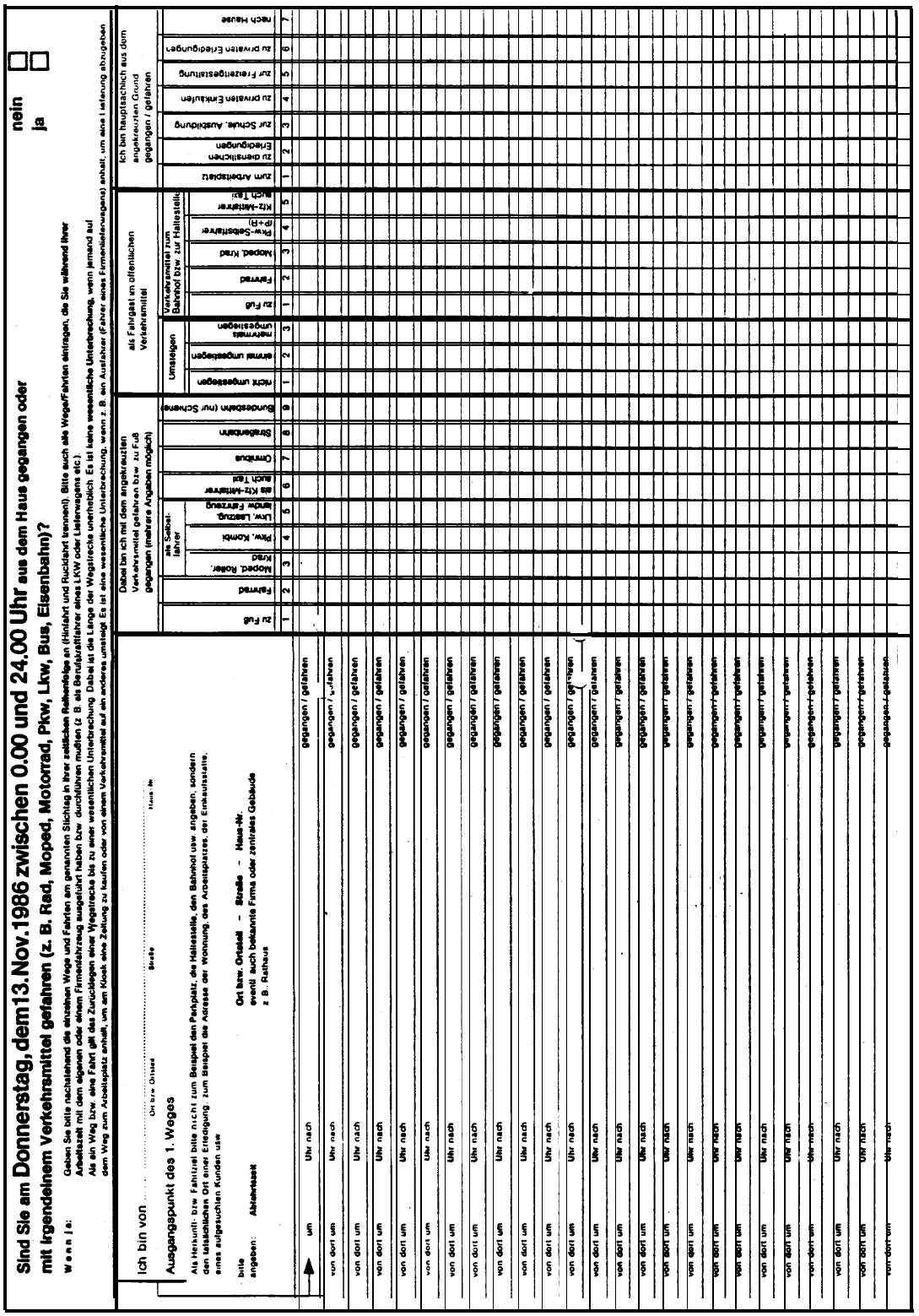




A.8 Karlsruhe 1986

Name	Nachbarschaftsverband Karlsruhe
Year	1986
Approach	Trip-based
Format	A4 Landscape
Administration	Self-completion
Comments	This for its date very traditional form is remarkable, as it does not establish the arrival time at the destination. There is some stage information for public transport in the form of the access mode. The form also records the number of transfers. The recording of minor stops is discouraged in the instructions.

Figure A.8 Diary form: Karlsruhe 1986



A.9 Ontario 1988

Name	Ontario fuel-usage survey
Year	1988
Approach	Half-tour
Format	A4 Landscape
Administration	Self-completion by driver
Comments	This form was developed with the needs of an energy audit in mind, which is reflected in the detailed recording of the vehicle, the use of odometer readings for improved mileage accuracy, in the lack of spatial detail, i.e. no recorded address of destination, and in the unusual driving details (speed limits and type of driving questions). The open nature of the "If you made any stops . . ." questions and the use of expression "Main reason" sets this form apart from a simple "trip-based" form. This is also underlined by the relatively small numbers of trips provided for on the form (6 here against 7+extra form for KONTIV or 25 for Karlsruhe).

Figure A.9 Diary form: Ontario 1988

FIRST DAY

Reminder: the label on the front cover tells you which are "your" days. Please use the log for those three consecutive days, no matter how much or how little you drive. Please complete:

DAY 1

The FIRST DAY on which I used used this log was: _____ , _____
Day of the week Date

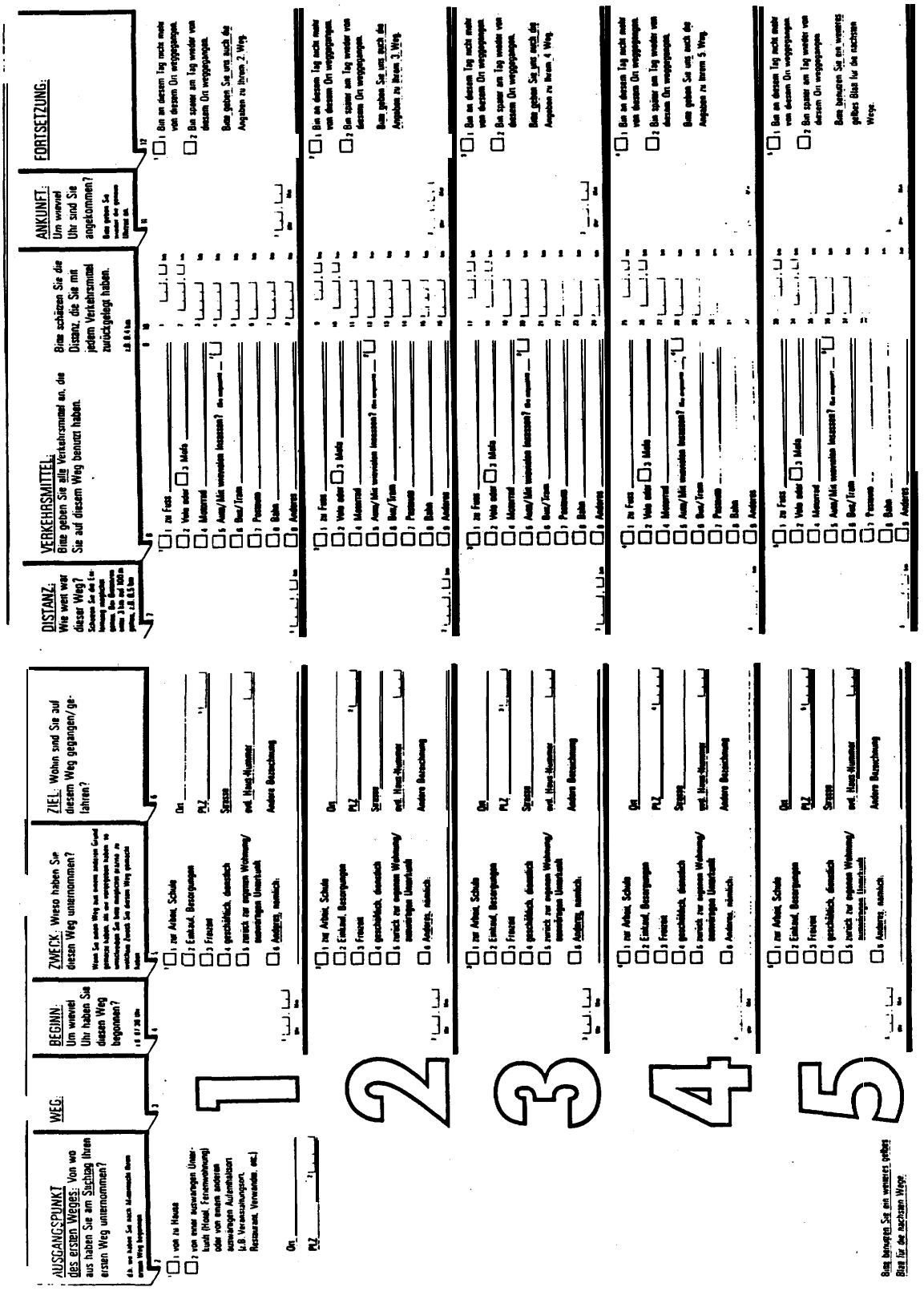
	1st Trip	2nd Trip
	Vehicle used: Make _____ Model _____ Year _____	Vehicle used: Make _____ Model _____ Year _____ ☐ Same as previous trip
1. *What time did the trip START?*	1. *Time trip started:* [:] ☐ am ☐ pm	1. *Time trip started:* [:] ☐ am ☐ pm
2. *Odometer reading at START of trip?*	2. *Odometer at start:* [ ][ ][ ][ ][ ][ ] ☐ miles ☐ Km	2. *Odometer at start:* [ ][ ][ ][ ][ ][ ] ☐ miles ☐ Km
3. *Where did the trip start?*	3. *The trip started at:* ☐ Your home ☐ Work or School ☐ Somewhere else	3. *The trip started at:* ☐ Your home ☐ Work or School ☐ Somewhere else
4. *What time did the trip END?*	4. *Time trip ended:* [:] ☐ am ☐ pm	4. *Time trip ended:* [:] ☐ am ☐ pm
5. *Odometer reading at END of trip?*	5. *Odometer at end:* [ ][ ][ ][ ][ ][ ]	5. *Odometer at end:* [ ][ ][ ][ ][ ][ ]
6. *Where did the trip end?*	6. *The trip ended at:* ☐ Your home ☐ Work or School ☐ Somewhere else	6. *The trip ended at:* ☐ Your home ☐ Work or School ☐ Somewhere else
7. *IF YOU MADE STOPS ALONG THE WAY, about how many minutes in total did you spend OUT OF THE CAR?*	7. *Total time out of the car in stops en route:* [ ] minutes.	7. *Total time out.of the car in stops en route:* [ ] minutes.
8. *Why are you making this trip?* (Check only most important)	8. *Main reason for trip:* ☐ To or from work/school ☐ Driving as part of job ☐ Personal/family errands or shopping ☐ Recreational, social ☐ Other _____	8. *Main reason for trip:* ☐ To or from work/school ☐ Driving as part of job ☐ Personal/family errands or shopping ☐ Recreational, social ☐ Other _____
9. *How many passengers did you carry (NOT including yourself)*	9. *Number of passengers:* [ ] (EXcluding driver)	9. *Number of passengers:* [ ] (EXcluding driver)
10. *What SPEED LIMITS applied to all, most or some of the roads you used during this trip?*	10. *Speed limits:* ALL: MOST: SOME: 100 kmh ☐ ☐ ☐ 70-90 kmh ☐ ☐ ☐ 60 kmh or less ☐ ☐ ☐	10. *Speed limits:* ALL: MOST: SOME: 100 kmh ☐ ☐ ☐ 70-90 kmh ☐ ☐ ☐ 60 kmh or less ☐ ☐ ☐
Was all, most or some of the distance driven in urban (built-up), or rural areas?	11. *Urban/rural driving:* ALL: MOST: SOME: Urban ☐ ☐ ☐ Rural ☐ ☐ ☐	11. *Urban/rural driving:* ALL: MOST: SOME: Urban ☐ ☐ ☐ Rural ☐ ☐ ☐
12. *Did any of the following bother you on this trip?*	12. *Bothered by:* ☐ Slippery roads ☐ Heavy traffic ☐ Unexpected delay ☐ Poor visibility ☐ Other drivers ☐ Other _____ ☐ Nothing unusual	12. *Bothered by:* ☐ Slippery roads ☐ Heavy traffic ☐ Unexpected delay ☐ Poor visibility ☐ Other drivers ☐ Other _____ ☐ Nothing unusual

If you drove more than 6 trips on "your" day, please estimate how many miles or kilometres you drove IN ADDITION to the trips you have recorded.
[ ] ☐ miles ☐ kilometres

A.10 Switzerland 1989

Name	Schweizer Verkehrsbefragung
Year	1989
Approach	Trip-based
Format	A3 Landscape
Administration	Self completion
Comments	This is an interesting trip-based form. It overcomes the tightness of some of the earlier examples, such as the Karlsruhe 1986 form, which were difficult to fill in. It provides space for 5 trips, which requires the use of a second form in many cases. But the designers must have preferred to provide additional forms to cramping the design. Both a detailed address and a distance estimate are requested. The former item is unusual for a national level survey. Also unusual is the request to detail the mileage for each mode used. Otherwise, the detail requested has been reduced to the minimum.
Source	

Figure A.10 Diary form: Switzerland 1989



A.11 San Francisco Bay 1990

Name	MTC Area Transportion Study (San Francisco Bay Area)
Year	1990
Approach	Stage-based
Format	A5
Administration	Memory jogger in conjunction with a telephone interview
Comments	This simple memory jogger allowed the respondents to record the essential details during the journey. The recording of further details would have to rely on respondent recall.

Figure A. 11 Diary form: San Francisco Bay Area 1990

1990 MTC AREA TRANSPORTATION STUDY
YOUR TRIP RECORD FOR ONE DAY

Please carry this trip card with you and write down each trip you make on TRAVEL DAY _____
When you go from one place to another for any reason, this is a trip.
When you change your travel mode (car, bus, BART, bicycle, walk, etc.) this is a new trip.
Please record an address if possible, or an easily identifiable location, where each trip begins and ends, as well as the times for each trip beginning and ending.

PERSON: _____

TRIP BEGINNING		TRIP DESTINATION		DESTINATION PURPOSE	TRAVEL MODE (car, bus, BART, walk, etc.)	PARKING COST or TRANSIT FARE (and how paid)	NUM IN CAR
START TIME	ADDRESS AND CITY	ADDRESS AND CITY	END TIME				
		Please turn card over and continue					

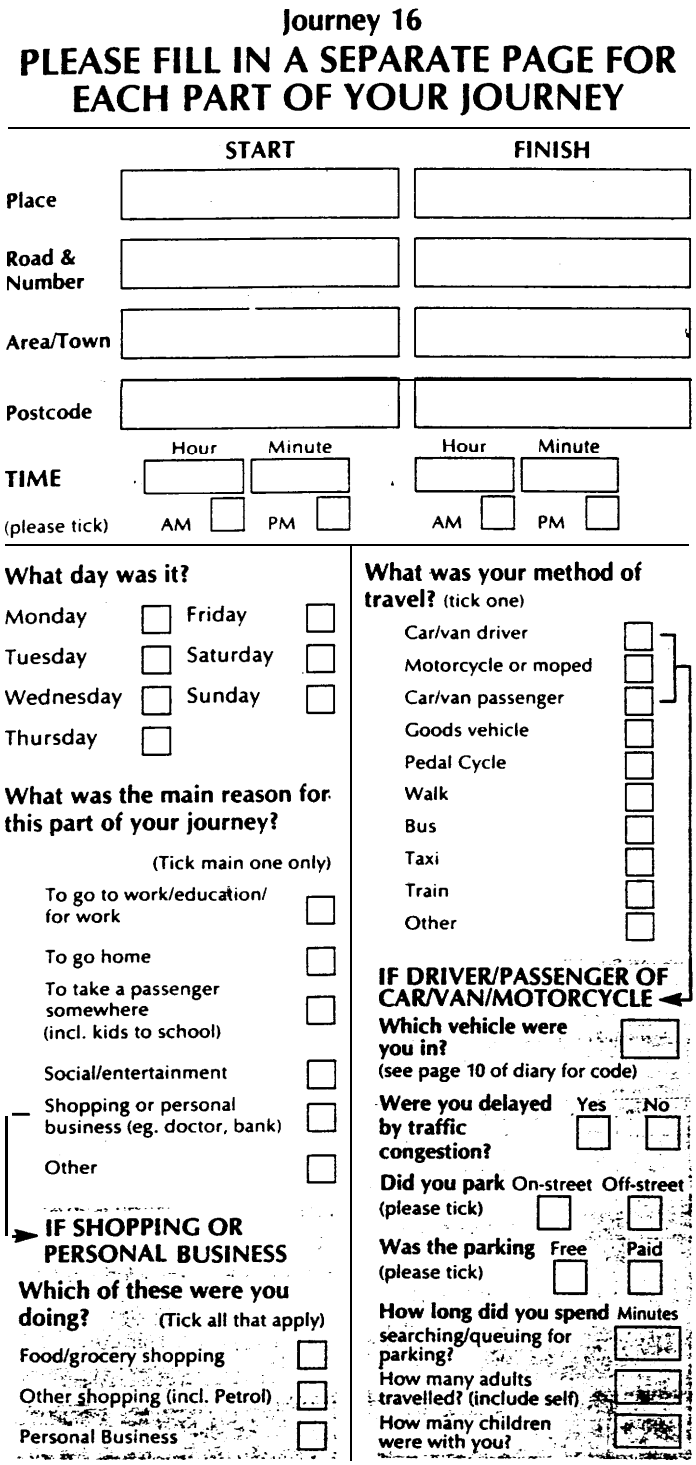
TRIP BEGINNING		TRIP DESTINATION		DESTINATION PURPOSE	TRAVEL MODE (car, bus, BART, walk, etc.)	PARKING COST or TRANSIT FARE (and how paid)	NUM IN CAR
START TIME	ADDRESS AND CITY	ADDRESS AND CITY	END TIME				

All information will be kept completely confidential and used for transportation planning purposes only.

A.12 Swindon 1990/91

Name	Sainsbury's Swindon Survey
Year	1990/91
Approach	Trip-based
Format	1/4 A4-booklet
Administration	Self-completion
Comments	This survey form was developed for a three-wave panel by Taylor-Nelson Research, a market research firm, together with Peter Jones, then Transport Studies Unit at the University of Oxford. The task of the panel was to analyse the effect of the opening of the new mayor out-of-town supermarket and the parallel closing of a the city centre store of the same firm. The respondent were asked to fill in the booklet for seven days. This background explains the request for a parking search time estimate, a contributor to environmental problems. The shopping detail was tied in with a separate grocery-expenditure survey. The booklet format allows for a clear and easy to follow lay-out. Note the need for the identification of the day in this multiple day instrument.
Source	For background see Stokes, Armstrong and Goodwin (1991)

Figure A.12 Diary form: Swindon, 1990/1991



Journey 16

PLEASE FILL IN A SEPARATE PAGE FOR EACH PART OF YOUR JOURNEY

	START	FINISH
Place		
Road & Number		
Area/Town		
Postcode		
TIME (please tick)	Hour Minute AM PM	Hour Minute AM PM

What day was it?

Monday ☐ Friday ☐
Tuesday ☐ Saturday ☐
Wednesday ☐ Sunday ☐
Thursday ☐

What was the main reason for this part of your journey?

(Tick main one only)

To go to work/education/ for work ☐
To go home ☐
To take a passenger somewhere (incl. kids to school) ☐
Social/entertainment ☐
Shopping or personal business (eg. doctor, bank) ☐
Other ☐

IF SHOPPING OR PERSONAL BUSINESS

Which of these were you doing? (Tick all that apply)

Food/grocery shopping ☐
Other shopping (incl. Petrol) ☐
Personal Business ☐

What was your method of travel? (tick one)

Car/van driver ☐
Motorcycle or moped ☐
Car/van passenger ☐
Goods vehicle ☐
Pedal Cycle ☐
Walk ☐
Bus ☐
Taxi ☐
Train ☐
Other ☐

IF DRIVER/PASSENGER OF CAR/VAN/MOTORCYCLE

Which vehicle were you in? (see page 10 of diary for code) ☐

Were you delayed by traffic congestion? Yes ☐ No ☐

Did you park (please tick) On-street ☐ Off-street ☐

Was the parking (please tick) Free ☐ Paid ☐

How long did you spend searching/queuing for parking? Minutes ☐

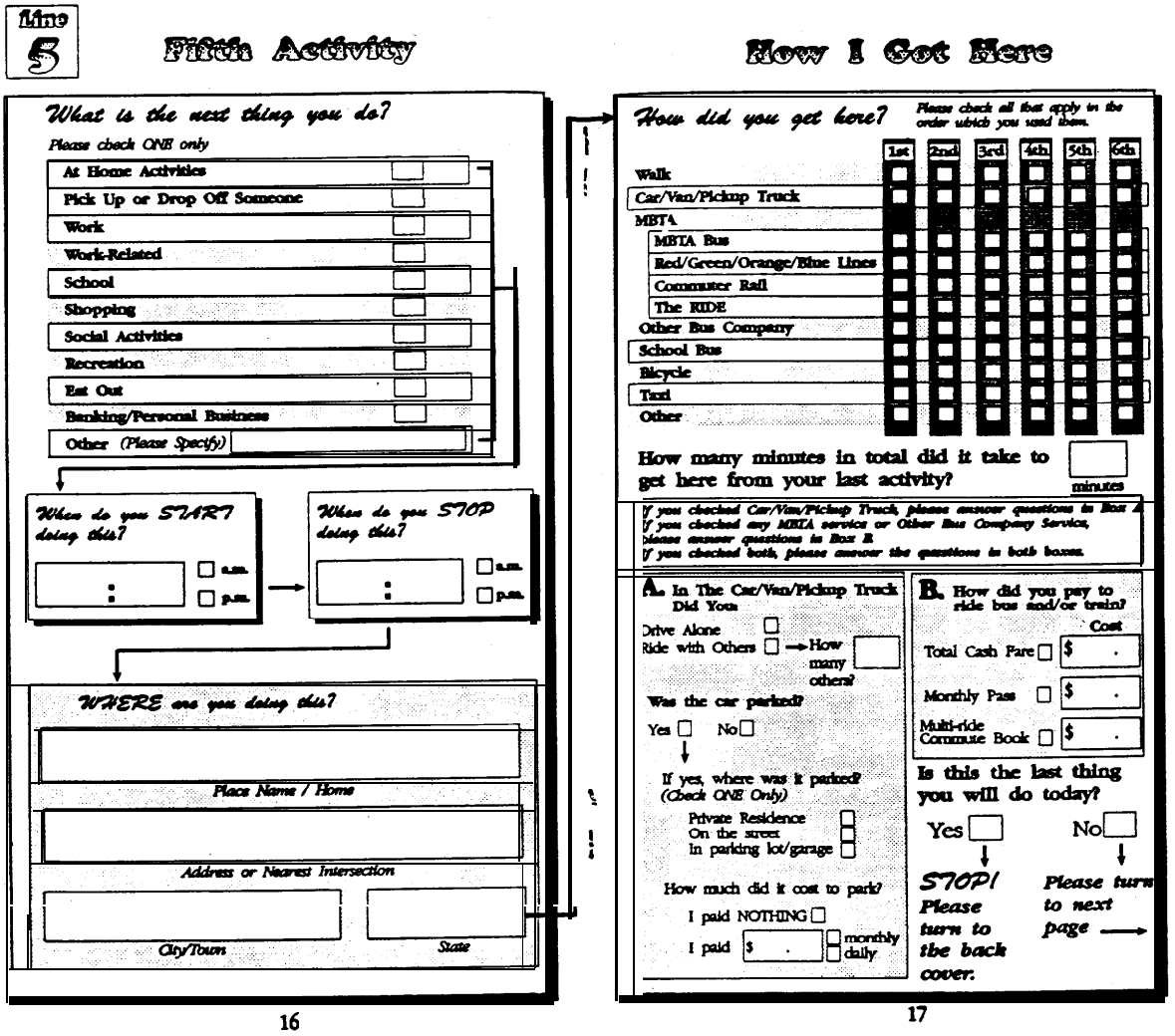
How many adults travelled? (include self) ☐

How many children were with you? ☐

A.13 Boston 1991

Name	Boston Bay Area Survey
Year	1991
Approach	Activity-based
Format	2/3 A4 booklet
Administration	Self-completion
Comments	This prototype shows how an activity-based design focuses the attention of the respondent first on the activity and then on the trip. The recording of the trip improves the stage recording by establishing the order of the stages and each use of a mode. Transfers between public transport modes should are recordable in this design. The design allows for a substantial amount of modal detail (parking type and cost, public transport fare). Later implementations of the design reduced the number of different fonts used to stress the seriousness of the form.
Source	Stopher (1992)

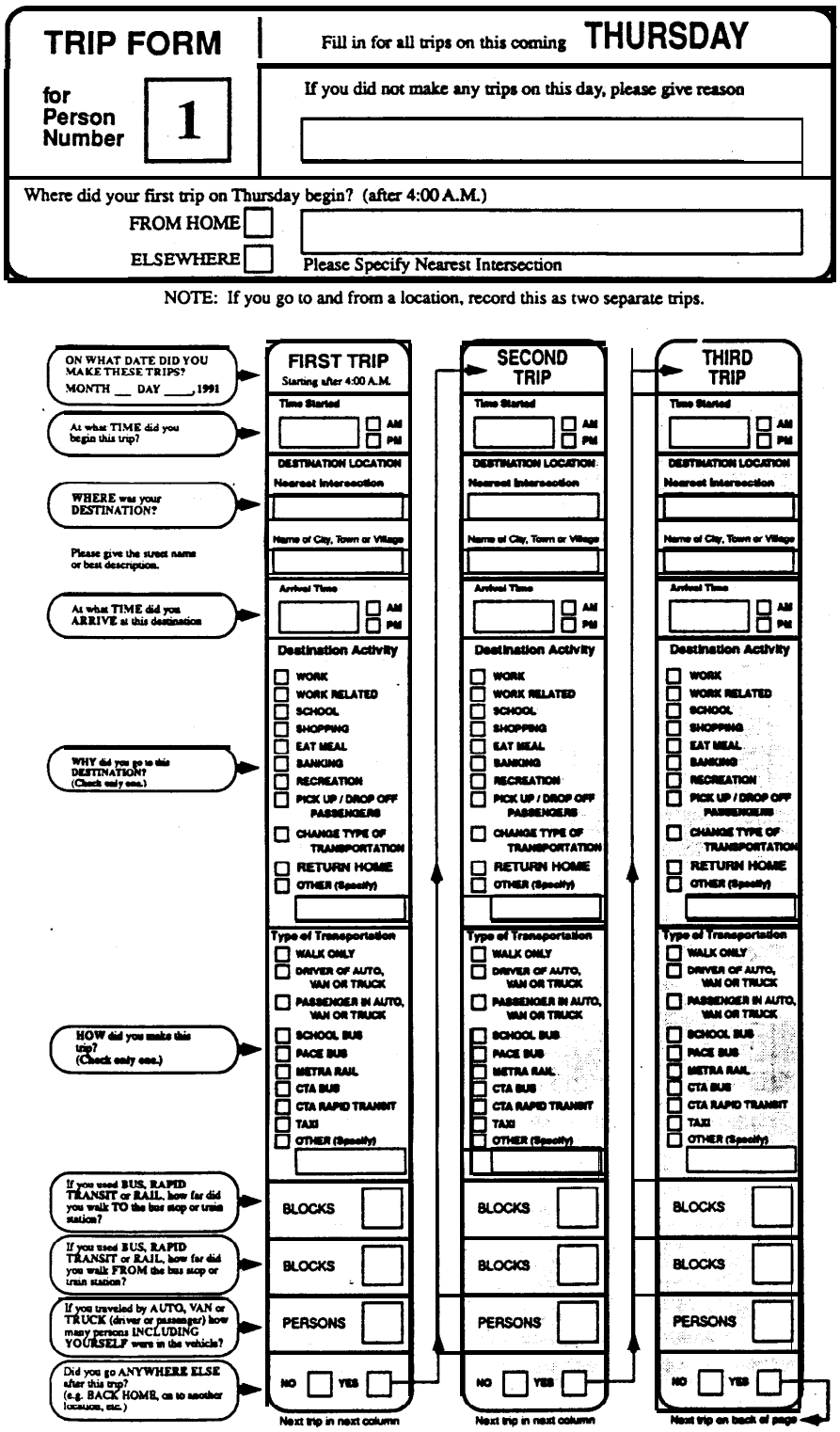
Figure A.13 Diary form: Boston 1991



A.14 Chicago 1991

Name	Chicago Area Transportation Study
Year	1991
Approach	Stage-based
Format	A4+ Portrait
Administration	Self-completion
Comments	This form is derived from the KONTIV design. It adapts the trip-based format of the original to the American stage-based practice by including a "Change type of transportation" purpose. Note the cramped space for the entry of the exact address which is probably acceptable in an environment with many numbered streets. Note the request for walking distance estimation for public transport access and egress.

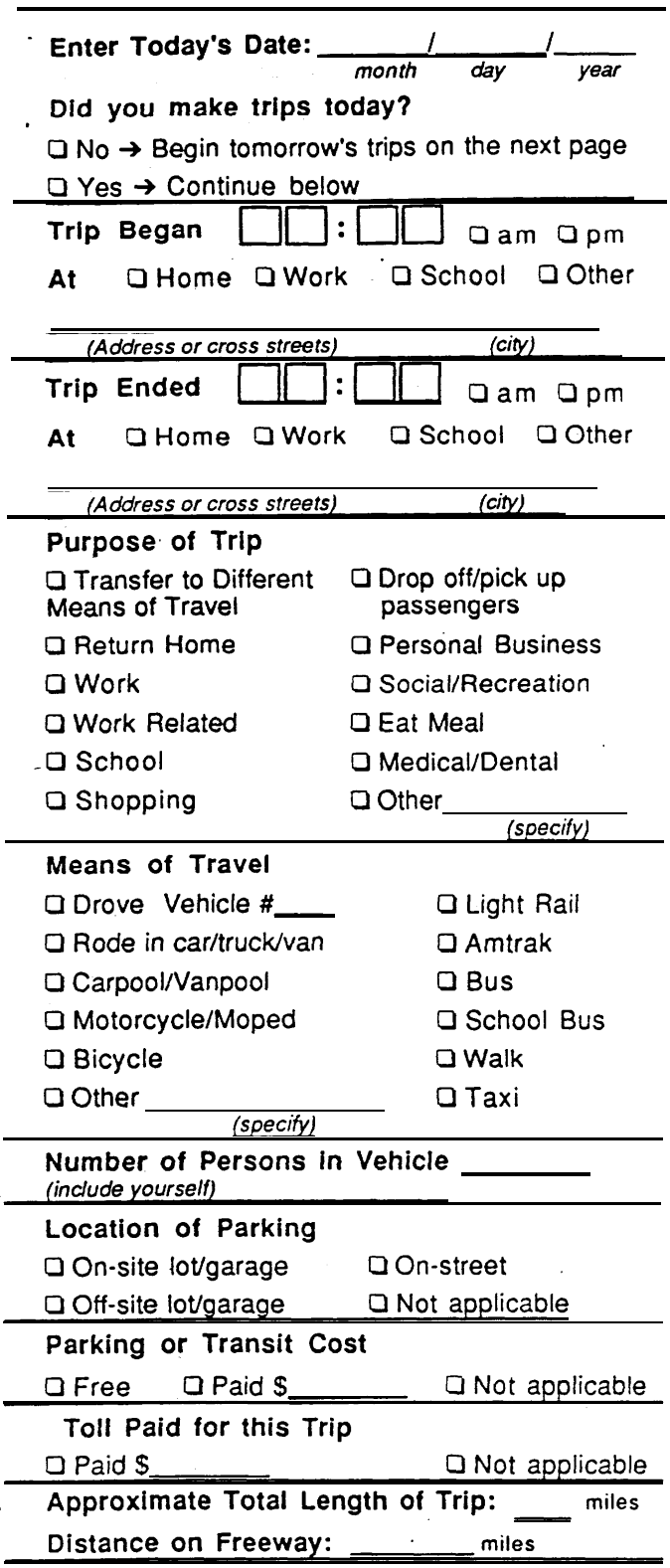
Figure A.14 Diary form: Chicago Area Transportation Study 1991



A.15 West Davis 1992

Name	Mobility and Liveable Communities Study (West Davis)
Year	1992
Approach	Stage-based
Format	1/4 A4 spiral bound
Administration	Self-completion
Comments	This design is part of a study directed at wider questions than just transport behaviour, such as residential satisfaction, community perception etc. The respondents are asked to fill in their diary for a three day period and are invited to carry the diary with them at all times. The lists of modes and purposes are rather comprehensive. The "Eat meal" category is aimed at restaurants. Note the parking detail and the toll related question. The environmental orientation of the survey is visible in the request for the vehicle ID number and the freeway distance estimation request. Note the need for the identification of the day in this multiple day instrument.

Figure A. 15 Diary form: West Davis 1992



Enter Today's Date: _____/_____/_____
month day year

Did you make trips today?

❑ No → Begin tomorrow's trips on the next page

❑ Yes → Continue below

Trip Began ☐☐:☐☐ ❑ am ❑ pm

At ❑ Home ❑ Work ❑ School ❑ Other

_____
(Address or cross streets) *(city)*

Trip Ended ☐☐:☐☐ ❑ am ❑ pm

At ❑ Home ❑ Work ❑ School ❑ Other

_____
(Address or cross streets) *(city)*

Purpose of Trip

❑ Transfer to Different Means of Travel
❑ Drop off/pick up passengers
❑ Return Home
❑ Personal Business
❑ Work
❑ Social/Recreation
❑ Work Related
❑ Eat Meal
❑ School
❑ Medical/Dental
❑ Shopping
❑ Other_____ *(specify)*

Means of Travel

❑ Drove Vehicle #____
❑ Light Rail
❑ Rode in car/truck/van
❑ Amtrak
❑ Carpool/Vanpool
❑ Bus
❑ Motorcycle/Moped
❑ School Bus
❑ Bicycle
❑ Walk
❑ Other _____ *(specify)*
❑ Taxi

Number of Persons in Vehicle _____
(include yourself)

Location of Parking

❑ On-site lot/garage ❑ On-street
❑ Off-site lot/garage ❑ Not applicable

Parking or Transit Cost

❑ Free ❑ Paid $_____ ❑ Not applicable

Toll Paid for this Trip

❑ Paid $_____ ❑ Not applicable

Approximate Total Length of Trip: ____ miles

Distance on Freeway: _____ miles

A.16 TIB 1992

Name	Tweeverdieners-In-Beweging (Two earner households in motion)
Year	1992
Approach	Trip-based
Format	1/3 A5 Portrait
Administration	Self-completion
Comments	This interesting design combines a trip diary with a diary for the activities at home, which reenforce each other. The authors reports substantially higher trip rates with his instruments in comparison to contemporaneous surveys in Holland. The trip diary is very brief, but includes two unusual items: an indication of the land use at the destination and of the planning horizon of the trip.
Source	Dijst, 1994

Figure A.16 Diary form: TIP 1992

Trip diary

ZATERDAG **PAGINA 19**

1. IK VERTREK NU OM: ....uur ....minuten ☐ VM ☐ NM

2. OM OP HET EERSTVOLGENDE ADRES TE KOMEN GEBRUIK IK (in volgorde van gebruik aankruisen):

	lopen	fiets	auto best.	auto pas.	(snel) tram	bus	trein	overig
EERST:	☐	☐	☐	☐	☐	☐	☐	☐
DAARNA:	☐	☐	☐	☐	☐	☐	☐	☐
DAARNA:	☐	☐	☐	☐	☐	☐	☐	☐
DAARNA:	☐	☐	☐	☐	☐	☐	☐	☐
DAARNA:	☐	☐	☐	☐	☐	☐	☐	☐

3. IK KOM OP DIT ADRES AAN OM: ......uur ....minuten

4. HET SOORT ADRES IS (één aankruisen/bijschrijven):

☐ THUIS	☐ MARKT	☐ KLEDINGZAAK
☐ WERKADRES	☐ BAKKER	☐ BOEKHANDEL
☐ KINDERVERBL	☐ SLAGER	☐ IJZERWAREN
☐ SCHOOL	☐ GROENTEMAN	☐ HUISH APP.
☐ FAMILIE	☐ RESTAURANT	☐ SNACKBAR
☐ VRIENDEN	☐ SPORTTERREIN	☐ BENZINESTATION
☐ BUREN	☐ CAFE	☐ BLOEMIST
☐ SUPERMARKT	☐ WARENHUIS	☐ OPENB. WEG/PARK

☐ ANDERS (zie kaft): ....

5. HET ADRES IS: ☐ THUIS ☐ VAST WERKADRES ☐ ELDERS:

GEMEENTE: ....

STRAAT: ....NR.......

DAN WEL BIJ ZIJSTRAAT/PLEIN: ....

6. WAT DOE IK OP DIT ADRES? (één aankruisen)

☐ THUISBEZIGHEID (gebruik thuisboekje!) ☐ BETAALD WERK
☐ VRIJWILLIGERS WERK ☐ WEGBRENGEN/HALEN ☐ ANDERS

7. MET WIE REIS IK NAAR DIT ADRES? (meer aankruisen mag)

☐ ALLEEN ☐ PARTNER ☐ KIND(EREN) ☐ ANDER(EN)

8. WAAR HEB IK VANDAAG BESLOTEN NAAR DIT ADRES TE REIZEN?

☐ THUIS ☐ OP EEN ANDER BEZOCHT ADRES ☐ ONDERWEG

At home diary

VRIJDAG

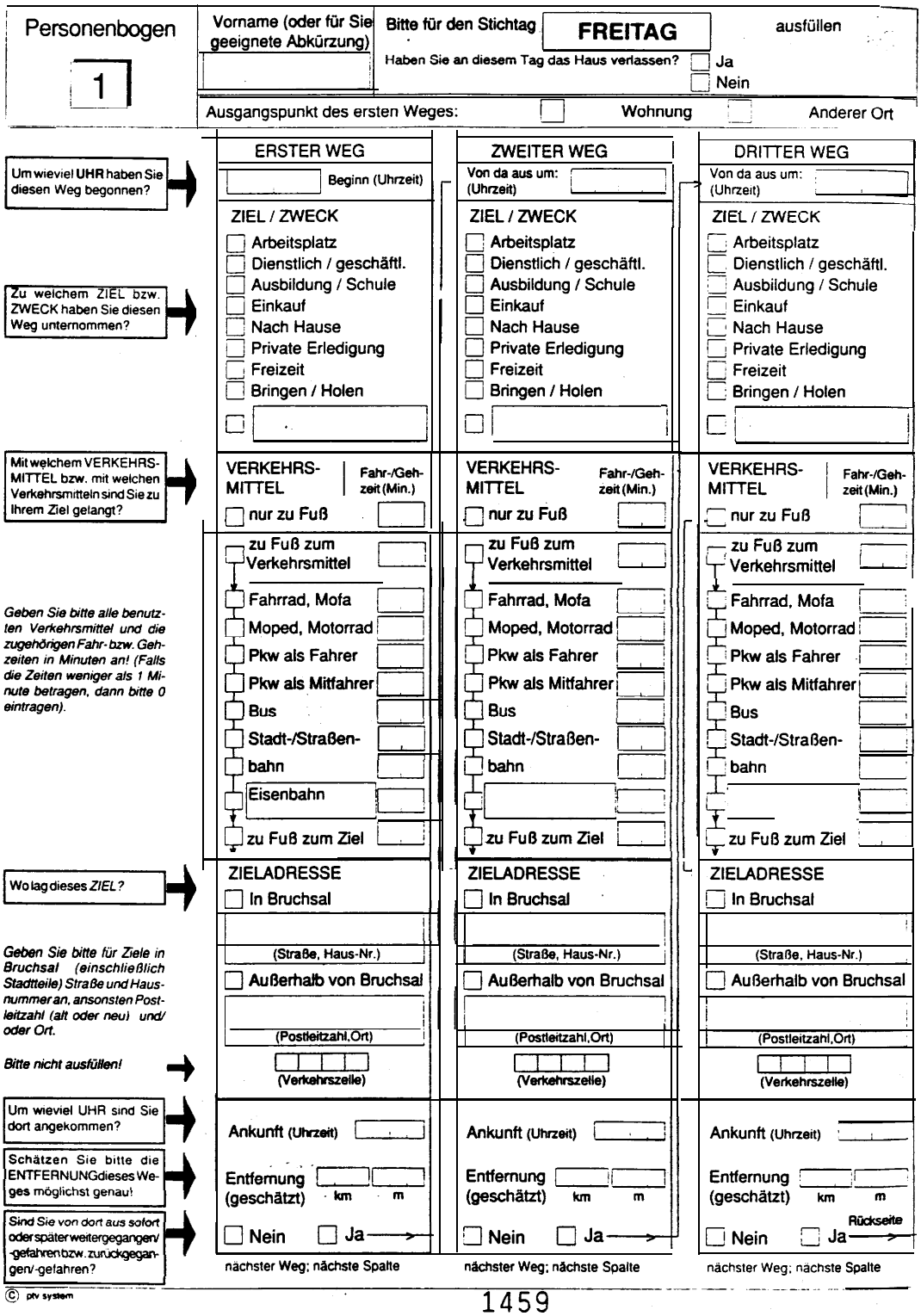
KRUIS S.V.P. AAN WELKE THUISBEZIGHEID U VERRICHT. NOTEER TEVENS DE BEGIN- EN EINDTIJD. (Per keer één bezigheid aankruisen, zie binnenkant kaft voor toelichting).

THUISBEZIGHEID				uren min.
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....
☐ Bet. Werk	☐ Zak. Pr.-Bez.	☐ Slapen	BEGIN	....
☐ Visite Thuis	☐ Eten	☐ Overig	EIND	....

A.17 Bruchsal 1993

Name	Verkehrsentwicklungsplan Bruchsal
Year	1993
Approach	Trip-based
Format	A4 Landscape
Administration	Self-completion
Comments	A further derivative of the KONTIV design. The interesting development in this design is the attempt to capture further stage detail. Both the order of the stages and as well as the duration of the stages are identified, although waiting times are omitted (see also Switzerland 1989).

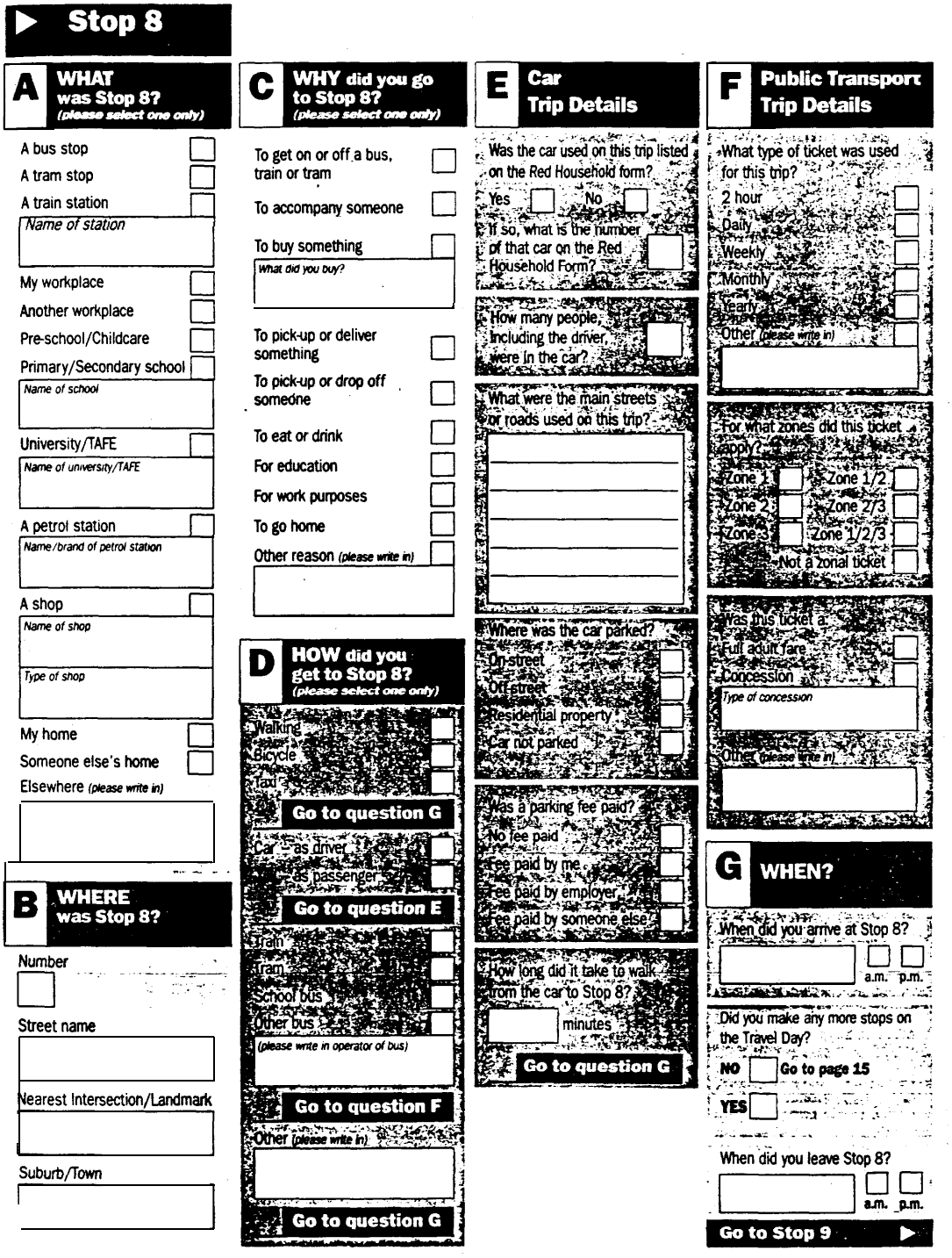
Figure A.17 Diary form: Bruchsal 1993



A.18 VATS 1994

Name	Victoria Activities and Travel Survey (VATS)
Year	1994
Approach	Stage-based
Format	A4 Portrait booklet
Administration	Self-completion
Comments	This is the latest incarnation of a development begun with the Adalaide survey (above). It transforms the format for self-administration by improving the layout and the respondent guidance through the form. The use of the "What was Stop n" - question focuses the attention of the respondent by recalling a further clue, which travel diaries have normally ignored, i.e. the type, name of the physical environment, which might be easier to recall than the street address. Waiting times can be identified for change mode occasions through the formulation of the timing questions. Although the approach is stage-oriented, the timings are not, as they establish arrival and end time at stop, i.e. activity. The large format allows a comprehensive set of questions about the modal details of parking type and cost, public transport ticket type and fares. Unusual for such a current survey is the inclusion of a request to identify the main roads used, which was typical for surveys in the 50's and 60's.

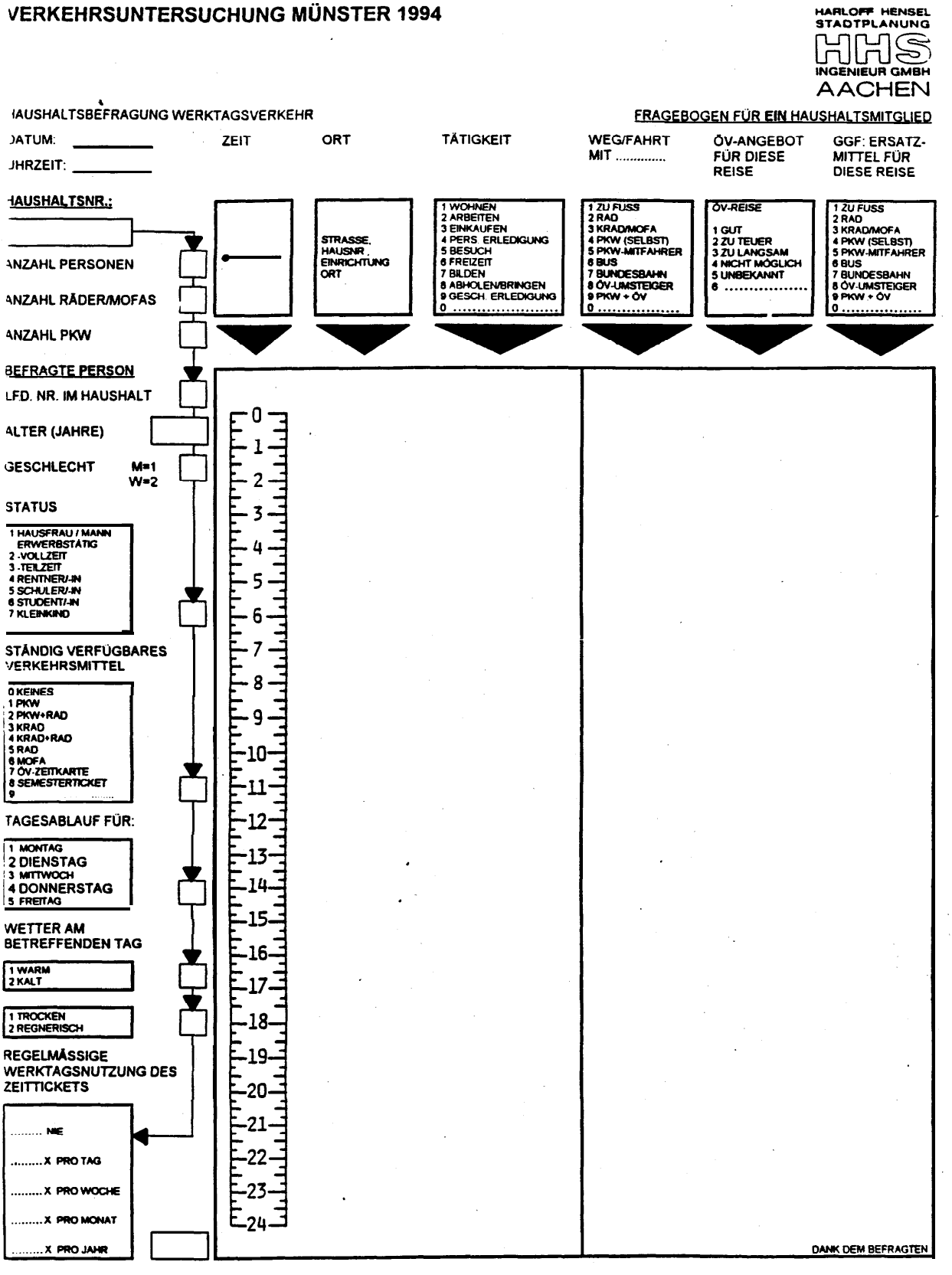
Figure A. 18 Diary form: Victoria Area Travel Survey 1994



A.19 Münster 1994

Name	Verkehrsuntersuchung Münster
Year	1994
Approach	Trip-based
Format	A3 Portrait
Administration	Home interview
Comments	An interesting interviewer form, which does away with precoding trips. The interviewer uses the time line to mark trips established during the personal interview and records destination address, main mode and in this case an assessment of public transport and any alternative mode. The form also includes the person detail as a series of pre-coded questions on the left-hand side of the form. The set of questions is small, but does include a question about the weather, as a typical situation handicap. This question is particularly relevant in Münster, where more than a fifth of all trips are performed by bicycle. This form has been used for the last ten years by the consultants, who have developed it. It is one particular end-point to the German tradition of survey forms.

Figure A.19 Diary form: Münster 1994



A.20 RAC 1994

Name	Royal Automobile Club Car Dependency Study
Year	1994
Approach	Activity-based
Format	A5-booklet
Administration	Self-completion
Comments	This form is in the main derived from design developed by Peter Stopher for Boston. The reason to present it is the inclusion of scheduling related questions on the right side. They concern regularity, planning horizon, ease of replacement, importance and belonging to a larger "project". In this case, these questions are asked for each activity, but there is no reason not to reduce this frequency or replace them with other relevant questions.

1. What was the third thing you did today?
(Tick one answer)

- Activity at work/ work related ☐
- Pick up/ drop off someone ☐
- Study at school/ college ☐
- Weekly/ grocery shopping ☐
- Other shopping ☐
- Visiting/ social/ sport ☐
- Eating out ☐
- Personal business (bank,doctor) ☐
- Something at home ☐
- Other *(Write in)* _____

2. What time did you start the activity?
Write in the time _____ *Tick Box* am ☐ pm ☐

3. What time did you end the activity?
Write in the time _____ *Tick Box* am ☐ pm ☐

4. Where did you carry out this activity? *(Write in)*

Address	Post Code	Miles

5. How many miles was it from the last place?

6. How did you travel there from the last place and how long did it take? *If you use more than one means in one journey, circle one code per line to show 1st, 2nd etc*

Means of transport	First used	2nd used	3rd	4th	
Drove car/motorbike	1	2	3	4	
Given a lift	1	2	3	4	
Walk	1	2	3	4	
Bicycle	1	2	3	4	
Ordinary bus	1	2	3	4	
Special transport	1	2	3	4	
Train/tube	1	2	3	4	Total Journey time
Other	1	2	3	4	
Enter time in mins for each means					

7. If used public transport, cost of fare? £ p

8. Did you travel alone? *(Tick box)*
Yes ☐
Or with..
- Disabled person ☐
- Spouse/partner ☐
- Children ☐
- Other from home ☐
- Other person ☐

9. How many travelled there altogether including you?

10. Did you have any heavy shopping/luggage etc?
Yes ☐
No ☐

DRIVERS ONLY

11. Which vehicle were you in?
Give vehicle ID recorded at front of diary

12. Where did you park? *(Tick box)*
- On-street ☐
- Off-street ☐
- Multi-storey ☐
- At home ☐

13. How long did it take to find a place?
Time in Minutes

14. How much did you pay for parking?
£ p

WHAT DID YOU DO NEXT? Go to the next page for today
OR if you have finished the day go to page 46 for the fifth diary day

Please answer these questions for the activity which you have just described

Q1. How regularly do you perform the activity you have just recorded?
(Tick one answer)

- More than once a day ☐
- Once a day ☐
- 2-4 times a week ☐
- Once a week ☐
- Less often than once a week ☐

Q2. When did you first decide to undertake the activity you have just recorded?
(Tick one answer)

- On the spur of the moment ☐
- Earlier today ☐
- Yesterday ☐
- During the past week ☐
- Sometime before this ☐
- It's a regular activity you undertake almost everyday ☐

Q3. If you had not been able to undertake this activity today and at this time, could you have carried it out.....
(Tick ALL answers which apply)

- At a different time of the day ☐
- On a different day of the week ☐
- At a different location ☐
- Could not have changed arrangements at all ☐
- Would have to cancel this activity altogether ☐

Q4. Now could you rate the importance of the activity you have just undertaken, on a scale from "0" to "10", where "0" is very unimportant and "10" extremely important. Assume that an activity like relaxing at home in the evening is rated "5".
(Use the scale from "0" very unimportant to "10" extremely important)

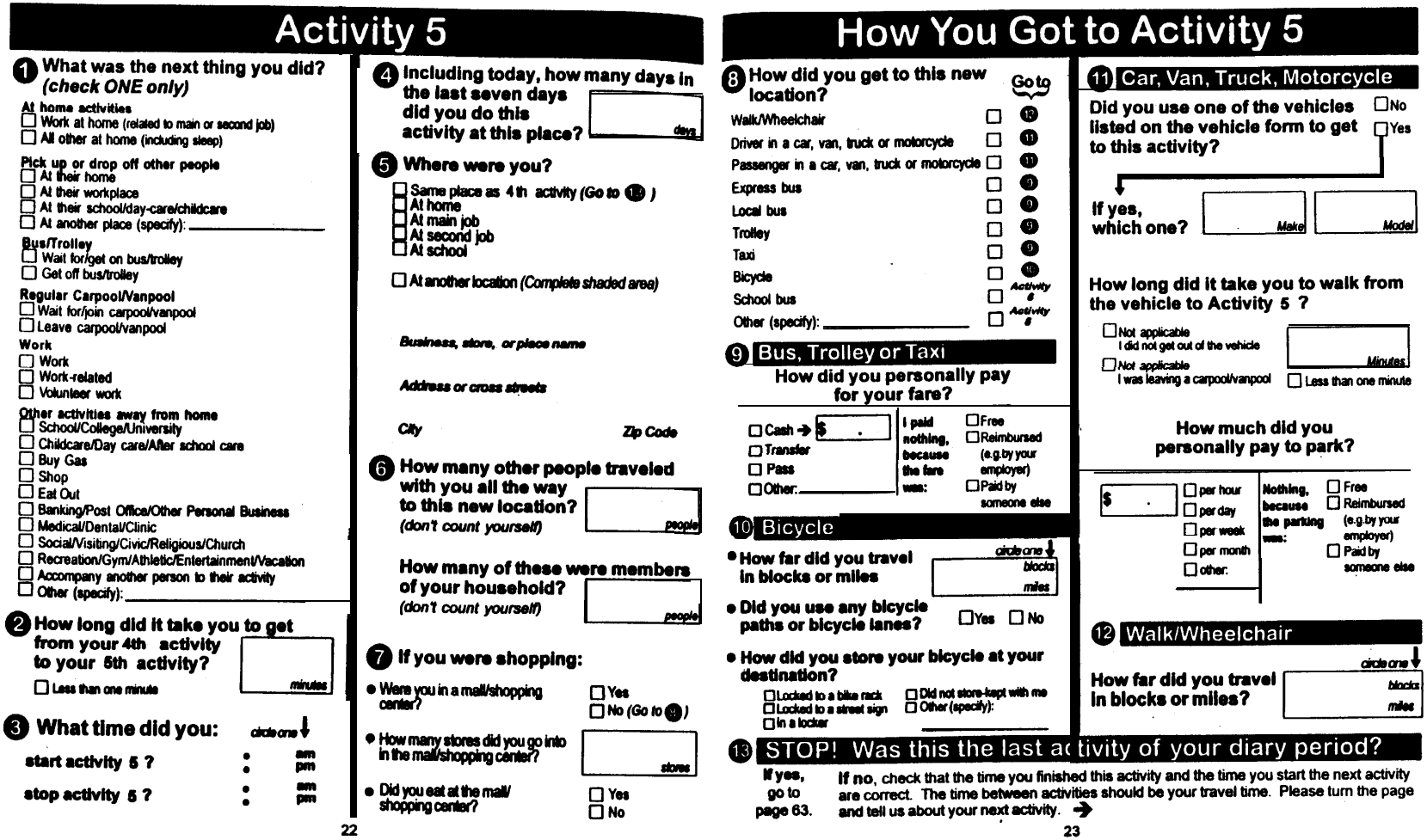
☐

Q5. Does this activity form part of a future activity?
(Tick one answer)
Yes ☐
No ☐

A.21 **Dallas/Fort Worth 1995** - Pilot **instrument**

Name	Travelcount 1995 - Pilot instrument
Year	1995
Approach	Activity/Stage-based
Format	about 2/3 A4 Landscape-booklet
Administration	Self completion and telephone retrieval
Comments	This form is an interesting development of the original activity-based design. It adopts the stage-based orientation to the activity-based design. Note the level of detail for the change-mode activities, which includes car pooling explicitly. In addition, it provides for a break down of in-home activities into work and non-work, thereby moving the approach closer to a true time-budget type survey. Also interesting are the request to state the number of shops visited in a mall and the request to state activity frequency. Note that the bicycling parking is detailed finer than car parking, which is rather unexpected given the place of the survey.

Figure A.21 Diary form: Dallas/Fort Worth 1995



Activity 5

1 What was the next thing you did? *(check ONE only)*

At home activities
- ☐ Work at home (related to main or second job)
- ☐ All other at home (including sleep)

Pick up or drop off other people
- ☐ At their home
- ☐ At their workplace
- ☐ At their school/day-care/childcare
- ☐ At another place (specify): _____

Bus/Trolley
- ☐ Wait for/get on bus/trolley
- ☐ Get off bus/trolley

Regular Carpool/Vanpool
- ☐ Wait for/join carpool/vanpool
- ☐ Leave carpool/vanpool

Work
- ☐ Work
- ☐ Work-related
- ☐ Volunteer work

Other activities away from home
- ☐ School/College/University
- ☐ Childcare/Day care/After school care
- ☐ Buy Gas
- ☐ Shop
- ☐ Eat Out
- ☐ Banking/Post Office/Other Personal Business
- ☐ Medical/Dental/Clinic
- ☐ Social/Visiting/Civic/Religious/Church
- ☐ Recreation/Gym/Athletic/Entertainment/Vacation
- ☐ Accompany another person to their activity
- ☐ Other (specify): _____

2 How long did it take you to get from your 4th activity to your 5th activity?

☐ Less than one minute

minutes

3 What time did you: *circle one*

start activity 5 ? : am pm

stop activity 5 ? : am pm

4 Including today, how many days in the last seven days did you do this activity at this place?

days

5 Where were you?
- ☐ Same place as 4th activity *(Go to 13)*
- ☐ At home
- ☐ At main job
- ☐ At second job
- ☐ At school
- ☐ At another location *(Complete shaded area)*

Business, store, or place name

Address or cross streets

City *Zip Code*

6 How many other people traveled with you all the way to this new location? *(don't count yourself)*

people

How many of these were members of your household? *(don't count yourself)*

people

7 If you were shopping:
- Were you in a mall/shopping center? ☐ Yes ☐ No *(Go to 9)*
- How many stores did you go into in the mall/shopping center?

stores

- Did you eat at the mall/shopping center? ☐ Yes ☐ No

How You Got to Activity 5

8 How did you get to this new location?

		Go to
Walk/Wheelchair	☐	12
Driver in a car, van, truck or motorcycle	☐	11
Passenger in a car, van, truck or motorcycle	☐	11
Express bus	☐	9
Local bus	☐	9
Trolley	☐	9
Taxi	☐	9
Bicycle	☐	10
School bus	☐	Activity 6
Other (specify): _____	☐	Activity 6

9 Bus, Trolley or Taxi

How did you personally pay for your fare?

- ☐ Cash → $.
- ☐ Transfer
- ☐ Pass
- ☐ Other: _____

If paid nothing, because the fare was:
- ☐ Free
- ☐ Reimbursed (e.g.by your employer)
- ☐ Paid by someone else

10 Bicycle

- **How far did you travel in blocks or miles** *circle one* blocks / miles
- **Did you use any bicycle paths or bicycle lanes?** ☐ Yes ☐ No
- **How did you store your bicycle at your destination?**
  - ☐ Locked to a bike rack
  - ☐ Locked to a street sign
  - ☐ In a locker
  - ☐ Did not store-kept with me
  - ☐ Other (specify): _____

11 Car, Van, Truck, Motorcycle

Did you use one of the vehicles listed on the vehicle form to get to this activity? ☐ No ☐ Yes

If yes, which one? Make _____ Model _____

How long did it take you to walk from the vehicle to Activity 5 ?
- ☐ Not applicable I did not get out of the vehicle
- ☐ Not applicable I was leaving a carpool/vanpool

Minutes

☐ Less than one minute

How much did you personally pay to park?

$.

- ☐ per hour
- ☐ per day
- ☐ per week
- ☐ per month
- ☐ other: _____

Nothing, because the parking was:
- ☐ Free
- ☐ Reimbursed (e.g.by your employer)
- ☐ Paid by someone else

12 Walk/Wheelchair

circle one

How far did you travel in blocks or miles? blocks / miles

13 STOP! Was this the last activity of your diary period?

If yes, go to page 63.

If no, check that the time you finished this activity and the time you start the next activity are correct. The time between activities should be your travel time. Please turn the page and tell us about your next activity. →

B SURVEYCONTENTS

This appendix provides detailed list of the content of the 104 surveys reviewed. It also includes a table showing the results of Dumble (1979).

The following abbreviations are used in the tables:

Common abbreviations

Fact	indicates that the incidence of the item is established by the form withou. further detail, e.g. that the respondent used paid parking, but not how high the fee was.
m	Distance in metres or other units
min	Duration in minutes
Numbers	indicate the number of classes provided by the form.
Open	Open answer
Other	Open other category in conjunction with predefined categories
Yes	Fact and sometimes further detail are established
#	Count

Age

YOB	Year of birth

Company

ID	ID numbers from the household form
Pool	Indication of a car-pooling arrangement

Design

KONTIV	Survey form is a derivative of the original KONTIV design
SEQL	Variant of the SE Queensland design

Distance to public transport stop

1., 2....	To nearest. to the two nearest ...

Duration

AT	Access times
ST	Search times
TT	Transfer times
WT	Wait times

End location

Class	A small number of classified types of location
Muni	Only at the level of municipality
Stop	Public transport stop

Flexibility

Hours	Starting and end time of work

Public transport cost

Amount	Exact amount of fare

	Type	Type of ticket
Race		
	POB	Place of birth
Residence type		
	Size	Size of building in square footage, number of rooms etc.
	Type	Type of building
Sex		
	from licence	Established from drivers licence records
	Housewife	Established for housewives from employment classification
Stages		
	Existence	Existence, but not order of the stages is known
	Importance	Respondent-assessed importance and existence of the stages is known
	Order	Order and existence of the stages is known
	OVT	Amount of out-of-vehicle time is known
	PT access	Only PT transport access stages are established individually
	PT stages	Only distinct public transport stages are established, otherwise no breakdown by stages
Start/End time		
	Act	Start/End times of activity are known
To head		
	Marital	Marital status only
	To first	Relationship to the person numbered "1"
	To head	Relationship to head of household
	To oldest	Relationship to oldest person in the household
	To sample	Relationship to the person sampled originally
Work amount		
	FT/PT	Only full time, part time distinction
	Hours	Exact number of hours worked
Work status		
	Yes & ed	Allows for respondents to indicate simultaneous participation in both work and education

Figure B.1 Items related to movement (Part 1)

Country	City	Year	Approach	Movement									
				Stages	Purpose	Mode	Company	Start time	End time	End location	Distance	Duration	Land use
UK	London	1949	Trips	-					-	-			-
UK	London	1954	Half-tour	-	5	6 & no walk		Yes	Yes	Yes			-
USA	BPR	1954	Stage	Order	10	5 (MIV&PT)	#	Yes	Yes	Yes			-
USA	Detroit	1955		-	nk	nk	#	Yes	Yes	Yes			Yes
D	Hamburg	1956	Trip	-	Work/Shop	17, no walking	-	Yes	Yes	Stop		of walks	-
USA	CATS	1956	Stage	Order	10	9 (MIV&PT)	#	Yes	Yes	Yes			-
D	Castrop-Rauxel	1962	Trip	-		Car only	#	Yes	-	Yes			-
UK	LATS	1962	Stage	Order	11	9 & no walk	#	Yes	Yes	Yes			-
UK	Leicester	1963	Stage	Order	9	10	#	Yes	Yes	Yes		AT	-
USA	New York Tri-State	1963	Stage	Order	10	10	#	Yes	Yes	Yes			-
D	Bruchsal	1964	Trip	-	6	Car only	#	Yes	-	Yes			-
USA	Bay Area	1965	Stage	Order	16 & other	14 & other	#	Yes	Yes	Yes	Blocks walke	ST, WT, TT	Yes
NL	Western Netherlands	1966	Trip	Order	11 & other	11 & other		Yes	Yes	Yes			Yes
USA	Victoria, Texas	1967	Stage	Order	10	10	#	Yes	Yes	Yes		-	Yes
D	Pforzheim	1967	Trip	-	3 (4)	Car only	#	Yes	Yes	Yes	-	-	-
D	Chemnitz	1968	Trip	-	6	8		Yes	-	Yes		of trip	-
D	Chemnitz	1968	Trip	-	5	8, no walking		Yes	Yes	Yes			-
D	Karlsruhe	1968	Trip	-	6	11, no walking		Yes	-	Yes			-
D	Stuttgart	1968	Stage	Order	7	9 & no walk	#	Yes	Yes	Yes			-
USA	Washington, DC COG	1968	Stage	Order	11	10	#	Yes	Yes	Yes	-	-	Yes
USA	CATS	1970	Stage	Order	9	10	#	Yes	Yes	Yes		AT	-
S	Uppsala	1971	Trip	-	Open	7 & other	#	Act	Act	Yes			-
UK	LATS	1971	Stage	Order	11	11	#	Yes	Yes	Yes			Yes
USA	FHWA	1973	Stage	Order	9	9		Yes	Yes	Yes			-
D	Germany	1973	Trip	Existence	5 & other	9 & other		Yes	Yes	Muni.	Estimate		-
UK	London/Cullen&Phlep	1974	Time budget	Order	Open	Open	Type	Act	Act	Yes			-
DK	Denmark	1975	Trip	Existence	15	17	#	Yes	-	-	of trip	of trip	-
UK	UK	1975/76	Stage	Order	14 & other	13 & 2 other	#	of trip	of trip	of trip	Estimate	of stages	-
F	Grenoble	1976	Trip	-	12	13	#	Yes	Yes	Yes			-
USA	Baltimore	1976	Trip	-	5 & other	9 & other	#/Pool	Yes	Yes	Yes	Route		Yes

Figure B.1 Items related to movement (Part 1) (continued)

Country	City	Year	Approach	Movement									
				Stages	Purpose	Mode	Company	Start time	End time	End location	Distance	Duration	Land use
USA	Baltimore	1976	Trip	-	5 & other	9 & other	#/Pool	Yes	Yes	Yes	-	-	Yes
USA	Michigan	1976	Half tour	OVT	68	Car only	#	Yes	-	Muni.	Estimate	Yes	-
CAN	Hamilton, Ontario	1978	Trip	-	Open	Open	#	Yes	-	Yes	-	-	-
CAN	Canada	1979/88	Fuel tank	-	-	-	-	Day	-	-	Odometer	-	-
AUS	Sydney	1981	Stage	Order	20	12	ID	Yes	Yes	Yes	-	-	-
D	Stuttgart	1981	Trip	Existence	5 & other	11 & other	-	Yes	Yes	Yes	Estimate	-	-
NL	Netherlands OVG	1981	Trip	Order	5 & other	9 & other	#	Yes	Yes	Yes	of mode	-	5 & other
SG	Singapore	1981	Trip	Order	9	12	#	Yes	Yes	Yes	-	-	-
UK	LATS	1981	Stage	Order	12 & other	12 & other	#	Yes	Yes	Yes	-	-	Yes
USA	Bay Area	1981	Stage	Order	15	19	#/Pool	Yes	Yes	Yes	-	WT	-
CH	Switzerland	1984	Trip	Existence	5 & other	9 & other	-	Yes	Yes	Yes	Estimate	-	-
USA	Houston-Galveston	1984	Trip		6	5 & other	#	Yes	-	Yes	-	-	-
D	Duisburg	1984/85	Trip		10	14	-	Yes	Yes	Yes	-	-	-
F	Grenoble	1985	Trip	Order	19	14	#	Yes	Yes	Yes	-	of parking	-
NL	Netherlands OVG	1985	Trip	Existence	7 & other	9 & other	-	Yes	Yes	Muni.	of mode	-	-
CAN	Quebec	1985/86	Half tour	OVT	7 & other	Car only	#	Yes	Yes	Class	Odometer	-	-
S	Stockholm	1985/86	Trip	Existence	6 & other	6 & other	-	Yes	Yes	Yes	-	-	-
UK	UK	1985/86	Stage	Order	14 & other	14 & 2 other	#	of trip	of trip	-	Estimate	of stages	-
A	Wien	1986	Trip	Existence	7 & other	11 & other	-	Yes	Yes	Yes	Estimate	-	-
AUS	Adelaide	1986	Stage	Order	12	17	-	Yes	Yes	Yes	-	-	-
AUS	Cairns	1986	Trip	Existence	6 & other	7 & other	-	Yes	Yes	Yes	-	-	-
D	Karlsruhe	1986	Trip	-	7	9	-	Yes	-	Yes	-	-	-
D	Kreis Unna	1986	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes	-	-	-
D	Mühlacker	1986	Trip	PT stages	6	6	-	Yes	Yes	Yes	-	-	-
DK	Denmark	1986	Trip	Existence	5	12	-	Yes	Yes	-	of stage	-	-
B	Belgium	1986/87	Activity	Existence	15	9 & other	#/# fam	Yes	Yes	-	of stage	of stage	-
NL	Dutch panel	1987	Trip	Order	13	12	#	Yes	Yes	Yes	Estimate	of stage	-
CAN	Ontario	1988	Half tour	OVT	4 & other	Car only	#	Yes	Yes	Class	Odometer	-	-
D	Leverkusen	1988	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes	-	-	-
UK	S Yorkshire	1988	Trip	PT access	9	10	#	Yes	Yes	Yes	-	-	-

Figure B.1 Items related to movement (Part 1) (continued)

Country	City	Year	Approach	Movement									
				Stages	Purpose	Mode	Company	Start time	End time	End location	Distance	Duration	Land use
USA	CA Telecommute	1988	Stage	Order	10 & other	2 & other	#	Yes	Yes	Yes	Odometer		-
SG	Singapore	1988/89	Stage	Order	7	13	-	trip	trip	Yes		of stage	Yes
CH	Switzerland	1989	Trip	Existence	5 & other	8 & other	#	Yes	Yes	Yes	Estimate	of mode	-
D	Essen	1989	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes	-	-	-
D	Germany	1989	Trip			Car only	#	Yes	Yes	-	of trip	-	-
D	Germany	1989	Trip	Existence	5 & other	11 & other	-	Yes	Yes	Muni.	Estimate		-
B	Charleroi	1989/90	Trip	Existence	11 & other	13	-	Yes	Yes	Yes			-
NZ	New Zealand	1989/90	Stage	Order	12	9	#	Yes	Yes	Yes	Estimate		-
D	Münster	1990	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes			-
N	Trondheim	1990	Trip	Existence	6 & other	6 & other	ID	Yes	Yes	Yes		TT	-
NL	Netherlands	1990	Trip	Order	8 & other	9 & other	-	Yes	Yes	Muni.	of stage		-
USA	Bay Area	1990	Stage	Order	16	23 & other	#/Pool	Yes	Yes	Yes			-
B	Brussels	1990/91	Trip	Order	n.k.	9+	-	Yes	Yes	Yes		-	-
UK	Swindon	1990/91	Trip	-	8	10	#	Yes	Yes	Yes		of search	-
A	Wien	1991	Trip	Existence	9	12	-	Yes	Yes	Yes	Estimate	-	-
CH	Northwest Switzerland	1991	Trip	Existence	5 & other	8 & other	#	Yes	Yes	Yes	Estimate	of mode	-
D	Hagen	1991	Trip	Order	8	8	-	Yes	Yes	Yes	Estimate	of stages	-
D	SrV	1991	Trip	Existence	7 & other	10 & other	-	Yes	Yes	Yes	Estimate		-
SG	SIngapore	1991	Stage	Order	13	10	#	Yes	Yes	Yes			-
Turkey	Bursa	1991	Trip	Order	12	15	-	Yes	Yes	Yes		of stage	-
UK	LATS	1991	Stage	Order	13	15	#	Yes	Yes	Yes			Yes
UK	S Yorkshire	1991	Trip	PT access	9	10	#	Yes	Yes	Yes			-
USA	Boston	1991	Activity	Order	10 & other	11	#	Act	Act	Yes		of trip	-
USA	CATS	1991	Stage	Order	10 & other	9 & other	#	Yes	Yes	Yes	Blocks w	-	-
USA	S California	1991	Activity	Order	11 & other	11	#	Act	Act	Yes		of trip	-
AUS	SE Queensland	1992	Stage	Order	8 & other	10 & other	#	Yes	Yes	Yes		-	-
CH	Cantons Zurich & Zug	1992	Trip	Order	Open	Open	-	Yes	Yes	Yes	Estimate	of stage	-
Chile	Santiago	1992	Trip	Order	7 & other	10 & other	#	Yes	Yes	Yes	of walks		-
D	Karlsruhe	1992	Trip	Importance	7 & other	8 & other	-	Yes	Yes	Yes	Estimate		-
D	Übach-Palenberg	1992	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes			

Figure B.1 Items related to movement (Part 1) (continued)

Country	City	Year	Approach	Movement									
				Stages	Purpose	Mode	Company	Start time	End time	End location	Distance	Duration	Land use
NL	Dijst & Vidakovic	1992	Trip	Order	5	8	Type	Yes	Yes	-		-	25
UK	London Transport	1992	Stage	Order	10	8 & no walk	-	Banded	-	Stop		-	-
USA	West Davis	1992	Stage	Order	11 & other	11 & other	#	Yes	Yes	Yes	Estimate	-	-
DK	Denmark	1992/94	Stage	Existence	5	12	-	Yes	Yes	Type	of stage	-	-
D	Bruchsal	1993	Trip	Order	8 & other	9	-	Yes	Yes	Yes	Estimate	of stage	-
NL	Netherlands OVG	1993	Trip	Existence	7 & other	9 & other	-	Yes	Yes	Yes	of mode		-
UK	West Midlands	1993	Stage	Order	Open	Bus only	-	Yes	-	Yes			-
USA	Wasatch, Utah	1993	Activity	Order	11 & other	9	##fam	Yes	Yes	Yes		of trip	-
F	France	1993/94	Trip	Order	24	30	#	Yes	Yes	Yes	of trip		-
AUS	Victoria	1994	Stage	Order	9 & other	9 & other	#	Yes	Yes	Yes	-		-
D	Münster	1994	Trip	-	9 & other	9 & other	-	Yes	Yes	Yes	-		-
NL	Netherlands OVG	1994	Trip	Existence	7 & other	10 & other	-	Yes	Yes	Yes	of mode		-
UK	RAC-Survey	1994	Activity	Existence	8 & other	7	Type	Yes	Yes	Yes	-	of trip	-
UK	RAC-Survey	1994	Activity	Order	9 & other	8	#	Yes	Yes	Yes	-	of stage	-
USA	Southeast Michigan	1994	Act/Stage	Order	12 & other	14	##fam	Yes	Yes	Yes	-		-
USA	Dallas/Fort Worth	1995	Act/Stage	Order	23 & other	9 & other	##fam	Yes	Yes	Yes	walk/bike	of stage	-
USA	New York MTC	1995	Activity	Order	23	15 & other	##fam	Yes	Yes	Yes	-	of trip	-
USA	Oahu	1995	Activity	-	16 & other	11 & other	##fam	Yes	Yes	Yes	of walk		-

Figure B.2 Items related to movement (Part 2)

City	Year	Movement									Day
		Parking				PT		Distance	Vehicle	Situational	Reason for
		Type	Cost	Distance	Other costs	Cost	Stop/Line	to stop	ID	handicap	no mobility
London	1949	-	-	-		-	-	-	-	-	-
London	1954	-	-	-		Amount	-	-	-	-	-
BPR	1954	10	Fact	-		-	-	-	-	-	-
Detroit	1955	-	-	-		-	-	-	-	-	-
Hamburg	1956	At work	-	-		Ticket	Stop	-	-	-	Yes
CATS	1956	10	Fact	-		-	-	Blocks	-	-	-
Castrop-Rauxel	1962	-	-	-		-	-	-	-	-	-
LATS	1962	-	-	-		Type/Amount	Bus route	-	-	-	-
Leicester	1963	4	-	Location		-	-	-	-	-	-
New York Tri-State	1963	9	Amount	min		-	-	min	-	-	-
Bruchsal	1964	-	-	-	-	-	-	-	-	-	-
Bay Area	1965	10 & other	Amount	-	-	-	-	-	-	Car avail. for PT	-
Western Netherlands	1966	-	Amount	-	Tolls	Type	Line	-	-	-	-
Victoria, Texas	1967	10	Fact	-	-	-	-	-	-	-	-
Pforzheim	1967	-	-	-	-	-	-	-	-	-	-
Chemnitz	1968	-	-	-	-	-	-	-	-	-	Null return
Chemnitz	1968	-	-	-	-	-	-	-	-	-	Null return
Karlsruhe	1968	3	Fact	-	-	-	-	-	-	-	-
Stuttgart	1968	-	-	-	-	-	-	min	-	-	3
Washington, DC CO	1968	10	Fact	Blocks	-	-	-	-	Yes	-	-
CATS	1970	-	Fact	-	-	Type	-	-	-	-	-
Uppsala	1971	-	-	-	Act	-	-	-	-	-	-
LATS	1971	8	Amount	-	-	Type/Amount	Bus/U	-	-	-	-
FHWA	1973	-	-	-	-	-	-	-	-	-	-
Germany	1973	-	-	-	-	-	-	-	-	-	Open
London/Cullen&Phle	1974	-	-	-	-	-	-	-	-	-	-
Denmark	1975	-	Amount	-	-	Type	-	-	-	-	-
UK	1975/76	-	-	-	-	Type/Amount/	-	-	Yes	-	-
Grenoble	1976	-	-	-	-	-	-	-	-	-	-
Baltimore	1976	-	Amount	Location	Tolls	Amount	-	-	Yes	-	-

Figure B.2 Items related to movement (Part 2) (continued)

City	Year	Movement				PT		Distance	Vehicle	Situational	Day
		Parking									
		Type	Cost	Distance	Other costs	Cost	Stop/Line	to stop	ID	handicap	Reason for no mobility
Baltimore	1976	-	-	-	-	-	-	-	Yes	-	-
Michigan	1976	-	-	-	-	-	-	-	Yes	-	-
Hamilton, Ontario	1978	-	-	-	of activity	-	-	-	-	-	-
Canada	1979/88	-	-	-	Fuel price	-	-	-	-	-	-
Sydney	1981	10 & other	Fact	-	-	Type	Stop	-	Yes	-	5 & other
Stuttgart	1981	-	-	-	-	-	-	-	-	-	Open
Netherlands OVG	1981	-	-	-	-	-	-	-	-	-	-
Singapore	1981	-	Amount	min	ALS	Amount	-	min	-	-	-
LATS	1981	9	Amount	-	-	Type/Amount	Bus/U	-	-	-	-
Bay Area	1981	9	Amount	-	Tolls	Amount	-	-	Yes	-	-
Switzerland	1984	-	-	-	-	-	-	-	-	-	Open
Houston-Galveston	1984	-	-	-	-	-	-	-	-	-	-
Duisburg	1984/85	-	-	-	-	-	-	-	-	-	Open
Grenoble	1985	-	-	-	-	Type	-	-	-	-	-
Netherlands OVG	1985	-	-	-	-	-	-	-	-	-	Open
Quebec	1985/86	-	-	-	-	-	-	-	Yes	-	-
Stockholm	1985/86	-	-	-	-	-	Lines	-	-	-	Open
UK	1985/86	6 & other	Amount	-	-	Amount	Transfers	-	Yes	-	-
Wien	1986	-	-	-	-	-	Line	-	-	-	Open
Adelaide	1986	7 & other	Amount	-	-	Type/Amount	-	-	-	-	-
Cairns	1986	-	-	-	-	-	-	-	-	-	Open
Karlsruhe	1986	-	-	-	-	-	-	-	-	-	Null return
Kreis Unna	1986	-	-	-	-	-	-	-	-	Weather	-
Mühlacker	1986	-	-	-	-	-	Stop	-	-	-	-
Denmark	1986	-	-	-	-	-	-	-	-	-	Yes
Belgium	1986/87	-	-	-	-	-	-	-	-	-	-
Dutch panel	1987	-	-	-	-	-	-	-	-	-	Open
Ontario	1988	-	-	-	-	-	-	-	Yes	-	-
Leverkusen	1988	-	-	-	-	-	-	-	-	-	-
S Yorkshire	1988	-	Amount	-	-	Amount	-		-	-	-

Figure B.2 Items related to movement (Part 2) (continued)

City	Year	Movement									Day	
		Parking				PT		Distance	Vehicle	Situational	Reason for	
		Type	Cost	Distance	Other costs	Cost	Stop/Line	to stop	ID	handicap	no mobility	
CA Telecommute	1988						Line	-	Yes			
Singapore	1988/89		Amount	-	ALS, Car pool	Amount	Yes	-	-	Weather		
Switzerland	1989							-	-			
Essen	1989		-	-			-	-	-			
Germany	1989									Luggage	Yes	
Germany	1989							-	-		Open	
Charleroi	1989/90						Line	-	-			
New Zealand	1989/90	6 & other						-	Yes			
Münster	1990							-	-			
Trondheim	1990		Amount	min				min	-			
Netherlands	1990	-	-	-	-			-	-		Open	
Bay Area	1990	8	Amount	-	Tolls	Type/Amount	-	-	Yes	-		
Brussels	1990/91	-	-	-	-	-	Line	-	-			
Swindon	1990/91	2	Fact	-	-	-	-	-	Yes	# of kids	-	
Wien	1991	5	-	min	-	-	Line	m	-	Yes	Open	
Northwest Switzerlan	1991				-	-		-	-	-	7	
Hagen	1991	3		min				min	-	-	-	
SrV	1991		-	-		-		-	-	-	Open	
SIngapore	1991	6	Amount	-	Area licence	Amount		Bus/MRT	Yes		2 & other	
Bursa	1991		-	-	-					-		
LATS	1991	4	Amount	-		Type/Amount	-	-	Yes	Kids <5		
S Yorkshire	1991		Amount	-		Amount	-	-	-			
Boston	1991	3	Amount	-		Type/Amount	-	-	-		-	
CATS	1991		-	-		-	-	-	-		Open	
S California	1991	3	Amount	-		Type/Amount	-	-	-		-	
SE Queensland	1992	4	Amount	min	Tolls	Type/Amount	Stop	-	Yes		Open	
Cantons Zurich & Zu	1992		-	-		-	-	WT	-			
Santiago	1992		Amount	blocks	% of pool	-	Stop	Blocks	-			
Karlsruhe	1992							-	-			
Übach-Palenberg	1992		-	-	-	-	-	-	-	Weather		

Figure B.2 Items related to movement (Part 2) (continued)

City	Year	Movement				PT		Distance	Vehicle	Situational	Day
		Parking									
		Type	Cost	Distance	Other costs	Cost	Stop/Line	to stop	ID	handicap	Reason for no mobility
Dijst & Vidakovic	1992	-	-	-	-	-	-	-	-	-	-
London Transport	1992	-	-	-	-	Type	Yes	-	-	-	-
West Davis	1992	3	Amout	-	Toll	Amount	-	-	Yes	-	-
Denmark	1992/94	-	-	-	-	-	-	-	-	-	-
Bruchsal	1993	-	-	-	-	-	-	-	-	-	Open
Netherlands OVG	1993		-	-	-	-	-	-	-	-	Open
West Midlands	1993	-	-	-	-	Type	-	-	-	-	-
Wasatch, Utah	1993	-	-	-	-	-	-	-	-	-	-
France	1993/94	7	-	-	-	-	-	-	Yes	Luggage	-
Victoria	1994	4	Fact	min	-	Type & zones	Stop	-	Yes	-	Open
Münster	1994	-	-	-	-	-	-	-	-	Weather	-
Netherlands OVG	1994	-	-	-	-	-	-	-	-	-	Open
RAC-Survey	1994	-	-	-	-	-	-	-	-	-	-
RAC-Survey	1994	4	Amount	-	-	Amount	-	-	Yes	Luagag, other people	-
Southeast Michigan	1994	-	Amount	-	-	Amount	-	-	-	-	-
Dallas/Fort Worth	1995	-	Amount	min	Taxi	Amount	-	-	Yes	-	-
New York MTC	1995	-	-	-	Taxi	Type	Stops	-	Yes	-	-
Oahu	1995	6 & other	Amount	-	Taxi	Type	-	Access m	Yes	-	-

Figure B.3 Items related to person (Part 1)

City	Year	Person												
				Race/	To head/		Work					Licences		
		Sex	Age	Nationality	Marital	Education	Status	Amount	Profession	Flexibility	Income	MIV	Duration	Cycle
London	1949	-			-	-								
London	1954	Yes	Age		-	-	Yes	-			Yes			
BPR	1954	Yes	-	Race	-	-	Yes	-	Open	-	-			
Detroit	1955	Yes	Yes	Race	-	-	Yes	?	Yes		(Yes)			
Hamburg	1956	Yes	YOB		Marital	-	Yes	Hours	9	Shift	-			
CATS	1956	Yes	Age	Race	To head	-	Yes	-	Open		-	Car	-	-
Castrop-Rauxel	1962	-	-		-	-	Yes	-	4 & open	-	-			-
LATS	1962	Yes	Age				Yes	-	Open		-		-	-
Leicester	1963	Yes	-		to head	Yes	Yes	-	Open	-	-			-
New York Tri-State	1963	Yes	Age	-	to head	-	Yes	-	Open	-	-	Car	-	-
Bruchsal	1964	-	-	-	-	-	Yes	-	4 & open	-		-	-	-
Bay Area	1965	Yes	YOB	-	To head	Yes	Yes & ed	FT/PT	Open			Car	-	-
Western Netherlands	1966	Yes	Age	-	to head/mar	-	Yes & ed	FT/PT	Open	-		-	-	-
Victoria, Texas	1967	Yes		-	to head	-	Yes	-	Open	-		-	-	-
Pforzheim	1967	Housewives	-	-	-	-	Yes	-	6			-	-	-
Chemnitz	1968	Yes	YOB		-	Yes	Yes	-		-	Yes	-	-	-
Chemnitz	1968	Yes	Banded	-	-	-	Yes	-	4			-	-	-
Karlsruhe	1968	Yes	Banded	-	To head	-	Yes	-	Open	-		Class	-	-
Stuttgart	1968	Yes	Banded	-	-	-	Yes & ed	Hours	4	-		-	-	-
Washington, DC CO	1968	Yes	Age	Race of head	To head	of head	Yes	FT/PT		-		Car	-	-
CATS	1970	Yes	Banded	-	To head	-	Yes	FT/PT	Open	-	-	Car	-	-
Uppsala	1971	Yes	Age	-	to head	-	Yes	Hours	Open		-	Car	-	-
LATS	1971	Yes	Banded	-	To head/ma	-	Yes	FT/PT	Open	Hours	-	Car/MC	-	-
FHWA	1973	Yes	Age	-	To head/ma	-	-	-	-	-	-			-
Germany	1973	Name	YOB	-	Marital	Yes	Yes	FT/PT	6		-	Class	-	-
London/Cullen&Phle	1974	Yes	Banded	POB/Parents	to head	-	Yes	Hours	Open	Shift	Yes	(Car/MC)	-	Yes
Denmark	1975	Yes	YOB	-	to head	Yes	Yes	FT/PT	8	-	Yes	Car/MC	-	-
UK	1975/76	Yes	Age	-	To head/ma	-	Yes & ed	FT/PT	Open	-	Yes	6	Yes	-
Grenoble	1976	Yes	Age	-	To head	Yes	Yes	-		-	-	Car	-	-
Baltimore	1976	Yes	Age	Race	Marital	Yes	Yes	Hours	Open	Yes	Yes	Car	-	-

Figure B.3 Items related to person (Part 1) (continued)

City	Year	Person					Work					Licences		
		Sex	Age	Race/ Nationality	To head/ Marital	Education	Status	Amount	Profession	Flexibility	Income	MV	Duration	Cycle
Baltimore	1976	Yes	Age	Race	Marital	Yes	Yes	Hours	Open	Yes	Yes	Car	-	-
Michigan	1976	Yes	YOB	-	Marital	Yes	Yes	FT/PT	Open	-	-	4	Car	-
Hamilton, Ontario	1978	Yes	YOB	-	to head	-	Yes	-	Open	-	-	Car	-	-
Canada	1979/88	From licence			-	-	-	-						-
Sydney	1981	Yes	Age	-	To head	Yes	Yes & ed	Hours	Open	5	Banded	Car/MC	-	Yes
Stuttgart	1981	Yes	YOB	-	-	Yes	Yes	FT/PT	5	-	-	Class	-	-
Netherlands OVG	1981		-	-	-	Yes	Yes	Hours	4	-	Yes			-
Singapore	1981	Yes	Age	-	to head	-	Yes	Hours	Open	-	Yes			-
LATS	1981	Yes	Banded	-	To head/ma	-	Yes	FT/PT	Open	Hours	-	3	-	-
Bay Area	1981	Yes	Age	Race	To head	-	Yes	FT/PT	Industry			Car	-	-
Switzerland	1984	Yes	YOB	Nationality	Marital	Yes	Yes	FT/PT		-		Car/MC	-	-
Houston-Galveston	1984	Yes	Age	-	To first	-	Yes	FT/PT	-			-	-	-
Duisburg	1984/85	Yes	YOB	Nationality	-	Yes	Yes & ed	FT/PT	Open	Shift		Car	-	-
Grenoble	1985	Yes	Age	-	To head	Yes	Yes	FT/PT	7			Car	-	-
Netherlands OVG	1985	-	-	-	-	Yes	Yes	Hours	4	-	Yes	(Car)	-	-
Quebec	1985/86	From licence	(Yes)	-	Marital	-	Yes	FT/PT	-	-	-	Car/MC	-	-
Stockholm	1985/86	Yes	YOB	-	-	Yes	Yes	FT/PT	-	3 & other	Yes	-	-	Yes
UK	1985/86	Yes	Age	-	To head/ma	-	Yes & ed	FT/PT	Open	-	Yes	6	Car	-
Wien	1986	Yes	Age	Nationality	Marital	Yes	Yes	FT/PT	6	-	-	Yes	-	Yes
Adelaide	1986	Yes	Age	-	To head	-	Yes	FT/PT	Open	6 & open	-	4	-	-
Cairns	1986	Yes	YOB	-	-	-	Yes	FT/FT	Open	-	-	Car/MC	-	-
Karlsruhe	1986	Yes	Banded	-	-	-	Yes	FT/PT	5	-	-	Car	-	-
Kreis Unna	1986	Yes	Age	-	-	-	Yes & ed	FT/PT	-	-	-	-	-	Yes
Mühlacker	1986	Yes	Age	-	-	-	Yes	FT/PT	5	-	-	Class	-	Yes
Denmark	1986	Yes	YOB	-	to head	Yes	Yes	FT/PT	8	-	Yes	Car/MC	Yes	Yes
Belgium	1986/87	Yes	Age	-	to head/mar	Yes	Yes	Hours	?	-	Yes	Car	-	-
Dutch panel	1987	Yes	YOB	-	To head	-	-	-		-	-	-	-	-
Ontario	1988	From licence			Marital	-	Yes	FT/PT		-	-	Car	Car	-
Leverkusen	1988	Yes	Age	-	-	-	Yes & ed	FT/PT		-	-	-	-	Yes
S Yorkshire	1988	Yes	YOB	-	To head	-	Yes	Hours		-	-	Car/MC	-	

Figure B.3 Items related to person (Part 1) (continued)

City	Year	Person												
				Race/	To head/		Work					Licences		
		Sex	Age	Nationality	Marital	Education	Status	Amount	Profession	Flexibility	Income	MIV	Duration	Cycle
CA Telecommute	1988	Name	Age	-	To sample	-						-		
Singapore	1988/89	Yes	Age		to head	Yes	Yes	-	14 & other	-	Banded	-		
Switzerland	1989	Yes	YOB	Nationality	Marital	Yes	Yes	Hours	7	-	-	3		(Yes)
Essen	1989	Yes	Age		-	-	Yes & ed	FT/PT		-	-	-		Yes
Germany	1989	Yes	Age		-	Yes	Yes	-		-	-	Car	Yes	-
Germany	1989	Yes	YOB	Nationality	Marital	Yes	Yes	FT/PT	5	-	-	Class	Car	Yes
Charleroi	1989/90	Yes	Age	Nationality	to head	-	Yes	FT/PT	9	-	-	-	-	-
New Zealand	1989/90	Yes	YOB	Race	To head	-	Yes	FT/PT	Open	-	Banded	3	3	-
Münster	1990	Yes	Age		-	-	Yes & ed	FT/PT		-	-	Car	Yes	Yes
Trondheim	1990	Yes	YOB		-	Yes	Yes	FT/PT	Open	3 & other	Yes	Car	-	Yes
Dutch Panel	1987		-		-	Yes	Yes	Hours		-	Yes	-	-	-
Bay Area	1990	Yes	Age	Race	To first	-	Yes	FT/PT	13	-	-	Car	-	-
Brussels	1990/91	Yes	YOB/Age	Nationality	-	Yes	Yes	Hours	17 + other	Hours	-	-	-	Yes
Swindon	1990/91	-	-		-	-	-	-		-	-	-	-	-
Wien	1991	Yes	Age	Nationality	Marital	Yes	Yes	FT/PT	6	Hours	-	Car	Car	Yes
Northwest Switzerlan	1991	Yes	YOB	Nationality	Marital	Yes	Yes	Hours	7	-	-	3		(Yes)
Hagen	1991	Yes	YOB		To oldest	-	Yes	FT/PT		3	-	Car & oth	-	Yes
SrV	1991	Yes	YOB		-	Yes	Yes	FT/PT	5	-	-	Car	Car	-
Singapore	1991	Yes	YOB		to head	Yes	Yes	FT/PT	Open	-	-	3	Yes	-
Bursa	1991	Yes	Age		-	Yes	Yes	-	3	-	-	-	-	-
LATS	1991	Yes	Age	POB/Race	To first	-	Yes	FT/PT	Open	Arrival	-	6	-	Yes
S Yorkshire	1991	Yes	YOB	-	To head	-	Yes	Hours	Open (HHH)	-	-	Car/MC	-	-
Boston	1991	Yes	YOB	-	To first	-	Yes & ed	FT/PT	-	-	-	Car	-	-
CATS	1991	Yes	YOB	-	To oldest	-	Yes & ed	FT/PT	Open	-	-	-	-	-
S California	1991	Yes	YOB	-	to first	-	Yes & ed	FT/PT	-	-	-	Car	-	-
SE Queensland	1992	Yes	YOB	-			Yes & ed	FT/PT	Open	-	-	Car/MC	-	-
Cantons Zurich & Zu	1992	Yes	YOB	-			Yes	FT/PT		-	-	Car/MC	-	-
Santiago	1992	-		-					-	-	-			-
Karlsruhe	1992	-	-		-	-	-	-	-	-	-	-	-	-
Übach-Palenberg	1992	Yes	Age				Yes & ed	FT/PT	-					Yes

Figure B.3 Items related to person (Part 1) (continued)

City	Year	Person					Work					Licences		
		Sex	Age	Race/ Nationality	To head/ Marital	Education	Status	Amount	Profession	Flexibility	Income	MIV	Duration	Cycle
Dijst & Vidakovic	1992	-	-	-	-	-	-	-	-	-	-			-
London Transport	1992	Yes	Banded	-	-	-	Yes	FT/PT	Open (HHH)	-	-			-
West Davis	1992	Yes	Age	-	-	Yes	Yes & ed	FT/PT	8 & other	-	-			-
Denmark	1992/94	Yes	YOB	-	to first	Yes	Yes	Hours	Open	-	Yes	Car	-	-
Bruchsal	1993	Yes	YOB	-	-	-	Yes	FT/PT	5	-	-	Car	-	Yes
Netherlands OVG	1993	Yes	YOB	-	to head	Yes	Yes	Hours	4	-	Yes	Car/MC	-	Yes
West Midlands	1993	Yes	Banded	-	-	-	Yes	-		-	-	-	-	-
Wasatch, Utah	1993	Yes	YOB	-	to first	-	Yes	FT/PT	5	-	-	Car	-	-
France	1993/94	Yes	YOB	Nationality	to first/marit	Yes	Yes	FT/PT	Open	Yes	-	Class	Yes	-
Victoria	1994	Yes	YOB	POB	to first	-	Yes & ed	FT/PT	Open	-	-	Car/MC	-	-
Münster	1994	Yes	Age	-	-	-	Yes & ed	FT/PT	-			-	-	Yes
Netherlands OVG	1994	Yes	YOB	-	to first/marit	Yes	Yes	Banded	-	-	Yes	Car/MC	-	Yes
RAC-Survey	1994	Yes	YOB	-	to each/mari	Yes				-	-	-	-	Yes
RAC-Survey	1994	Yes	YOB	-	to each/mari	Yes	Yes	Hours	6 & other	Degree	Yes	7	Yes	Yes
Southeast Michigan	1994	Yes	YOB	-	to first	-	Yes	FT/PT				Car	-	-
Dallas/Fort Worth	1995	Yes	YOB	Race	to first	-	Yes	Hours	9 & other	Shift +	Yes	Car	-	-
New York MTC	1995	Yes	YOB	-	to first	-	Yes	Hours	9 & other	Shift +	-	Car	-	-
Oahu	1995	Yes	YOB	-	to first	-	Yes	Hours	9 & other	Shift +	-	Car	-	-

Figure B.4 Items related to person (Part 2)

City	Year	Person									
		Vehicle	Car	Season ticket		Mode	Parking at work				Personal
		Funding	availability	Ownership	Funding	to work	Type	Cost	Distance	Funding	Handicap
London	1949	-				-	-		-		
London	1954	-			-	-	-		-		
BPR	1954	-				-	-		-		
Detroit	1955	-		-		-	-	-	-	-	-
Hamburg	1956	-		via trip		-	-	-	-		
CATS	1956	-	-	-	-	-	-	-	-	-	-
Castrop-Rauxel	1962	-	-		-	-	-	-	-	-	-
LATS	1962	-	-	via stage	-	Yes	-	-	-		-
Leicester	1963	-	-	-	-	-		-	-		-
New York Tri-State	1963	-				-	-	-	-		
Bruchsal	1964	-				-	-	-	-		
Bay Area	1965	Fact		-		-	-	-	-		
Western Netherlands	1966	Fact	-	via trip		-	-	-	-		
Victoria, Texas	1967	-	-	-	-	-	-	-	-		
Pforzheim	1967	-				-	-	-	-		
Chemnitz	1968	-		-	-	-	-	-	-		
Chemnitz	1968	-				-	-	-	-		
Karlsruhe	1968	Fact				Yes	-	-	-		
Stuttgart	1968	Fact	-			-	6	Fact	Yes		
Washington, DC CO	1968	Fact	-			-	-	-	-	-	
CATS	1970	-	-	via stage	-	-		-	-		
Uppsala	1971	Fact	Driven	-	-	-	-	-	-		
LATS	1971	-	(by stage)	via stage	-	Yes	-	-	-		
FHWA	1973	-	-	-	-	-	-	-	-	-	-
Germany	1973	-	-	-	-	-	-	-	-	-	-
London/Cullen&Phle	1974	-	Yes	-	-	Yes	-	-	-		-
Denmark	1975	Fact	% use	via trip	-	Yes	-	-	-	-	
UK	1975/76	Type	-	Yes	Fact	Yes	3 & other	Yes	-	Fact	
Grenoble	1976	-	-	-	-	-	-	-	-		-
Baltimore	1976	Type	-	-	-	-	-	-	-		Yes

Figure B.4 Items related to person (Part 2) (continued)

City	Year	Person									
		Vehicle	Car	Season ticket		Mode	Parking at work				Personal
		Funding	availability	Ownership	Funding	to work	Type	Cost	Distance	Funding	Handicap
Baltimore	1976	Type	-	-	-	-	-	-	-	-	Yes
Michigan	1976	Fact	-	-	-	-	-	-	-	-	-
Hamilton, Ontario	1978	-	Yes	-	-	-	-	-	-	-	-
Canada	1979/88	-	-	-	-	-	-	-	-	-	-
Sydney	1981	Type	-	via stage	-	-	-	-	-	-	-
Stuttgart	1981	Fact	-	Type	-	-	-	-	-	-	-
Netherlands OVG	1981	-	-	-	-	-	-	-	-	-	-
Singapore	1981	-	-	Type	-	-	-	Cost	min	Fact	-
LATS	1981	-	Yes	Yes	-	Yes	-	-	-	-	Yes
Bay Area	1981	-	-	-	-	-	-	-	-	-	Yes
Switzerland	1984	-	-	Yes	-	-	-	-	-	-	-
Houston-Galveston	1984	-	-	-	-	-	-	-	-	-	-
Duisburg	1984/85	-	-	-	-	-	-	-	-	-	-
Grenoble	1985	-	-	-	-	-	-	-	-	-	-
Netherlands OVG	1985	Fact	Main user	Type	-	-	-	-	-	-	-
Quebec	1985/86	Fact	-	-	-	-	-	-	-	-	-
Stockholm	1985/86	Fact	Yes	Yes	-	Yes	4	Yes	-	-	-
UK	1985/86	Type	-	Yes	Fact	Yes	-	-	-	-	Yes
Wien	1986	-	Yes	Yes	-	-	2	Yes	m	Yes	-
Adelaide	1986	Type	-	via stage	Fact	-	-	-	-	Fact	Yes
Cairns	1986	-	-	-	-	-	-	-	-	-	-
Karlsruhe	1986	-	Yes	-	-	-	-	-	-	-	-
Kreis Unna	1986	-	Yes	-	-	-	-	-	-	-	-
Mühlacker	1986	-	-	-	-	-	-	-	-	-	-
Denmark	1986	-	-	-	-	PT only	-	-	-	-	-
Belgium	1986/87	Amount	Yes	Yes	-	-	-	-	-	-	-
Dutch panel	1987	-	-	-	-	-	-	-	-	-	-
Ontario	1988	Fact	-	-	-	-	-	-	-	-	-
Leverkusen	1988	-	Yes	-	-	-	-	-	-	-	-
S Yorkshire	1988	Fact	-	Yes	-	-	-	-	-	-	-

. Figure B.4 Items related to person (Part 2) (continued)

City	Year	Person									
		Vehicle	Car	Season ticket		Mode	Parking at work				Personal
		Funding	availability	Ownership	Funding	to work	Type	Cost	Distance	Funding	Handicap
CA Telecommute	1988	-	-	-	-	-	-	-	-	-	-
Singapore	1988/89	-	-	Yes	-	-	-	-	-	-	-
Switzerland	1989	-	Day/Always	Type	-	Yes	-	-	-	-	-
Essen	1989	-	Yes	-	-	-	-	-	-	-	-
Germany	1989	Fact	-	-	-	-	-	-	-	-	-
Germany	1989	-	-	-	-	-	-	-	-	-	-
Charleroi	1989/90	-	Yes	-	-	PT/Other	-	-	-	-	-
New Zealand	1989/90	Fact	-	-	-	-				-	-
Münster	1990	-	Yes	-	-	-	-	-	-	-	-
Trondheim	1990	Fact	-	Yes	-	Yes	3 & other	Yes	-	-	-
Netherlands	1990	Fact	-	-	-	-				-	-
Bay Area	1990	-	-	via stage	-	-				-	Yes
Brussels	1990/91	Fact	-	-	-	-				-	-
Swindon	1990/91	-	-	-	-	-	-	-	-	-	-
Wien	1991	-	Yes	Yes	-	-	3 & other	Yes	min	-	-
Northwest Switzerlan	1991	-	Day/Always	Type	-	Yes	4	Fact	-	Fact	-
Hagen	1991	Fact	6	-	-	-	3	-	min	-	-
SrV	1991	Fact	-	-	-	-	-	-	-	-	-
Singapore	1991	Fact	-	-	Fact	-	-	-	-	Yes	-
Bursa	1991	-	-	-	-	-	-	-	-	-	-
LATS	1991	Type	-	Type	4	Yes	4	Yes	-	Yes	Yes
S Yorkshire	1991	Fact	Yes	Yes	-	-	5	Fact	-	Fact	Yes
Boston	1991	Type	-	via trip	Fact	-	-	-	-	Fact	-
CATS	1991	-	-	-	-	-				-	-
S California	1991	-	-	-	-	-	-	-	-	Fact	-
SE Queensland	1992	Fact	-	via stage	-	-	-	-	-	Yes	-
Cantons Zurich & Zu	1992	-	Day/Always	Type	-	-	-	-	-	-	-
Santiago	1992	-	-	-	-	-	-	-	-	-	-
Karlsruhe	1992	-	-	-	-	-	-	-	-	-	-
Übach-Palenberg	1992	-	Yes	-	-	-	-	-	-	-	-

Figure B.4 Items related to person (Part 2) (continued)

City	Year	Person									
		Vehicle	Car	Season ticket		Mode	Parking at work				Personal
		Funding	availability	Ownership	Funding	to work	Type	Cost	Distance	Funding	Handicap
Dijst & Vidakovic	1992	-	-			-	-	-	-		-
London Transport	1992	Type	Yes	Type	3	-	-	-	-	Yes	-
West Davis	1992	-	-	-	-	Yes	-	-	-	-	-
Denmark	1992/94	-		Yes	-	Yes	-	-	-	-	-
Bruchsal	1993	Fact	3 levels			-	-	-	-	-	-
Netherlands OVG	1993	Fact	Owner			-	-	-	-	-	-
West Midlands	1993					-	-	-	-	-	-
Wasatch, Utah	1993		-	-	-	-	-	-	-	-	-
France	1993/94	-	-	Type	-	Yes	-	-	-	-	Yes
Victoria	1994	Fact	-	via stage	-	-	-	-	-	-	-
Münster	1994	-	Yes	Fact	-	-	-	-	-	-	-
Netherlands OVG	1994	Fact	Main user	Fact	-	-	-	-	-	-	-
RAC-Survey	1994	-		Type	-	Yes	-	-	-	-	Yes
RAC-Survey	1994	Share	Yes	Type	-	Yes	Fact	Amou	Min	Share	Yes
Southeast Michigan	1994			-	-	-	-	-	-	-	-
Dallas/Fort Worth	1995	Fact	Yes	Amount	Fact	Yes	-	-	-	-	Yes
New York MTC	1995	Fact	-		Fact	Yes	3	Amou	Min	Fact	Yes
Oahu	1995	Fact			Fact	Yes	3	Amou	Min	-	Yes

Figure B.5 Items related to household

City	Year	Household						
		Residence			Distance	Number of vehicles		
		Type	Tenure	Telephon	to PT stop	MIV	Cycle	Income
London	1949							
London	1954		-	-				
BPR	1954	-	-	-	-	#		
Detroit	1955	Type	-	-	-	#		Yes
Hamburg	1956		-	-	-	2	Yes	
CATS	1956	Type	-	Yes		#		
Castrop-Rauxel	1962	-	-	-	-			
LATS	1962	-	-	-	-	2		Yes
Leicester	1963	-	Yes	-	-	Car	-	Yes
New York Tri-State	1963	Type	Yes	Yes		Car		Yes
Bruchsal	1964	-	-	-	-			-
Bay Area	1965	Size	Yes	-	-	5 & #	-	Yes
Western Netherlands	1966	-	-	-	-	6	Yes	-
Victoria, Texas	1967	Type	-	-	-	2	-	Yes
Pforzheim	1967	-	-	-	-	-	-	
Chemnitz	1968	-	-	-	1.,min	3	-	
Chemnitz	1968	-	-	-	1.,min	3	Yes	
Karlsruhe	1968	Size	Yes	-	-	-	-	
Stuttgart	1968	-	-	-	-	5	-	
Washington, DC CO	1968	Type	Yes	-	-	Car	-	Yes
CATS	1970	-	-	Yes	-	#	-	Yes
Uppsala	1971	-	-	-	-	Car/MC	Yes	Yes
LATS	1971	-	-	-	-	5	-	Yes
FHWA	1973	Type	-	-	-	5	-	
Germany	1973	Type	Yes	Yes	5, m	-	-	
London/Cullen&Phle	1974	-	-	-	-	-	-	
Denmark	1975	-	-	-	2, km	#	Yes	Yes
UK	1975/76	Type	Yes	-	2, min	5 & #	Yes	-
Grenoble	1976	-	-	-	-	2 & #	-	-
Baltimore	1976	Type	Yes		km	#	-	Yes

Figure B.5 Items related to household (continued)

City	Year	Household						
		Residence			Distance	Number of vehicles		
		Type	Tenure	Telephon	to PT stop	MIV	Cycle	Income
Baltimore	1976	Type	Yes		km	#	-	Yes
Michigan	1976	Type	-			-	Yes	Yes
Hamilton, Ontario	1978	-	Yes			-	-	Yes
Canada	1979/88	-	-	-	-	-	-	
Sydney	1981	Type	-	Yes	-	Open	Yes	-
Stuttgart	1981	Type	Yes	-	-	3 & #	Yes	
Netherlands OVG	1981		-	-	-	-	-	
Singapore	1981	-	-	-	-	3	-	Yes
LATS	1981	-	-	-	-	6	Yes	Yes
Bay Area	1981	Type	Yes	Yes		Open	-	Yes
Switzerland	1984	Type	Yes	Yes	-	3	Yes	-
Houston-Galveston	1984	-	-	-	-	-	-	Yes
Duisburg	1984/85	Size	Yes	-	-	2 & #	Yes	
Grenoble	1985	-	-	Yes	-	2 & #	-	-
Netherlands OVG	1985	-	-	-	-	-	-	-
Quebec	1985/86	-	-	-	-	-	-	Yes
Stockholm	1985/86	Type	-	-	-	#	-	
UK	1985/86	Type	Yes	-	2, min	9 & #	Yes	-
Wien	1986	-	-	-	4.,min	-	-	
Adelaide	1986	Type	Yes	Yes	-	Open	Yes	
Cairns	1986	-	-	Yes	-	3	Yes	
Karlsruhe	1986	-	-	-	-	-	-	
Kreis Unna	1986	-	-	-	-	Car	Yes	-
Mühlacker	1986	-	-	-	-	-	-	-
Denmark	1986	-	-	-	km	#	Yes	Yes
Belgium	1986/87	Type	Yes	-	-	#	Yes	Yes
Dutch panel	1987	-	-	-	-	-	-	
Ontario	1988	-	-	-	-	-	-	
Leverkusen	1988	-	-	-	-	Car	Yes	
S Yorkshire	1988	Type	-	-	-	5	-	

Figure B.5 Items related to household (continued)

City	Year	Household						
		Residence			Distance	Number of vehicles		
		Type	Tenure	Telephon	to PT stop	MV	Cycle	Income
CA Telecommute	1988			-			-	
Singapore	1988/89	-	-	-		-	-	
Switzerland	1989	Type	Yes	-	-	3	Yes	
Essen	1989	-	-	-		Car	Yes	
Germany	1989	-	-	-		Car	-	-
Germany	1989	Type	Yes	Yes		#	-	-
Charleroi	1989/90	Type	Yes	-		Avail	-	Yes
New Zealand	1989/90	Type	-	Yes		Open	Yes	-
Münster	1990	-	-	-	-	Car	Yes	-
Trondheim	1990	Type	-	-	by person	#	-	-
Netherlands	1990	-	-	-		-	-	-
Bay Area	1990	Type	Yes	Yes	-	4	Yes	Yes
Brussels	1990/91	Type&size	Yes	-	-	-	-	Yes
Swindon	1990/91	-	-	-	-	-	-	
Wien	1991	-	-	-	-	-	-	
Northwest Switzerlan	1991	-	-	-	-	3	Yes	-
Hagen	1991	-	-	-	2, min	2 & #	Yes	-
SrV	1991	-	-	-	-	-	-	-
SIngapore	1991	Type	-	Yes	-	6 & othe	Yes	-
Bursa	1991	-	Yes	Yes	-	-	-	
LATS	1991	-	Yes	-	-	5 & #	Yes	Yes
S Yorkshire	1991	Type	-	-		5	-	
Boston	1991	Type	Yes	Number	-	-	-	Yes
CATS	1991	-	-	Yes	-	4 & #	Yes	Yes
S California	1991	-	-	-	-	-	-	Yes
SE Queensland	1992	-	-	Yes	-	Open	Yes	-
Cantons Zurich & Zu	1992	-	-	-	-	3	Yes	
Santiago	1992	-	-			-	-	
Karlsruhe	1992	-	-	-	-	-	-	
Übach-Palenberg	1992	-	-	-	-	Car	Yes	

Figure B.5 Items related to household (continued)

City	Year	Household						
		Residence			Distance	Number of vehicles		
		Type	Tenure	Telephon	to PT stop	MtV	Cycle	Income
Dijst & Vidakovic	1992		-	-	-	-	-	-
London Transport	1992	-	-	-	-	#	-	-
West Davis	1992	Size	Yes	-	2, m	Car/MC	Yes	Yes
Denmark	1992/94		-	Yes	2, min	-	-	Yes
Bruchsal	1993		-	-	2, min	Car	-	-
Netherlands OVG	1993		-	Yes	-	Car/MC	Yes	-
West Midlands	1993		-	-	-	-	-	-
Wasatch, Utah	1993	Type	Yes	-	-	-	-	Yes
France	1993/94	-	-	-	-	Car/MC	Yes	-
Victoria	1994	Type	Yes	Yes	-	Open	Yes	-
Münster	1994	-	-	-	-	Car	Yes	-
Netherlands OVG	1994	-	-	-	-	-	Yes	-
RAC-Survey	1994	Type	Yes	-	Bus/Rail	3	Yes	Yes
RAC-Survey	1994	Type	Yes	-	Bus/Rail	3	Yes	Yes
Southeast Michigan	1994	Type	-	Yes	-	Car	-	Yes
Dallas/Fort Worth	1995	-	-	-	-	#	-	Yes
New York MTC	1995	-	-	-	-	#	-	Yes
Oahu	1995	-	-	-	-	#	-	Yes

Figure B.6 Items related to vehicles

City	Year	Vehicle							
						User/	Parking at home		
		Make	Motor	Age	VMT	Owner	Location	Type	Cost
London	1949	-		-				-	-
London	1954	-	-	-				-	-
BPR	1954	-	-	-				-	-
Detroit	1955	-	-	-				-	-
Hamburg	1956	-	-	-				Yes	-
CATS	1956	-	-	-	-		-	-	-
Castrop-Rauxel	1962	Kind	-	-		-	-	-	-
LATS	1962	Make	-	-		-	Off-street	-	-
Leicester	1963	-	-	-		Owner	-	-	-
New York Tri-State	1963	-	-	-	-	-	-	-	-
Bruchsal	1964	Kind	-	-	-	-	-	-	-
Bay Area	1965	Kind	-	-	-	Owner	-	6 & other	Fact
Western Netherlands	1966	-	-	-	-	-	-	-	-
Victoria, Texas	1967	-	-	-				-	-
Pforzheim	1967	Kind	-	-					
Chemnitz	1968	Kind	-	-	Annual	User	m	2	-
Chemnitz	1968	Kind	-	-	Annual	-	Address	3	-
Karlsruhe	1968	Kind	-	-	-	User	-		
Stuttgart	1968	Kind	-	-	Annual	-	Distance		
Washington, DC CO	1968	Make	-	Yes	-	-	-	-	-
CATS	1970	-	-	-				-	-
Uppsala	1971	-	-	-	-			-	-
LATS	1971	-	-	-	-		# off-street	-	-
FHWA	1973	-	-	-		-	-	-	-
Germany	1973	Kind	cc	-		Owner	-	-	-
London/Cullen&Phle	1974	-	-	-				-	-
Denmark	1975	Make	Weight	Yes	Yes	-		-	-
UK	1975/7	Model	cc	Yes	Annual	User		3 & other	-
Grenoble	1976	-	-	-				-	-
Baltimore	1976	Model	-	Yes			distance	5	Amount

Figure B.6 Items related to vehicles (continued)

City	Year	Vehicle				User/	Parking at home		
		Make	Motor	Age	VMT	Owner	Location	Type	Cost
Baltimore	1976	Model	-	Yes	-		distance	5	Amount
Michigan	1976	Model	-	Yes	all cars	Owner		-	
Hamilton, Ontario	1978	Make	-	Yes		Owner		-	
Canada	1979/8	Model	Cylinders	Yes			-	-	-
Sydney	1981	Model	Cylinders	Yes	Life time	User	-	-	-
Stuttgart	1981	-	-	-		-	-	-	-
Netherlands OVG	1981	-	-	-	-	-	-	-	-
Singapore	1981	-	-	-			-		Banded
LATS	1981	-	-	-				3 & #	-
Bay Area	1981	Model	Mileage	Yes			-	-	-
Switzerland	1984	-	cc	-	last year			-	
Houston-Galveston	1984	-	-	-	-			-	
Duisburg	1984/8	-	-	-				-	
Grenoble	1985	-	-	-	-	-	-	5	
Netherlands OVG	985	Fuel	Weight	Yes	Yes	User	-	-	
Quebec	1985/8	Model	cc	Yes	all cars	Owner	-	-	-
Stockholm	1985/8	Model	cc	Yes	-	-	-	4	Amount
UK	1985/8	-	cc, Fuel	Yes	Annual	User	-	-	-
Wien	1986	Kind	-	-		Owner	min	3 & other	Amount
Adelaide	1986	Body	Fuel type	-		User	-	-	-
Cairns	1986	-	-	-	-				
Karlsruhe	1986	Car	-	-	-	Owner	-	-	-
Kreis Unna	1986	-	-	-	-	-	-	-	-
Mühlacker	1986	Kind	-	-	-	Owner	-	-	-
Denmark	1986	Make	Weight	-	-	-	-	-	-
Belgium	1986/8	Make	cc	Yes	Yes	Owner		Garage	Amount
Dutch panel	1987	-	-	-	-	-		-	-
Ontario	1988	Model	-	Yes	all cars	Owner			
Leverkusen	1988	-	-	-	-				
S Yorkshire	1988	-	-	-				-	-

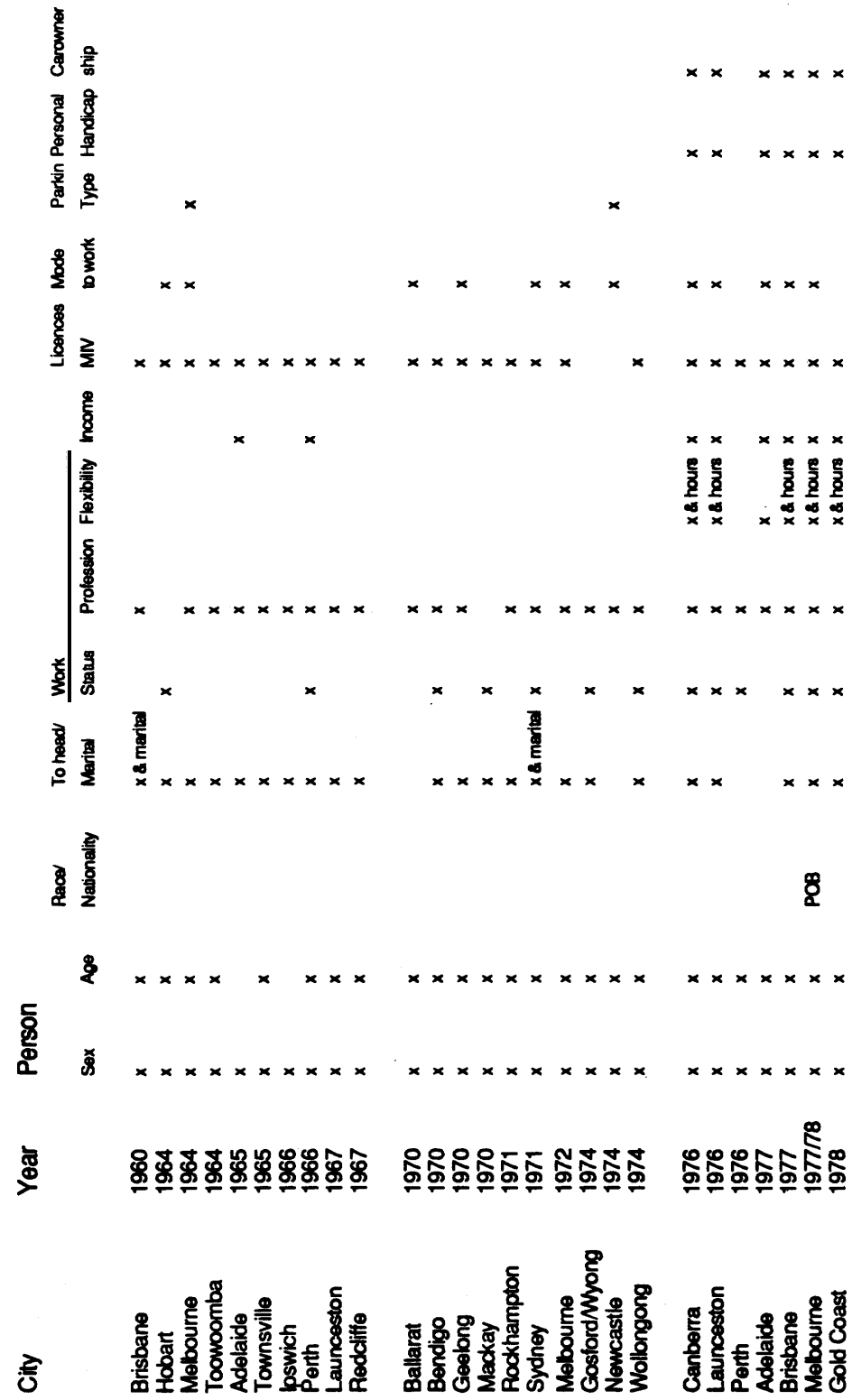
. Figure B.6 Items related to vehicles (continued)

City	Year	Vehicle							
						User/	Parking at home		
		Make	Motor	Age	VMT	Owner	Location	Type	Cost
CA Telecommute	1988	Model	mpg	Yes	-	Owner	-		
Singapore	1988/8	-							
Switzerland	1989	Kind	cc	Yes	last year	-	-	-	-
Essen	1989	-	-	-	-	-	-	-	-
Germany	1989	Kind	cc	Yes	-	Owner	-	-	-
Germany	1989	Kind	cc	-	-	Owner	-	-	-
Charleroi	1989/9	-	-	-	-	-	-	-	-
New Zealand	1989/9	Model	cc	-					
Münster	1990	-	-	-	-	-	-	-	-
Trondheim	1990	Model	-	Yes	Annual	-	-	-	-
Netherlands	1990	-	Fuel type	Yes	Annual	Main user	-	-	-
Bay Area	1990	Model	-	Yes	-	Owner	-	-	-
Brussels	1990/9	Kind	-	-	-	Owner	-	Garage	-
Swindon	1990/9	-	-	-	-	-	-	-	-
Wien	1991	Kind	-	-	-	Owner	min	3 & other	Amount
Northwest Switzerlan	1991	-	-	-	-	-	# at home	-	-
Hagen	1991	-	-	-	-	-	-	3	-
SrV	1991	Kind	-	-	-	Owner	m	Garage	-
SIngapore	1991	Make	cc	Yes	-	Owner	-	-	-
Bursa	1991	Fact	-	-	-	Owner	-	-	-
LATS	1991	Type	cc/fuel	-		Main user	At home	4	Amount
S Yorkshire	1991	-	-	-		-	-	on-street	
Boston	1991	-	-	-		-	-		
CATS	1991	-	-	-		-	-		
S California	1991	-	-	-		-	-		
SE Queensland	1992	Model	Cylinders	Yes		-	-		
Cantons Zurich & Zu	1992	-	-	-					
Santiago	1992	Model	-	Yes					
Karlsruhe	1992	-	-	-					
Übach-Palenberg	1992	-	-	-					

Figure B.6 Items related to vehicles (continued)

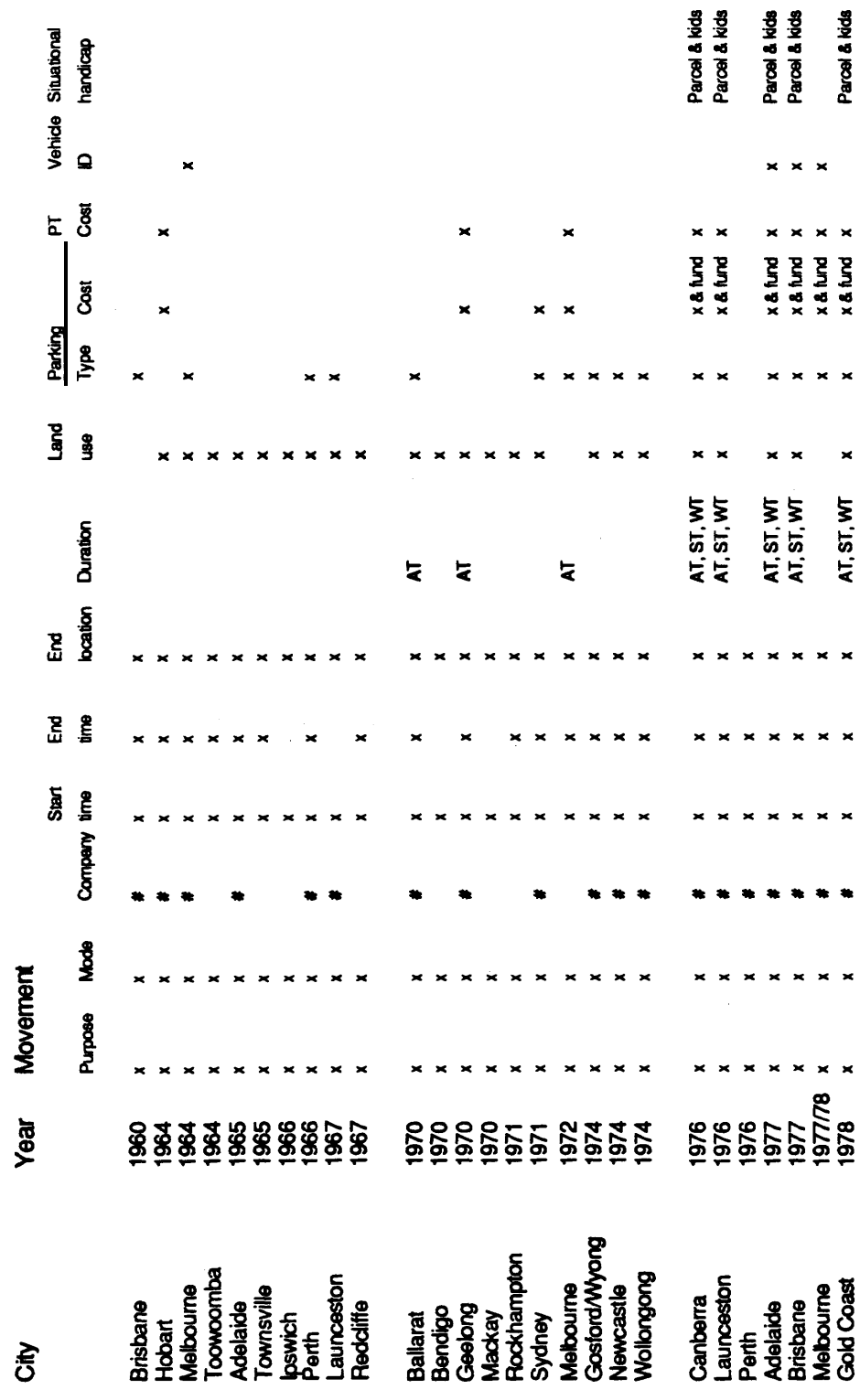
City	Year	Vehicle					Parking at home		
		Make	Motor	Age	VMT	User/ Owner	Location	Type	Cost
Dijst & Vidakovic	1992	-			-	-	-	-	-
London Transport	1992	-	-	-			-	-	-
West Davis	1992	Model	Fuel	Yes		Owner	-	On/Off	Amount
Denmark	1992/9	-	-	Yes	Yes		-		
Bruchsal	1993	Kind	-	-	-	Owner	-		
Netherlands OVG	1993	Fuel	Weight	Yes	Yes	User	-		
West Midlands	1993	-	-	-			-		
Wasatch, Utah	1993	-	-	-		-	-		
France	1993/9	Make	kw	Yes	Yes	All users	-	4	
Victoria	1994	Model	Cylinders	Yes	-	-	-		
Münster	1994	-	-	-	-	-	-		
Netherlands OVG	1994	Fuel	Weight	Yes	Yes	User	-	-	-
RAC-Survey	1994	Make	-	Yes	Yes	Owner	-	5	-
RAC-Survey	1994	Make	cc	Yes		Owner	-	-	Amount
Southeast Michigan	1994	-	-	-		-	-		
Dallas/Fort Worth	1995	Model	-	Yes	-	Main user	-		
New York MTC	1995	Model	-	Yes	-	Main user	-		
Oahu	1995	Model	-	Yes	-	Main user	-		

Figure B.8 Items related to person in a sample of Australian travel diaries of the 1960's and 1970's



Source: adapted from Dumble (1979) cited in Wigan (1987)

Figure B.7 Items related to movement in a sample of Australian travel diaries of the 1960's and 1970's



City	Year	Movement									Parking		PT	Vehicle	Situational
		Purpose	Mode	Company	Start time	End time	End location	Duration	Land use	Type	Cost	Cost	ID	handicap
Brisbane	1960	x	x	#	x	x	x			x				
Hobart	1964	x	x	#	x	x	x		x		x	x		
Melbourne	1964	x	x	#	x	x	x		x	x			x	
Toowoomba	1964	x	x		x	x	x		x					
Adelaide	1965	x	x	#	x	x	x		x					
Townsville	1965	x	x		x	x	x		x					
Ipswich	1966	x	x		x		x		x					
Perth	1966	x	x	#	x	x	x		x	x				
Launceston	1967	x	x	#	x		x		x	x				
Redcliffe	1967	x	x		x	x	x		x					
Ballarat	1970	x	x	#	x	x	x	AT	x	x				
Bendigo	1970	x	x		x		x		x					
Geelong	1970	x	x	#	x	x	x	AT	x		x	x		
Mackay	1970	x	x		x		x		x					
Rockhampton	1971	x	x		x	x	x		x					
Sydney	1971	x	x	#	x	x	x		x	x	x			
Melbourne	1972	x	x		x	x	x	AT		x	x	x		
Gosford/Wyong	1974	x	x	#	x	x	x		x	x				
Newcastle	1974	x	x	#	x	x	x		x	x				
Wollongong	1974	x	x	#	x	x	x		x	x				
Canberra	1976	x	x	#	x	x	x	AT, ST, WT	x	x	x & fund	x		Parcel & kids
Launceston	1976	x	x	#	x	x	x	AT, ST, WT	x	x	x & fund	x		Parcel & kids
Perth	1976	x	x	#	x	x	x							
Adelaide	1977	x	x	#	x	x	x	AT, ST, WT	x	x	x & fund	x	x	Parcel & kids
Brisbane	1977	x	x	#	x	x	x	AT, ST, WT	x	x	x & fund	x	x	Parcel & kids
Melbourne	1977/78	x	x	#	x	x	x			x	x & fund	x	x	
Gold Coast	1978	x	x	#	x	x	x	AT, ST, WT	x	x	x & fund	x		Parcel & kids

Source: adapted from Dumble (1979) cited in Wigan (1987)