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Recent experiences

Conference Paper

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Respondent response to alternative travel diary designs: Recent experiences

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Abstract

Work load, response rate, data yield and data quality of travel diaries are interacting variables. It has long been suspected that it is impossible to maximise all variables at the same time. Still, empirical work trying to improve our understanding of the trade-offs between them has been very rare. This paper reports preliminary results from experiments with long-distance diaries, which aim to clarify some of the possible relationships.

The object of experimentation are surveys of long-distance travel behaviour, which are currently of particular interest in Europe and elsewhere. The development of the tourism industry, deregulation of the long-distance modes and infrastructure concerns require improved data about long-distance travel, both in the sense of improved inventories as well as in the sense of improved behavioural understanding.

The experiments undertaken here varied the work load of the respondents by varying the number of items to be reported about any long-distance journey, the duration of the survey period and the temporal orientation of the survey.

The first results indicate that the response rate and the data yield, i.e. the number of reported journeys and stages, change systematically with changes in the experimental variables. This trade-off forces the designer of such surveys to choose carefully and to invest time and effort in correcting for the potential biases resulting from this systematic behaviour.

Keywords

Travel diary - Long-distance - Austria - Experiments - Respondent work load - Data yield - Data quality

1 INTRODUCTION

The designer of a travel diary survey has to balance a number of competing aims: he has to cover a certain set of data items to allow the development of pre-specified models or the estimation of particular pre-specified statistics; he has to maximise response rate to minimize possible non-response biases; he has to obtain complete, valid and error-free data. It is understood that trade-offs are necessary as the respondents will not necessarily be willing to provide the time and effort required to respond fully to the survey. The survey has to motivate the respondents and to enable the respondents to give a complete and error-free reply. Surprisingly there is very little published empirical work, which would allow the designer of a new survey to optimize his designs a-priori. This paper is a contribution to this literature reporting results on the interaction between respondent work load and the data yield of a long-distance travel diary instrument.

The work load of the respondent in a travel diary is the product of the number of journeys undertaken during the survey period times the number of items requested for each journey plus the rather less variable "overhead" of questions about the household, person and vehicles. It is assumed that the willingness of the respondent to participate depends on the work load perceived by respondent and on the motivation of the respondent created by the topic of the study or any supporting material which is included in the survey or provided by direct contact with the respondent. It is clear, that the perceived work load will be very high for highly mobile persons, but that they might be especially motivated due to their large exposure to the transport system. It is now well-known, that special efforts are required to correct the biases resulting from the non-response of both highly mobile and non-mobile persons (Ettema, Timmermans and van Veghel, 1996).

In addition to the response "Not to respond", the respondent is able to reduce his work load by omitting complete journeys, tours within journeys or stages within trips. It is therefore necessary to give special attention to this data yield as it might indicate differential biases due to this specific underreporting.

There is currently an increasing policy interest in the amount and type of long-distance travel undertaken in Europe. This reflects the growing economic importance of tourism widely understood and the growing concern about the environmental impacts of traffic, in particular by road and air. Additionally, the current policy initiatives of the European Union in the context of the development of the "Transeuropean Networks" (Deiss, 1996) require data for planning and evaluation. The work reported here is part of both a national and European initiative to improve the methods for the collection of long-distance data. The national background is the development of a national infrastructure and policy programme for all transport networks in Austria (Kovacic, 1996). It was felt, that for the future development of that programme improved methods for the collection of long-distance journeys were a necessity. At the same time EUROSTAT, the statistical office of the European Union, is coordinating studies to test a common set of definitions for long-distance travel diary surveys (EUROSTAT, 1995a).

The paper is structured in the following way: the next section will discuss the methodological approach, while the following section will present the survey instruments developed. The results of the initial analysis will be the focus of the main section followed by conclusions, which will also outline the further work planned.

2 APPROACH

The task of the experiments was to study the relationships between respondent work load, response rate and data yield and quality. The work load of the respondents is a function of the following variables under the control of the survey designer:

- *Object definition* is the exact definition of the object(s), which the respondents have to recollect and describe in the survey. While there is a large degree of standardization of this definition for urban/regional travel diaries, this is not the case for long distance surveys (Youssefzadeh and Axhausen, 1996). The definition has to cover the following main points:
 - the minimum distance for the furthest destination, which is required for inclusion as a long distance journey
 - the structure of the reporting, i.e. whether the journey has to be reported as stages, trips or only as complete journeys and their definitions in turn.
 - treatment of sidetrips on the way to and from the destination
 - treatment of movements at the destination
- *Number and detail of items* involves the specific items queried for each journey, trip or stage of the journeys, but also the detail of the coding involved.
- *Temporal orientation* concerns the choice of a retrospective or a prospective format. In a retrospective survey the work is concentrated in one episode, while a prospective survey allows the respondent to distribute the work involved over multiple episodes. This in turn should influence both response rate and data yield.
- *Survey period* is the duration of the reporting period. This is especially crucial if the survey is retrospective, as memory effects have to be considered.

The study was framed as a contribution to the on-going EUROSTAT-pilots (EUROSTAT, 1995a). This provided to a large extent the object-definition, as participation in the pilots required the adoption of a common object definition: 100 km minimum, stage-based description of the journeys, inclusion of all side trips, but exclusion of all trips at the destination. The common definition also provided a minimum set of items and their coding detail.

To test the interactions it was decided to vary the other factors in a complete 2^3 factorial design. The attributes chosen were:

- *Temporal orientation*: prospective and retrospective

- *Survey period:* 4 weeks and 8 weeks to provide enough spread, without either extending it to a duration where recall problems could be expected¹ or to be so short, as to have too many respondents without any long-distance journey.
- *Items and their level detail:* in addition to the set defined by EUROSTAT, a second more extensive set was developed, which covered each item in more coding detail, as well as adding further items reflecting concerns raised by other EU-policy initiatives (EUROSTAT, 1995b).

To avoid boundary problems at the 100km limit, it was decided to ask the respondents for trips with a minimum distance of 75km.

Due to resource constraints it was decided to execute the main survey as a mail out/mail back supplemented by a telephone based non-response interview, as well as telephone interviews with respondents about their experience. The mail out/mail back survey consisted out the following elements:

Prospective surveys

Announcement letter
Survey distribution
2 letters during the survey period
 reminding the respondents
Reminder letter
Redistribution

Retrospective surveys

Announcement letter
Survey distribution

Reminder letter
Redistribution

This survey protocol is in-line with current practice in urban travel diary survey work and is required to assure reasonable response rates (Brög, 1996).

The non-response interviews began two weeks after the redistribution of the surveys, while the telephone interviews of the respondents started immediately after the receipt of the surveys. Up to five contact attempts were undertaken before the respondent was classified as non reachable. The NR-interviews covered basic socio-demographics including income, long-distance travel and the reasons for non-participation, while the response-interviews covered income and the impression of working with the survey.

The sample was developed from a random sample of 1500 young to middle-aged adult males in the city of Innsbruck provided by an address dealer. Other, official, sampling frames were not available due to legal restrictions. Excluded were persons without a telephone number in the latest CD-ROM version of the official telephone book, as well as persons who could not be found at the address given by the address dealer, as these could not be guaranteed to be the same person. Of the 1297 names remaining, 200 were used for a pretest not reported here and 1080 for the main survey.

The survey was conducted from March to May 1996 with the last NR-interviews taking place in June.

¹ The initial results of the French NTPS had indicated strong recall problems for periods over 8 weeks.

3 SURVEY INSTRUMENT

The survey instrument was designed from scratch, as no comparable survey instruments had been used before in Austria, or Europe. It was structured into four parts distributed across two instruments:

- *Household details* covering household details and the description of all members of the household.
- *Vehicle details* covering the description of the vehicles of the household.
- *Journey details* describing each journey as a whole (main purpose, main destination, names of accompanying household members, number of other accompanying persons)
- *Stage detail* covering each stage (movement with one mode) and some aspects of the stay at the destination. The set of items and their coding level were varied according to the experimental design.

The items included are shown in Table 1. These were grouped into a:

- *Household and vehicle form* (A3 folded to A4)
- *Journey form* (A4 booklet with space for eleven journeys of up to five stages). The front page gave the minimum instructions, including survey period, plus the number of a help line. The backpage asked for the last journey undertaken just before and the first planned after the survey period.

This was supplemented by a:

- *Cover letter* signed by the first author stressing the random nature of the sample, the confidentiality of the data received and the rough background of the study.
- *Policy background flyer* (A4 folded to 1/3 A4) explaining the survey and the policy background
- *Explanations and examples* (A4 booklet) giving more detailed definitions of the survey object and an overview calendar of the survey period on the front page and three examples of growing complexity inside.

The journey form was for all members of the household. Each member was asked to record his/her journeys in this one booklet and to mention all other members accompanying him/her. This design was chosen, as the pretest had shown that households resented the multiple entry of identical journeys in the various personal forms. This improvement in the ease of filling in the form was judged to be more important than the possible loss of the direct connection and responsibility between a person and its journey form.

The design of the journey form and the distribution of the journey and stage information was difficult and a number of alternatives was tested in informal focus groups. The final version adapted the column design familiar from the KONTIV-design (Axhausen, 1995). The six available columns were allocated to one column of journey-level questions and five columns for a stage each. Heavy arrows were needed to guide the respondents from the bottom of the column to the start of the next and even heavier arrows were required to direct respondents to continue a journey overleaf (See Figure 1). The purpose *Wohnen* (return home) was added as a stage purpose to remind the respondents that their journey had ended and to avoid spurious answers on the last stage.

Given the sampled population the lettering was chosen at a size, which would be unsuitable for a general population survey. In this case, in particular with the same number of questions and codes, a different format

would have to be chosen. A possibility would then be to dedicate a whole page to one stage (see also Richardson, Ampt and Meyburg, 1995).

To minimize the initial exposure to definitions, explanations and examples the design distributes these over three locations. This allows the "browsers" to go straight to the form without being detracted or discouraged by these elements, while the "readers" can study them at length (White and Collins, 1996). The journey form states only the bare essentials (minimum distance, survey period, coverage of out- and return-trip and of stages). The front page of the explanation booklet gives detailed definitions in as easy a language as possible, but still not covering all possible complexities and exceptions. The examples range from a simple car-only shopping journey, to a more complex one-day business trip involving multiple modes and a multi-day, multiple mode holiday journey. They cover some of the complexities in their annotations of the examples. This staged concept allows the respondent to match their more detailed questions against more detailed material, but might give some respondents the impression of inconsistency, as the less detailed instructions hide complexities revealed only in the more complex ones. Further testing is required here.

The announcement letter and the response-paid and pre-addressed envelope provided to the respondents was franked with a stamp, while all other letters/mailings were franked by machine to reduce costs.

The respondent were offered a small incentive in the form of a ÖS 10 (about US\$ 1.00) donation to a charity of their choice from a list of six, offering institutions with environmental, third-world and social, global and local foci.

Table 1 Items covered

Area	Items
Household	Location of main residence
Person	First name Year of birth Sex Marital status Nationality Education achieved Current job description Selfemployment Current working hours/week Working hour flexibility Car driving licence ownership Public transport discount ticket ownership Frequent flyer program membership Car sharing club membership
Vehicle	Kind Type Marque cc Year of production Type of fuel Catalytical converter Mileage in the last twelve month Current odometer reading Main user Owner Leasing status
Journey	Departure time and date Departure location Main purpose (You wouldn't have travelled without this activity ?) Main destination First names of all household members travelling Number of other accompanying persons
Stage	Mode (small + large set) Class (train and air) (large set) Travel paid by (large set) Destination (small + large set) Arrival time and date (small + large set) Purpose (small + large set) (multiple purposes possible) Type of overnight accommodation, if any (large set) Accommodation paid by (large set) Departure time and date (small + large set)

Figure 1 Example page for the journey form (large question set)

Vorname _____

Fortsetzung der Reise →

↓ **Beginn der nächsten Reise**

Etappe der Hin-, Weiter- oder Rückfahrt gefahren mit

<input type="checkbox"/> Haushalts-PKW	Nr. _____
<input type="checkbox"/> Anderem privaten PKW	
<input type="checkbox"/> Leihwagen	<input type="checkbox"/> Bus
<input type="checkbox"/> Firmenwagen	<input type="checkbox"/> Reisebus
<input type="checkbox"/> Taxi	(Linien dienst)
<input type="checkbox"/> ICE/IGV o.ä.	Reisebus(Charter)
<input type="checkbox"/> IC/EC	Linienflug
<input type="checkbox"/> Anderem Fernzug	Charterflug
<input type="checkbox"/> Nahverkehrszug/S-Bahn	Fähre/Schiff
<input type="checkbox"/> Straßenbahn/U-Bahn	Motorrad/Moped
	Fahrrad
	Anderem

Zug **Flug**

<input type="checkbox"/> 1. Klasse	<input type="checkbox"/> 1. Klasse
<input type="checkbox"/> 2. Klasse	<input type="checkbox"/> Business
	<input type="checkbox"/> Economy

Bezahlt von

<input type="checkbox"/> Selbst	<input type="checkbox"/> Auftraggeber
<input type="checkbox"/> Familie/Freunde	<input type="checkbox"/> Gastgeber
<input type="checkbox"/> Arbeitgeber	<input type="checkbox"/> Anderem

Ankunft in:

Am: _____ um: _____ Uhr

Aktivitäten am Aufenthalts- oder Zielort
(Mehrfachnennungen möglich!)

Umsteigen/Fahrzeugwechsel

Pause/Essen

Übernachten

Arbeit am ständigen Arbeitsplatz/Dienst

Ausbildung/Weiterbildung

Geschäftlich/Dienstlich

Private geschäftliche Angelegenheiten

Private Dienstleistungen/Arztbesuch

Einkaufen

Besuch bei Verwandten/Freunden

Freizeit/Erholung

Absetzen/Abholen

Anders

Wohnen

Übernachtung

<input type="checkbox"/> Nicht übernachtet	<input type="checkbox"/> Bei Verwandten/Freunden
<input type="checkbox"/> Hotel/Pension	<input type="checkbox"/> Eigene
<input type="checkbox"/> Ferienort/Club	<input type="checkbox"/> Zweitwohnung
<input type="checkbox"/> Jugendherberge	<input type="checkbox"/> Zweitwohnung von Freunden/Familie
<input type="checkbox"/> Campingplatz	
<input type="checkbox"/> Privatzimmer	
<input type="checkbox"/> Anders	
<input type="checkbox"/> Möglichkeit	

Übernachtung bezahlt von

<input type="checkbox"/> Selbst	<input type="checkbox"/> Auftraggeber
<input type="checkbox"/> Familie/Freunde	<input type="checkbox"/> Gastgeber
<input type="checkbox"/> Arbeitgeber	<input type="checkbox"/> Kostenlos

Weiter

Am: _____ um: _____ Uhr

Etappe der Hin-, Weiter- oder Rückfahrt gefahren mit

<input type="checkbox"/> Haushalts-PKW	Nr. _____
<input type="checkbox"/> Anderem privaten PKW	
<input type="checkbox"/> Leihwagen	<input type="checkbox"/> Bus
<input type="checkbox"/> Firmenwagen	<input type="checkbox"/> Reisebus
<input type="checkbox"/> Taxi	(Linien dienst)
<input type="checkbox"/> ICE/IGV o.ä.	Reisebus(Charter)
<input type="checkbox"/> IC/EC	Linienflug
<input type="checkbox"/> Anderem Fernzug	Charterflug
<input type="checkbox"/> Nahverkehrszug/S-Bahn	Fähre/Schiff
<input type="checkbox"/> Straßenbahn/U-Bahn	Motorrad/Moped
	Fahrrad
	Anderem

Zug **Flug**

<input type="checkbox"/> 1. Klasse	<input type="checkbox"/> 1. Klasse
<input type="checkbox"/> 2. Klasse	<input type="checkbox"/> Business
	<input type="checkbox"/> Economy

Bezahlt von

<input type="checkbox"/> Selbst	<input type="checkbox"/> Auftraggeber
<input type="checkbox"/> Familie/Freunde	<input type="checkbox"/> Gastgeber
<input type="checkbox"/> Arbeitgeber	<input type="checkbox"/> Anderem

Ankunft in:

Am: _____ um: _____ Uhr

Aktivitäten am Aufenthalts- oder Zielort
(Mehrfachnennungen möglich!)

Umsteigen/Fahrzeugwechsel

Pause/Essen

Übernachten

Arbeit am ständigen Arbeitsplatz/Dienst

Ausbildung/Weiterbildung

Geschäftlich/Dienstlich

Private geschäftliche Angelegenheiten

Private Dienstleistungen/Arztbesuch

Einkaufen

Besuch bei Verwandten/Freunden

Freizeit/Erholung

Absetzen/Abholen

Anders

Wohnen

Übernachtung

<input type="checkbox"/> Nicht übernachtet	<input type="checkbox"/> Bei Verwandten/Freunden
<input type="checkbox"/> Hotel/Pension	<input type="checkbox"/> Eigene
<input type="checkbox"/> Ferienort/Club	<input type="checkbox"/> Zweitwohnung
<input type="checkbox"/> Jugendherberge	<input type="checkbox"/> Zweitwohnung von Freunden/Familie
<input type="checkbox"/> Campingplatz	
<input type="checkbox"/> Privatzimmer	
<input type="checkbox"/> Anders	
<input type="checkbox"/> Möglichkeit	

Übernachtung bezahlt von

<input type="checkbox"/> Selbst	<input type="checkbox"/> Auftraggeber
<input type="checkbox"/> Familie/Freunde	<input type="checkbox"/> Gastgeber
<input type="checkbox"/> Arbeitgeber	<input type="checkbox"/> Kostenlos

Weiter

Am: _____ um: _____ Uhr

Abfahrt von

zu Hause

Sonst _____

Am: _____ um: _____ Uhr

Hauptzweck der gesamten Reise

Arbeit am ständigen Arbeitsplatz/Dienst

Ausbildung/Weiterbildung

Geschäftlich/Dienstlich

Private geschäftliche Angelegenheiten

Private Dienstleistungen/Arztbesuch

Einkaufen

Besuch bei Verwandten/Freunden

Freizeit/Erholung

Absetzen/Abholen

Anderer: _____

Gab es einen Hauptzielort der Reise?

Nein

Ja, bitte Ortsnamen/Land angeben: _____

Vornamen aller weiteren mitreisenden Haushaltsmitglieder (auch unter 15 Jahren)

Anzahl der anderen Mitreisenden

Table 2 Response behaviour

Experiment	Survey period	Journey form	Response rate [%]	Un-reachable [%]	Share of NR-Interviews [%]	Share of R-interviews [%]	Sample loss [of 135]
Prospective	4 weeks	Small	25.6	20.5	46.5	100.00	18
Prospective	4 weeks	Large	33.3	26.7	42.4	96.6	15
Prospective	8 weeks	Small	26.7	22.5	40.6	100.00	15
Prospective	8 weeks	Large	27.6	29.1	31.2	100.00	8
Retrospective	4 weeks	Small	39.0	25.2	37.5	91.7	12
Retrospective	4 weeks	Large	37.2	16.5	50.8	97.4	14
Retrospective	8 weeks	Small	38.3	24.2	26.4	97.8	7
Retrospective	8 weeks	Large	38.0	18.6	36.5	100.0	6

4 INITIAL RESULTS

The results presented here focus on response rates and data yield in terms of their descriptive analysis and of some simple modelling. The substantive content of the results and more complex modelling of response and data yield will be reported in later papers.

4.1 Response

Table 2 gives the overview of the response behaviour for the eight experiments. Sample loss is the number of survey packs returned by the post or new tenants as "Addressee unknown" or "Wrong address". The response rate is the share of those remaining after the sample loss returning usable forms. The rate of unreachables is the share of households which we tried to reach by phone for either type of telephone interview and which could not be reached within five attempts. The rate of non-response (NR) interviews is the share of households eligible for a NR-interview, which did participate (i.e. excludes households which we could not finally reach). The rate of response-interviews is defined analogously (Table 2).

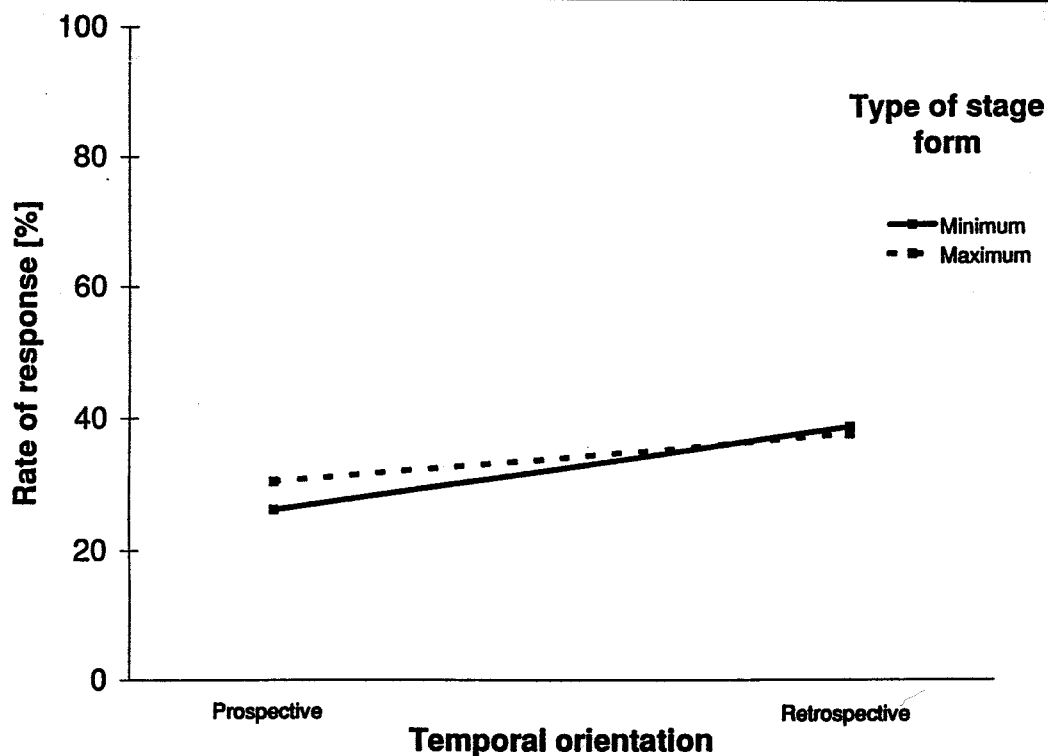
The response rate, on average across the experiments, of 33.2% is in the range expected in Austria, but the total response (return of the form or a full NR-interview covering journeys made) is 53.2% of all respondents (minus sample loss). Using linear regression to analyse the aggregate rate of response only the temporal orientation had a significant effect on the response rate. Prospective surveys have a response rate 9.8% (t-statistic 5.12; adjusted $r^2 = 0.78$ with only the three main effects) lower than retrospective surveys. An analysis of variance shows a marginally significant interaction effect between temporal orientation and size of journey item set (See Figure 2).

One can only speculate about the reasons for this drop: it is possible that the households are just less willing or less able to organize the filling-in of the survey form over such a long period; that the expected work load and its possible variability is perceived as too high a risk in comparison to the retrospective surveys, where the respondents knows what the work load is. The further drop for the smaller question set might indicate, that respondents judge the seriousness of the survey by its size and detail and that there might be a minimum threshold to convey this impression of seriousness and importance to the respondents.

The share of households not reachable by phone is independent of the characteristics of the survey, as would be expected (grand mean 22.9%). These addresses are likely to be second homes or people away on longer holidays.

The regression analysis of the share of NR-interviews indicates, that the duration of the survey period has a marginally significant effect (-10.6% for eight weeks in comparison to four weeks; $p = 0.09$). It seems obvious that respondents will be less likely to participate, if the interview can be expected to be longer due to the longer survey period, while the temporal orientation of the original written instrument should have no influence any more.

Figure 2 Rate of response as function of temporal orientation and type of stage form



4.2 Data yield

The response rate is only one part of the equation. The second part is the amount of information obtained from the respondents. Table 3 summarizes the data yields as a function of the survey instrument. The numbers refer only to those journeys reported on the forms. Journeys reported on the phone were excluded. The temporal orientation and the size of the question set has no significant impact on the number of reported journeys (linear regression of the aggregate averages). Surprisingly, considered per week of reporting period the duration has no effect on the reporting, either. The comparison of the journeys reported over the survey period by the prospective and retrospective survey shows no significant differences (see Figure 3). As it is possible, that a substantial share of the "prospective" respondents filled the questionnaire retrospectively, it is impossible to say, that there are no differences as such. Future research is need to address the issue of when respondents actually respond.

The regression analysis of the average number of stages per journey is shown in Table 4. The negative impact of a retrospective survey on the detail provided is clear and consistent with expectations. Recall difficulties make it likely that the respondents omit stages. The significant negative impact of the larger item set is also consistent with expectations, but not as large as could be feared given the substantial increase in item number and coding detail, although the highest number of stages is reported for the combination of a prospective survey with a small item set. Duration has no significant effect on the number of stages reported.

5 CONCLUSIONS AND DIRECTIONS FOR FURTHER WORK

The initial work reported above shows that the survey designer faces trade-offs between the work load of the respondent, the response rate(s) and the data yield obtained from the survey: retrospective surveys increase the willingness of the respondents to participate, but the amount of stage detail is reduced in comparison with a prospective survey. Increasing the duration of the survey period could induce fatigue, but will still increase the total number of journeys reported. In addition, a longer survey period decreases the probability that the respondents will participate in NR-interviews, which would allow the collection of some information about the person and its travels. It is interesting to note, that the number of reported journeys is not affected by the temporal orientation and the size of the item set, but that the respondent decrease their work load by reducing the detail they provide.

Figure 3 Comparison of the number of persons departing on any one day of the survey period as recorded on the prospective and retrospective instruments

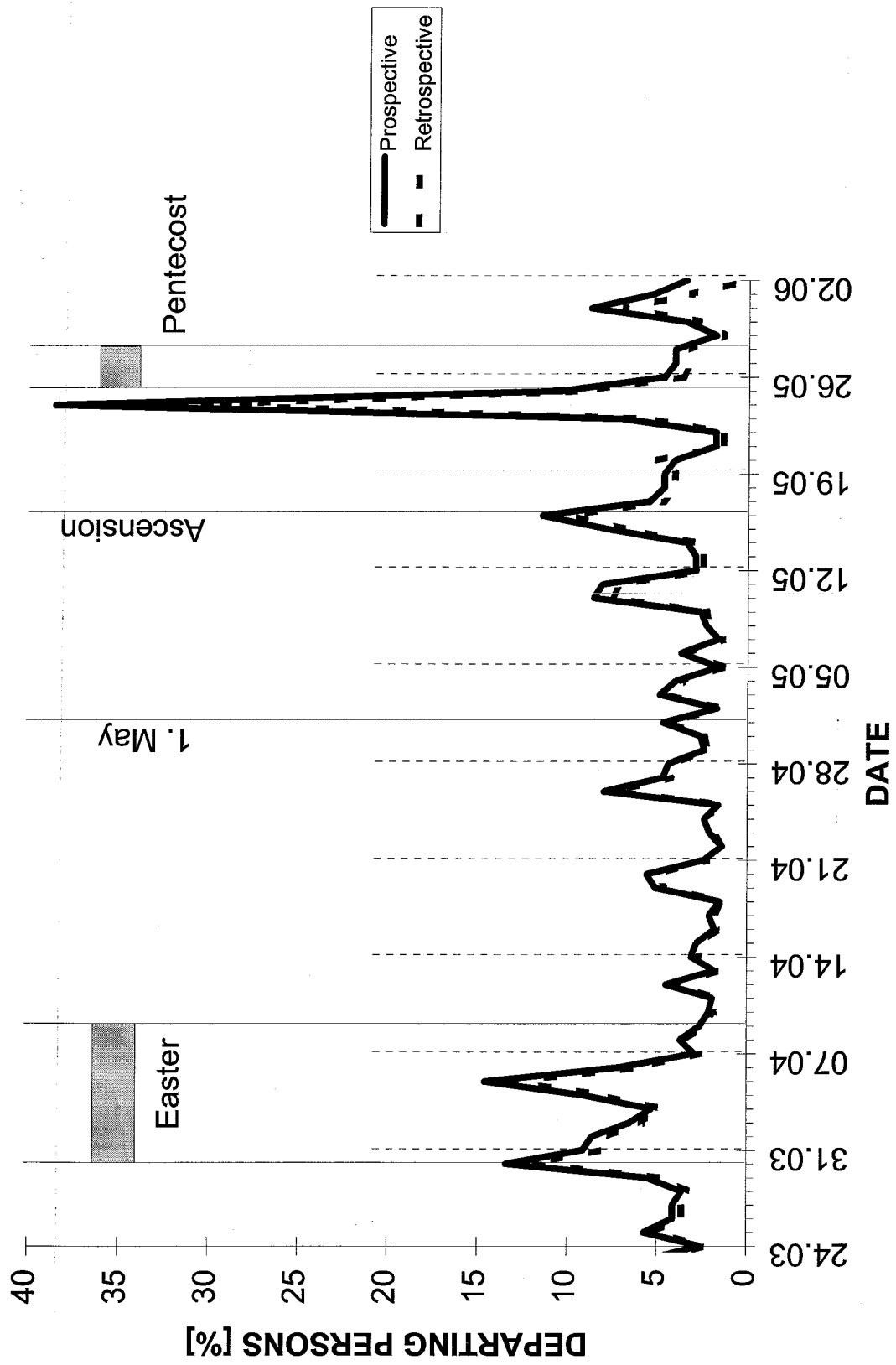


Table 3 Response behaviour: journeys/stages reported on the survey forms

Experiment Orientation	Survey period	Journey form	Data yield	
			Journeys per person and week inside the survey period	Stages per journey inside the survey period
Prospective	4 weeks	Small	0.12	4.13
Prospective	4 weeks	Large	0.14	3.50
Prospective	8 weeks	Small	0.15	4.68
Prospective	8 weeks	Large	0.12	3.39
Retrospective	4 weeks	Small	0.13	3.27
Retrospective	4 weeks	Large	0.13	3.07
Retrospective	8 weeks	Small	0.11	3.43
Retrospective	8 weeks	Large	0.11	3.03

Table 4 Results of the regression analysis of the average number of stages by survey instrument

Variable	Parameter	t-Statistic	p
Intercept	3.40	9.39	0.001
Retrospective 8 weeks	-0.73 0.04	-3.47 0.67	0.026 0.540
Large journey item set	-0.63	-3.01	0.039
df	7		
adjusted R ²	0.73		
F	7.19 (p = 0.043)		

This initial analysis has to be supplemented and deepened in a number of directions² The availability of the data from the NR-interviews will be used to estimate models of response as a function of the socio-demographics of the respondents as well as of their travel behaviour and of the characteristics of the survey form at the individual level. This will increase our insight into the response behaviour at the individual level, which the initial aggregate analysis was not able to provide. Similarly, it is necessary to correct the total number of journeys reported for seasonal effects to permit a better analysis of the effect of survey duration on response behaviour and data yield. The available information on durations between long-distance journeys will be used to detect possible fatigue

² This work will be undertaken in the next two months.

effects over the duration of the survey period. The analysis of the data yield will be refined to include individual or household level information in addition to the information about the survey form.

Given the quality advantages of prospective surveys confirmed here for long-distance survey, although long known for urban surveys, future experimental work should focus on how to increase the response rate for such surveys in order to avoid any systematic bias due to respondent self-selection. It is necessary to develop methods or designs, which reduce the apparent work load for the respondent to overcome any initial resistance to participating in the survey. The other mayor area of work has to be the comparison with telephone surveys and or methods combining reduced forms (memory joggers) with telephone retrieval.

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