

# **NatCen**

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# **Exploring reasons for differences in the number of short walks recorded in the NTS travel diary:**

**Findings from cognitive interviews**

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# 1 Summary

The National Travel Survey (NTS) provides the Department for Transport (DfT) with its main measure of personal travel in Britain. Each year, in the region of 7.500 household interviews are administered. At each participating household, all individuals are asked to complete a seven-day travel diary. The diary collects data about each journey made including its purpose and the mode of travel, as well as other details such as duration and ticketing details. In order to avoid over-burdening respondents, they are asked to provide data about walks of less than one mile (henceforth referred to as 'short walks') on the final day of the diary (Day 7). Short walks are then weighted up for analysis purposes. It is known that respondents' tend to become less diligent in their recording of trips during the course of the diary and this is also corrected for through means of weighting. However, because short walks have only been recorded on the final day of the diary, it was unknown whether they were also subject to a similar drop-off.

For this reason, in 2013, a split-sample experiment was undertaken to test the impact of requesting respondents to record short walks on the first day of the diary week (Day 1) instead of Day 7. This identified a high level of drop-off. Among adults, 29% recorded a short walk on the Day 1 version of the diary, compared with just 20% of those using the Day 7 version. This could potentially mean that short walks are routinely under-recorded in the NTS. In 2015, DfT therefore decided to undertake a repeat of the experiment in order to check its reliability. Alongside this, it commissioned NatCen to undertake some cognitive testing of the NTS travel diary. Respondents completing both the Day 1 and Day 7 diary were followed-up and a cognitive interview was undertaken to explore how they completed the diary and potentially shed light on why a difference might occur.

The findings presented in this draft report are based on 30 cognitive interviews: 13 'Day 1' and 17 'Day 7' cases. Details of how this research was carried out are contained in Appendix A.

## 2 Results

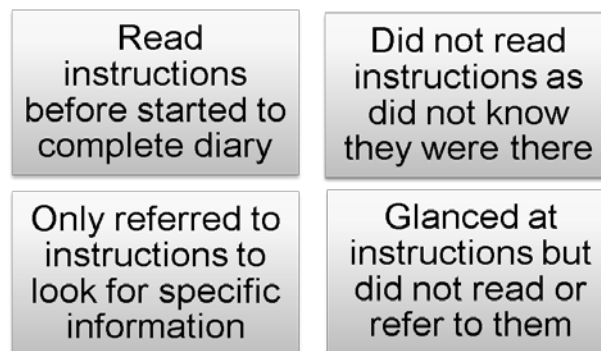
### 2.1 How was the diary completed?

One of the advantages of following up 'real' respondents (as opposed to recruiting respondents only for the cognitive interviews) in a naturalistic setting, where they were already completing a diary placed by a survey interviewer, is that we were able to capture a range of diary-completion behaviours. These behaviours combined in different ways among individual participants. We discuss these behaviours in the rest of this section.

#### 2.1.1 Use of instructions

The travel diary includes a set of instructions on the inside flap. These instructions relate to each of the lettered columns in the diary and provide further guidance on what information is needed and how to record it. Our findings support those from earlier studies<sup>1,2</sup> that the use of the instructions is variable. We found four distinct behaviours, see Figure 1 below, which relate to whether the instructions are read and referred to or not.

**Figure 1 Reading and reference to instructions behaviours**



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<sup>1</sup> McGee A, Gray M & Collins D (2006), *NTS Travel Record Review Stage 1*. Department of Transport. Available at: <http://webarchive.nationalarchives.gov.uk/+/http://www.dft.gov.uk/pgr/statistics/datatablespublications/personal/methodology/ntsrecords/ntstravelrecord1.pdf>

<sup>2</sup> McGee A, Gray M, Andrews F, Legard R, Wood N and Collins D (2006) *NTS Travel Record Review Stage 2*. Department of Transport. <http://webarchive.nationalarchives.gov.uk/+/http://www.dft.gov.uk/pgr/statistics/datatablespublications/personal/methodology/ntsrecords/ntstravelrecord2.pdf>

Sometimes participants had been shown the instructions by the interviewer at the diary placement stage but did not read them or refer to them. Set dates for diary completion are given to respondents and therefore they may be asked to complete the diary sometime after the placement interview. On occasion participants appeared not to have noticed the instructions at all.

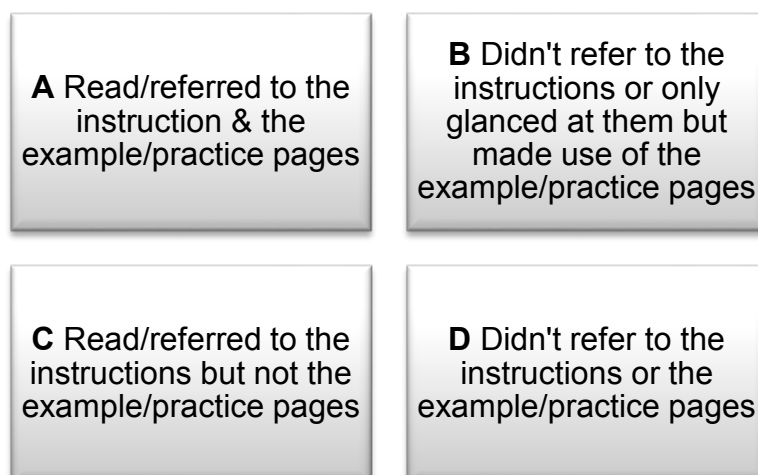
### **2.1.2 Use of the example and practice pages**

The first page of the diary shows an example of how to record journeys. The survey interviewer may talk through the example with the respondent and encourage them to write in a recent journey on the practice page to illustrate the process. This may not happen if the respondent is not present when the diary is placed (e.g. if the respondent was not at home when the interview took place) or if the interviewer decides not to do this (e.g. because the respondent is pressed for time).

Use of the example and practice pages was varied. There were a group of participants who made use of the example and or practice page when completing the diary and found them helpful. One Day 1 participant, a woman in her fifties, commented that she could not have completed the diary without the example page. Another Day 1 participant, a lone parent female in her thirties with two children, found the practice page more useful than the example as it showed her how to record her travel and the importance of breaking journeys down into chunks. However, there were those who did not use the example or the practice pages at all, or who only used them during the first few days of the diary, as they learnt how to fill it in.

Participants' use of the instructions and the example/practice pages was not always consistent, as Figure 2 illustrates. Whilst there were those who would use both or neither the instructions and example/practice pages, there were also a group who did not read or refer to the instructions but did find the example/practice pages useful. There were also two participants, a female in her twenties and a male in his fifties, both of whom were Day 7 cases, who read the instructions before starting to complete the diary and found them helpful, but did not look at the example or practice pages.

**Figure 2 Use of the instructions and the example pages**



### 2.1.3 Short walks instruction on Day 1 or Day 7

The instructions on the inside flap of the diary included instructions on the recording of walks on different days of the diary. The instructions for Day 1 and Day 7 cases differed, as shown below.

“On day 1 include **all** walks. On days 2-7 only include walks of a mile or more (it takes approximately 20 minutes to walk a mile).”

“On days 1-6 only include walks of a mile or more (it takes approximately 20 minutes to walk a mile). On day 7 include **all** walks.”

In addition, at the top of the Day 1 or Day 7 diary recording page was an instruction to participants which said “*Include all walks of a mile or more*”. During the cognitive interview participants were asked if they had seen these instructions. There are several things to note from the responses obtained.

In some cases participants reported that the survey interviewer had flagged this instruction during the diary placement, underlining or marking the instruction on the diary page to remind them. There were those who did not mention the survey interviewer flagging this instruction. Some in this group noticed it themselves whereas others did not.

Even if the interviewer had flagged it or the participant had seen the instruction this did not necessarily mean that participants always followed the instructions.

One participant, a male in his fifties Day 7 case, commented that he and his wife were confused at the ‘walking instruction’ on day 7. Did the instruction mean that he had to

add up all walks he had done to date and record them on Day 7, or just record all the walks he did on Day 7? His wife had walked to work on Days 1-5 – a walk of under a mile – but had not walked on Day 7. She wanted to record these walks somewhere.

## 2.2 Diary completion behaviours

A range of diary completion behaviours were identified and are summarised in Figure 3.

**Figure 3 Diary completion behaviours**

Pre-filling	Retrospective completion
<p>Anticipated journeys entered ahead of them actually happening – either at the start of the travel week or the start of each day</p>	<p>Diary completed at the end of each day</p> <p>At various points during the 7 day travel week period but not every day</p> <p>Filled in at the mid-week check, when the interviewer arrived and then at the end of each day thereafter</p>

The pre-filling diary behaviour was reported in two cases: one Day 1 case, a lone parent female in her thirties with two children and one Day 7 case (a female aged under 20). In the former (Day 1) case, the participant prefilled her diary with regular trips she knew she would take, such as taking her son to and from nursery. She prefilled the diary with ‘regular’ trips for the week ahead but left the time and distance blank so she could write in these details having made the actual journeys. In the latter case the participant pre-recorded trips that she planned to make on that day at the start of the day. She recorded all the details as she knew how long it would take, the distance and when she planned to make the journey.

*“I planned my day, like from the morning.... I jotted it down before I went out cus I knew what time roughly I was going to get back and what time I was going out, I know like the distance from here to where I was going, like there and back.”*

Day 7, female, aged under 20, unemployed.

Completing the diary retrospectively at the end of each day was the most common strategy among those interviewed for this work (18 cases out of 30). There were seven cases where the diary was filled in retrospectively at two or three points during the seven day period. This occurred when participants were too busy to be able to fill it in every day, too tired or just forgot. The interviewer mid-week check is designed to encourage people to fill in the diary and deal with any problems participants are having. In our follow up study there was one case where the participant did not start to record any information in her diary until the mid-week check. This Day 7 single mother of three preschool children found the task of completing the diaries onerous and time consuming. She had little time and needed some support to get going with completing the diary but after the mid-week check she was able to complete the diaries for herself and her children at the end of each day.

Our study included five participants who mentioned that someone helped them complete their travel diary. This help was provided by a girlfriend, wife, child or granddaughter. The level of help varied, from taking on the whole recording task over the seven days to providing help on recording particular types of journey, see Figure 4.



#### Figure 4 Cases where participants received help with completing their travel diary from another family member

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Male 25-64, Day 1 diary. Lives with girlfriend<sup>3</sup>      Girlfriend filled in his diary alongside her own over the seven days as they did everything together.

Female, 65+, Day 1 diary. Lives with granddaughter      Participant relayed her travel to her granddaughter each day who recorded the information in participant's travel diary.

Male, 65+, Day 7 diary. Lives with wife      His wife helped him complete his diary on days 1 and 2. He then completed days 3-7 himself.

Female, 65+, Day 1 diary. Lives with daughter      Her daughter helped explain where she was going wrong.

Male, 65+, Day 7 diary. Lives with wife and son      His wife and the survey interviewer filled it in for him; each day he told his wife what he had done and she would write it into the diary. The survey interviewer also visited every couple of days to help them fill in the diaries.

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### 2.2.1 Use of the memory jogger

The 'memory jogger' is a small 'pocket-sized' diary that interviewers can leave with the respondent at diary placement if they think it will help the respondent record his or her travel. Among the cognitive participants the use of the memory jogger was low, with only two participants using it. A Day 1 female in her sixties who lived with her mother who had used the memory jogger on day 1 to record the numerous journeys she had made and the entered them into the diary on day 2, and a Day 7 female in her forties who used the memory jogger only on some days when she was out and making several journeys. There were those who could not recall the survey interviewer offering them the memory jogger. In some cases participants had been offered it but not used it because:

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<sup>3</sup> In this case the cognitive interview was not conducted until day 8.

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- they used their own notebook;
- they did not think it was useful; or
- they had no need for it as they could recall their trips easily.

A total of 6 participants made their own notes rather than use the memory jogger.

## 2.2.2 Ease of completion

Participants were asked how easy or difficult they found the diary completion task as a whole. Different features of participants travel, diary completion behaviour and comprehension of the task and key concepts (journey, purpose) made the task easier or more difficult. These features, as discussed by the respondents, are presented below.

### **Features that respondents spoke about which they believed made the diary completion task easier or more difficult**

#### **Easy**

- Easy to remember travel
- Had a weekly routine
- Diary was clear and easy to complete
- Example page is helpful. Made the task simple by thinking that she only had to enter days where she had done journeys
- Instructions were clear
- Used her smartphone to record times spent walking.
- Already kept a log of mileage per week

#### **Difficult**

- Participant had limited time and lots of other demands on their time (e.g. young children, demanding job).
- Remembering what travel was done
- Journeys with multiple stages – e.g. going to the shops, then on to a friend's house before coming home. It was not immediately clear that the place you had ended your first journey was the place you should record as the start of your second journey

- Deciding what to record as the 'purpose' of the journey
- What to record as the place where the journey ended. How much detail was needed: the name of the town, the neighbourhood or an actual address?
- Mileage and time spent travelling were not always known. Participants had to make a conscious effort to note these, look them up or guess
- Recording a trip to the shops. A Day 1 participant walked into town, visiting three different shops and then returned home. This was recorded as a circular walk.
- On day 7, one participant was confused by the instruction to record all walks. He was unsure whether he should record the total of all walks he had made throughout the week or only on Day 7.
- Did not know where to record taxi fares
- Unclear how to record trips made by ferry
- Not knowing the make of the car the participant travelled in (it was not their own)
- Not knowing the cost of the journey, one Day 7 participant used a pre-paid oyster card and found it difficult to work out the cost of her travel
- Deciding 'how many times did you board?', one Day 1 participant was unsure whether this meant 'changing trains or buses on the same system of transport'

## 2.3 Understanding of key concepts

### 2.3.1 Journey purpose

The first piece of information respondents have to fill about their travel on a particular day is the 'purpose of your journey' (column A). This was not always considered straightforward, and participants were sometimes unsure what to record here. In recording the purpose of the journey, participants either thought about:

- the reason why they made the journey/ what they were going to do (e.g. shopping, education event, work, fishing, visiting dad); or
- where they were going (e.g. to the gym, home, work).

## 2.3.2 Stage

Column F asks respondents to record which mode of transport they used for each stage of their journey. The term 'stage' was understood as referring to:

- each time you change your mode of transport
- different travel destinations
- moving between places
- end-points for journeys

In some cases participants mentioned that the icons above columns F to I helped with their understanding of what they needed to record.

However, some participants were confused by column F. A day 7, female respondent in her forties did not understand that stage referred to the method of travel. She wanted to record each journey as a stage.

## 2.4 Recording of walks

On the NTS, participants are asked to record walks if they are one mile or more on days 1-6, and all walks (even walks under one mile) on day 7. The short walks experiment ran during the 2013 survey year<sup>4</sup> and repeated in 2015 included a version of the travel diary where all walks were recorded on Day 1 and walks over a mile on days 2-7. The 2013 experiment found a significant difference in the number of short walks recorded when this was on Day 1 rather than Day 7, with more short walks being recorded on Day 1 than Day 7.

This cognitive testing sought to understand why such a difference might occur and included both those asked to record short walks on Day 1 and on Day 7. This section looks at why walks do not get recorded, the factors that lead to walks being missed and why differences in the reporting of short walks found in the 2013 field experiment might occur.

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<sup>4</sup> For details on the 2013 experiment see Morris et al (2014) NTS Technical Report 2013. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/337263/nts2013-technical.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337263/nts2013-technical.pdf)

### 2.4.1 Missed walks

As part of the cognitive interview, we identified a number of cases where short walks were missed by the respondent, that is, not recorded in the travel diary.

- Short walks that occur within a location that the participant has already arrived at e.g. a walk within a station from one platform to another, walking round a show ground, walking around the shops, walking around university.
- Walks the participant considers too short e.g. walking to a house next door, walking from where the car was parked to a shop or restaurant.
- Return journeys e.g. walking back home from going on a walk or going into town.
- There was an even split between missed walks which included other modes of transport for example walking to a bus stop or from a car to a final destination and those which only included walking.

Details of these are provided in Table 1, Appendix B. Some of these 'missing' walks may be picked up by the survey interviewer at the mid-week and or diary pick up call and added in. Others may be removed from the final data set because they are out-of-scope, for example, walks that are not on the public highway, such as walks around a show ground or an indoor shopping centre. Yet some may remain 'hidden', such as walks that the participant considers are too short and will be missed altogether if the respondent does not mention this to the interviewer. There was no evidence from this study to suggest that certain types of walk were more likely to be missed when short walks were recorded on Day 7 rather than Day 1.

## 2.5 Reasons for walks not being recorded in the travel diary

We found no single reason why the 'missing' walks we identified in the course of the cognitive interviews were not recorded in the travel diary. Rather it appears that there are a variety factors which combine in different ways.

### 2.5.1 Diary completion behaviours

We compared the diary completion behaviours of those found to have omitted walks from their travel records with those who did not. Figure 6 shows that both groups were

found to engage in behaviours that are not seen as desirable e.g. not reading instructions. There were a small number of cases in the group who had not omitted walks from their diaries who had not done any walks on Day 1 or Day 7.

We compared the diary completion behaviours of those found to have omitted walks from their travel records with those who did not. Both groups were found to engage in behaviours that are not seen as desirable e.g. not reading or not referring to the instructions in the flap. This was a fairly common occurrence for both groups, and based on the cognitive interviews we cannot conclude that it was more prevalent among one group than the other.

Among the group who has omitted recording the short walks, it was more common not to refer to the example page or to complete the practice page than among the participants who had not omitted any short walks. Although the difference was small, this could point to the benefits of the practice page. Furthermore, participants who omitted walks were also somewhat more likely not to see the instructions on including all walks at the top of Day 1 or Day 7. Few participants who omitted to include the short walks told us that they had forgotten about the instructions to include all walks either on Day 1 or Day 7.

One of the most common behaviours for the participants was to fill in the diary retrospectively at the end of each day. The cognitive interviews found this behaviour was slightly more common among people who have omitted recording short walks. This may indicate that even if the walks are recorded at the end of the day, participants might forget about some short walks they have done during that day. Regardless, this was a very common behaviour among all participants and could indicate that filling out the diary at the end of the day is a common practice among all participants. A few people also told us that they recorded their walks retrospectively every few days. Evidently, this is not an advisable practice, as it will predispose participants to make more frequent recall errors.

A very small number of participants prefilled their diary, but there was no difference with regards to short walks omitted for these participants. Similarly, a few participants indicated that they were confused about how to record walks, but this did not lead to any significant difference with regards to omitting to record short walks.

There were also a small number of cases in the group who had not omitted walks from their diaries, but who had not done any walks on Day 1 or Day 7.

Given the nature of cognitive testing, we can only report how common certain behaviours were for the two groups; however this should not be taken as a numerical or statistical analysis. Rather, the report aims to investigate the reasons as described by the participants for why they omitted recording the short walks.

We have used the same behaviours described above to compare the number of walks omitted by the participants in Day 1 group and in Day 7. When we compare the diary completion behaviours of those who missed short walks for the Day 1 and Day 7 groups, we do see some differences. These differences are listed in Figure 5.

**Figure 5 Diary completion behaviours of Day 1 and Day 7 cases where short walks were omitted from the travel diary**

Behaviour	Walks omitted	
	Day 1	Day 7
Not reading/ referring to instructions in the flap	◆◆◆◆	◆◆
Not referring to the example page/completing the practice pages	◆◆◆	◆◆◆◆
Didn't see the instruction on including all walks at top of Day 1 / Day 7 page	◆	◆◆◆◆◆
Forgot about instruction to include all short walks on day 1 or 7		◆◆
Filled in diary retrospectively at the end of each day	◆◆◆◆	◆◆◆◆◆◆
Filled in retrospectively every few days or longer	◆	◆
Prefilled diary		◆
Confused about how to record walks		◆◆◆◆

◆ represents actual number of cases

Many of the participants in the Day 7 group who omitted short walks from their diaries said that they didn't see the instruction on including all walks at the top of Day 7. In one case the participant recalled that the interviewer had pointed out this instruction to her but she forgot about it when filling in her diary (this was the lone mother with three preschool children). This group also expressed confusion about how to record short walks. These behaviours were not noted among Day 1 cases. This suggests that the Day 7 group may be prone to forgetting information provided by the interviewer at

placement. It should be noted however that there were Day 1 and Day 7 cases where missing walks were identified who did not exhibit these less desirable diary completion behaviours. In summary, evidence from this study suggests that engaging in the undesirable behaviours listed in the table above maybe be a risk which leads to short walks being omitted from Day 7 of the diary.

## 2.5.2 Differences in reasons for omission of short walks between Day 1 and Day 7

We also explored the reasons why short walks were omitted from the diary. Figure 6 shows that these reasons fall into three main categories, which will be briefly described below based on the participants' input.

Some omissions resulted from **errors in comprehension** of the diary completion task and the recording procedure for short walks. Some participants also had difficulties understanding key concepts, such as what a journey and stage are, misunderstanding instructions provided by the interviewer and not making use of the diary instructions.

Other omissions were due to **recall errors** – this included forgetting about the journey due to being busy at work or being distracted when the diary was being completed; travel behaviour on Day 7 being different to 'normal' or the routine on Days 1-6; and as a result of completing the diary retrospectively – at the end of each day, every couple of days or at the end of the diary recording period. It is worth noting here that some form of retrospective diary completion was commonplace.

Lastly, some omissions were due to **cognitive biases** – this included the adoption of 'rules' by participants that helped them decide whether the walk should be included (i.e. its length and whether it was seen as being a separate stage or journey or part of a prior one; for example, one respondent did not include the walk she did around a high street shopping centre as she considered her 'journey' to be to and from the shopping centre – by car – and not her travel when she was there – walking). The prefilling of the diary with 'routine' journeys, such as the work commute also led to the omission of non-routine journeys.



**Figure 6 Reasons for omitted walks by day on which short walks captured**

Reason for omitted walk	Day 1	Day 7
<b>Errors in comprehension of task, concepts, diary layout</b>		
Unsure whether to include	✓	✓
Return journey not recorded	✓	✓
Instructions not read	✓	✓
'Purpose' not understood		✓
'Stage' not understood	✓	
<b>Recall error</b>		
Forgot journey when recording	✓	
Behaviour different to normal routine		✓
Diary completed retrospectively	✓	✓
<b>Cognitive biases</b>		
Not considered long enough to be recorded		✓
Not considered a separate journey as walk completed once arrived at journey destination	✓	✓
Diary completed before journeys made		✓

✓ represents the presence of this kind of error in the Day 1 or Day 7 group of participants

The errors in comprehension and the recall errors appear for both groups of participants, both for Day 1 and Day 7 participants when it comes to omitting short walks. The differences between the two groups exist, but for these types of errors they are not very strong. For example, the Day 1 group showed no instance of not understanding the purpose, while this error was present for the Day 7 group. Similarly, for the recall error relating to the behaviour being different to the normal routine, this was not an issue for the Day 1 group, but it did appear to affect Day 7 group.

It is interesting to note that the omission of short walks due to cognitive biases seems to occur mostly among Day 7 cases (with the exception of one Day 1 case who did not

include walks between platforms on the underground as they were considered the same stage of a journey).

The pattern appears to be consistent with the 2013 field experiment finding that fewer short walks were recorded on Day 7 than on Day 1. These cognitive biases can be seen as symptoms of diary fatigue. Participants may consciously or sub-consciously adopt rules and strategies that reduce the amount of cognitive effort needed to complete the diary as time goes on. Collecting information on all walks, irrespective of length, on Day 1 would minimise this type of omission.

### **2.5.3 Other factors that might explain lower reporting of short walks on Day 7**

One possible reason for the difference between the number of short walks recorded on Day 1 compared to those recorded Day 7 might be to do with the length of time between diary placement and the diary being completed. Interviewers are given dates when diaries should start and allocate each household to a particular date. This ensures an even spread of diary days across each month of fieldwork. However, the placement pattern can result in there being a gap of several weeks between diary placement and the start of diary completion. We looked at this gap to see if the differences in diary recording behaviour observed in Figure 7 were influenced by it and no clear pattern was discernible.

## **2.6 Conclusions and next steps**

The results from the 2013 experiment on the NTS suggests that recording all short walks on Day 7 rather than Day 1 produces a significantly lower estimate of the number of short walks undertaken. Evidence from this study suggests that this might be the result of a combination of the following factors, however some of these also relate to missing walks from day 1 respondents:

- Confusion over whether the short walk should be included– this was an issue for Day 1 and Day 7 participants
- Lack of understanding of how to record round trips and composite journeys (e.g. home to the shops, to a friend's, then home)– again, this was a problem for both Day 1 and Day 7 participants
- Not seeing the instruction about recording all walks or forgetting about the instruction – particularly an issue for Day 7

- Adoption of cognitive biases either consciously or subconsciously to make the diary recording task easier, such as making up definitions about how long a walk should be before it counts as one that needs to be recorded – cognitive biases appear to be more prevalent among Day 7 than Day 1.

### 2.6.1 Recommendations

Based on the findings from the 2013 short walks experiment, we can recommend moving the recording of all short walks to Day 1. The participants in this study appear to omit less short walks when they record them on Day 1 rather than Day 7. The reasons we found for this consistently relate to issues surrounding cognitive biases, as well as recall errors and errors in task comprehension. Furthermore, by asking participants to record an additional element, i.e., the short walks, on Day 1 we would avoid the dangers of survey fatigue, and that would allow for a more accurate recording of the short walks.

Related to the comprehension errors, we also recommend amending the example to illustrate a multi-purpose and round trip walk. The instructions could include an example which comprised of a walk from home to the shops, around the shops, then from the shops to the park, then from the park home. It should be made explicit to the participants that on Day 1 (or when they need to record all the short walks), they should include every stage of their trip which had a walking component. Also, recording the short walks on Day 1 will probably lead to less recall errors, or forgetting the instructions. If there is any confusion about how to fill out the diary, participants will probably be more inclined to check the instructions on Day 1 rather than on Day 7.

Asking participants to record the short walks on Day 1 presents one potential risk: in case they do not read or follow the instructions closely, participants might be tempted to continue recording short walks on the following days. This would not necessarily present a problem at the analysis stage, since these extra entries could be easily ignored during the analysis or coded as extra information.

Concretely, we recommend slight amendments to NTS diary, primarily asking participants to record the short walk on Day 1 and including a more detailed example in the instructions to represent the types of walks that should be recorded. Based on the cognitive testing, we believe that these changes to the diary will provide more accurate information and avoid a number of biases and errors.

# Appendix A. Methodology

In the second quarter of 2015 (April to June) a second split sample experiment was carried out on the NTS to explore what impact the recording all walks, not just those over a mile, on Day 1 of the travel diary as opposed to the current practice of recoding them on Day 7 would have on the survey's estimates. As part of this second split sample experiment a small number of cognitive, follow up interviews – 30 – were carried out.

The aim was to end up with an equal number of cognitive interviews with participants who were asked to record short walks on day 1 of the travel diary and those asked to record them on day 7, in order to allow comparison of both groups and identify any differences in the recording of short walks.

The cognitive interviews took place as soon after completion of either day 1 or day 7 of the travel diary as possible. The aim was to complete the cognitive interview the following day, and no later than two days after the diary was completed, to reduce problems with participants not being able to remember (clearly) how they went about filling in the diary. In practice this requirement was difficult to achieve. In some cases the cognitive interview was undertaken with a longer gap.

## A.1 Sample for cognitive interviews

This study involved a qualitative sampling approach. Unlike quantitative sampling methods, which are concerned with producing statistical estimates of the prevalence of characteristics or phenomena of interest to the study in the wider target population, qualitative sampling methods involve the study of far fewer people, but explore in more depth those individuals, settings, subcultures, and scenes, so as to generate a deeper understanding of individual perspectives, understandings and behaviours.

In contrast to the probability sampling techniques used in quantitative studies, qualitative studies, including those using cognitive interviewing methods, deploy purposive sampling approaches which involve the development of a framework of the characteristics that might influence an individual's contribution. The choice of framework characteristics is based on the researcher's practical knowledge of the research area and available literature and evidence, and participants are recruited

based on these characteristics (see for example, Bryman, 2012<sup>5</sup>; Ritchie et al, 2013<sup>6</sup>). For example in this study, it was vital to speak to people who were making short walks so we could speak to them about the way in which they recorded them. The characteristics chosen for this study are explored in more detail below in the screening and recruitment procedure section.

Both the day 1 and day 7 short walks groups were recruited by following up adults who had taken part in an NTS interview and agreed to complete the travel diary. Fieldwork initially took place between the 1st April and the 30th June 2015, with it being extended into August. The following up of 'real' respondents allowed capture, as far as is practical, of the 'real' diary recording process and the impact of others in the household on the participant's record-keeping behaviour.

## A.2 Screening and recruitment procedure

NTS interviewers asked respondents if they would be willing to be contacted by the cognitive interviewer about taking part in a follow up (cognitive) interview. For those who agreed the cognitive interviewer made contact by telephone, explained the purpose of the research, obtained consent and arranged a time to carry out the interview.

There were 'rules' about who survey interviewers' could approach about potentially taking part in the cognitive interview. These were as follows.

- The NTS respondent must be an adult, aged 18+
- The survey interviewer must have had direct contact with the NTS respondent and obtained their verbal consent to being contacted about taking part in the follow up interview
- Travel diary placement must have happened face-to-face with selected respondents
- The respondent must have been asked to record prospectively: cognitive respondents can't be asked to retrospectively fill in early days in the travel diary

We only interviewed adult in a household. We set quotas for recruitment to ensure we spoke with a wide range of NTS respondents. The quotas covered:

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<sup>5</sup> Bryman, A., *Social Research Methods*, Oxford: Oxford University Press (2012)

<sup>6</sup> Ritchie, J., Lewis, J., Nicholls, C. and Ormston, R. *Qualitative Research Practice*. London: Sage (2013)

- Age group
- Sex
- Economic activity status
- Household composition

Interviewers were given targets for different types of people to recruit for cognitive interviews, in order to ensure representation of different groups. This included aiming for:

- A mix of people from different ethnicities
- Some people who do not have continuous use of a motor vehicle (car, light van, motorbike, moped or scooter).
- People who are likely to walk regularly
- Some people who live in urban areas and some people in rural areas

*Table A.1 shows the characteristics of those interviewed and on whom the analysis presented in this report is based. It proved difficult to meet some of the quotas due to the logistics involved in obtaining the information and the limited pool of possible interviewees.*

**Table A.1 characteristics of those interviewed**

	Age group			Sex		Economic activity status		Household composition	Areas	Total
	18-24	25-64	65+	F	M	Working	Non-working	Contains dependent children	Location	
<b>Day 1 Target</b>	At least 4	At least 4	At least 4	At least 4	At least 4	At least 8	At least 4	At least 4	No target set	<b>16</b>
<b>Day 1 Achieved</b>	0	11	2	9	4	8	5	3	East Sussex: 5; London: 3; Cumbria: 5	<b>13</b>
<b>Day 7 Target</b>	At least 4	At least 4	At least 4	At least 4	At least 4	At least 8	At least 4	At least 4	Not target set	<b>16</b>
<b>Day 7 Achieved</b>	4	8	5	10	7	4	11 <sup>7</sup>	4	Manchester: 4; East Sussex: 3; London:3; Cumbria: 3; Lincolnshire: 4	<b>17</b>

The cognitive interviewer obtained verbal, informed consent from the participant to their taking part in the follow up cognitive interview.

### A.3 The cognitive interviews

The principal aims of carrying out the cognitive testing were:

- To understand how short walks are recorded in the travel diary
- To explore how participants approach the task of completing the travel diary
- To identify any record-keeping' behaviours that help or hinder the recording of all short walks
- To capture participants' understanding of the concepts of:
  - short walks

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<sup>7</sup> Please note – the number of participants under 'economic activity status' do not add up to 21 as work status was not discussed with two day 7 respondents

- journey
- stages

### **Interview protocol and structure**

An interview protocol was developed which allowed interviewers to explore how the respondent completed their diary, focusing specifically on any short walks they had carried out. Interviewers asked participants if they could look at their travel diary whilst carrying out the cognitive interview so it could be referred back to during probing. Interviewers were trained how to use the protocol before carrying out their first interview.

### **Recount of day 1 or day 7 of the travel diary**

The first thing participants were asked to do was to describe what they did on day 1 or day 7 of the travel diary (i.e. what they did yesterday or the day before yesterday in most cases). Interviewers encouraged the participant to describe in detail their day and what they did. This 'recount' helped identify any walks that were not been recorded in the diary, with the reasons for omission being explored.

### **Think Aloud**

Interviewers used the retrospective think-aloud technique with participants on this project to gain an insight into how people approached the diary completion task, what they looked at and how they went about filling it in.

### **Probing**

Interviewers were provided with a list of suggested probes. These were used during the interview, after the think aloud. The suggested probes formed the basis for an exploration of how the diary was completed in relation to walks. For example asking why walks had been omitted and exploring if there were any features of the diary which helped or hindered the recording of walks and short walks. Specific questions were asked about the example page, instructions and each journey the respondent had made and recorded in the diary.

## **A.4 Analysis**

A Framework approach to data management and analysis was used. Framework is a matrix approach where data is summarised into cells with a row representing an individual case and a column representing a common theme across the data. The



advantage of this approach is that it facilitates the analysis of different aspects of an individual's processing of information and the information features that influence understanding as well as enabling analysis of particular themes across different cases<sup>8</sup>.

All notes and transcripts were 'summarised' into an analytical framework set up in Excel. This analytical framework consisted of a number of descriptive and analytical categories, reflecting the interview protocol. The framework included a summary of the characteristics of participants: such as their sex, age, who they lived with and whether they were a 'Day 1' or 'Day 7' case. Under each topic, a summary was made of each interview's findings pertinent to the think aloud and each cognitive probe. An additional 'other' category was included, to capture any other comments made by the participant that had not been anticipated in the design of the probes. Thus, data could be read horizontally as a complete case record for an individual, or vertically by statement, looking across all cases.

The results of this analysis are presented in the main body of this report.

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<sup>8</sup> Collins, D., *Cognitive Interviewing Practice*, London, Sage (2014)

## Appendix B.

**Table 1 – Short walks identified as being missing from Day 1 or Day 7**

Case	Walks omitted	Rationale	On further probing
Day 1; Male, 25-49	Walk on South Downs	<i>"I forgot about the first two days...because I have been very busy at work"</i>	Respondent was asked to recall what he did and he recorded this in the dairy whilst thinking aloud  He was confused about how to record a circular walk: what the purpose was at column A of the diary. In column E he ticked 'Home' and in column F 'the Dyke'. He did not know the distance but was able to provide times. He did not record the return leg – from the Dyke.
Day 1, Male 25-59	Walk within a station from one platform to another (4 mins)	Unsure about whether it counted as a walk	
Day 1, Female, 60+	Walk to get bus back to Keswick to return home from shopping (5 minutes)	Forgot to include it as she took a break whilst filling in the diary. Got distracted by the TV.	Respondent said ' <i>I haven't got a clue</i> ' why she missed that information.
Day 1, Female, 25-59	Keswick town centre, return home (10 minutes)	Respondent did not know that she was to write down her return journey home. She did not see an obvious box that states to write down a return journey.	
Day 1, Female, 25-59	Walk between boardings on underground (under 5 minutes)	Part of the same stage of a journey	No extra info gained from probing – missed walk not discussed

Case	Walks omitted	Rationale	On further probing
Day 7; Female, 18-24	<p>Meeting a friend at university</p> <p>Going to a T-shirt shop</p> <p>Going to buy food</p> <p>Going to buy food</p> <p>Walked friend home</p>	<p><i>“Day 7 was yesterday and I didn’t do anything longer than walking two miles. So basically day 7 is empty because I did not walk far.”</i></p> <p>She did not recall the interviewer mentioning all walks needed to be recorded on day 7.</p>	<p>Respondent asked to recall what she did and record it in the diary. As she does this she thinks aloud.</p> <p>She meets a friend at university. They go and walk around an exhibition. She asks if this should be included. She decides not to and she doesn’t include all the walking she does around campus.</p>
Day 7, Female, 60+	<p>15 minute walk from car park to show tent</p> <p>2 hour walk around show ground</p>	<p>Respondent did not include these as was uncertain</p>	<p>In relation to walking around the show ground, respondent was confused by column A – purpose of journey</p> <p><i>“that bit was a bit unclear because it talked about journeys and when you are there you get to where you want to go”</i></p>
Day 7, Female, 18-24	<p>Walk to friend’s house, next door</p>	<p>Respondent had left day 7 blank because she did not think it relevant to record such a short walk</p>	
Day 7, Female 18-24	<p>Walk from shops to where car parked (two 6-7 minute walks)</p> <p>Walk from car park to restaurant &amp; back (2 minutes each way)</p>	<p>Respondent did not think to include as didn’t think they were “real” walks – just going from the car to the shops/restaurant</p>	<p>Only picked up later in the cognitive interview, however the interviewer was able to probe about the missed walk.</p>

Case	Walks omitted	Rationale	On further probing
Day 7, Female, 25-59	Walking around the shops (2 hours of walking)	Only thought about how got to and from the shops not the walking around when there.	
Day 7, Male, 65+	Walk to bus stop (under 5 mins)  Walk from bus stop to destination to meet friend (under 5 mins)  Walk to get bus to supermarket (under 5 mins)  From bus stop (around 5 minutes)	Respondent thought these walks were 'obvious' and didn't need to record them.  Respondent also said he did not remember being told to include these.	Respondent did not read the instructions for day 7 because he thought he knew what he had to do, interviewer explained everything and he thought he understood.
Day 7, Female, 25-59	Dog walk (2 miles / 45 minutes)	Respondent did record this trip, but not as a round trip and didn't include return journeys either (should have been a round trip)  Respondent entered her village under 'where did you go?' rather than entering round trip	Respondent recognised during probing they should have recorded this as round trip.  Respondent knew to record all walks on day 7 and remembered day 7 was different to other days – as explained by survey interviewer

Case	Walks omitted	Rationale	On further probing
Day 7, Male, 65+	Going to collect slabs Taking slabs to his yard	Respondent did not think it was necessary to include it as he only went across the road and back.	Respondent was aware of the instruction to include all short walks at day 7 - just thought these were too short
	Going to collect slabs Taking slabs to his yard		Respondent did not fill in the diary himself – he told his wife what he did and she filled it in.
	Going to collect slabs Taking slabs to his yard (all across the road, under 5 mins)		Survey interviewer also visited several times to check it was being completed/assist in the completion of the diary.
Day 7, Female, 65+	From car park to playground	Respondent was unaware that she had missed walks and did not pick up during the interview that all walks (under 1 mile) should be included at day 7.	Respondent was completely unaware of this instruction, thought the 'only include walks over 1 mile' applied to the whole week.
	From playground to car park (both less than a mile)		