

Journal of Research Practice  
Volume 2, Issue 1, Article D1, 2006



Research Design:

# Using Activity Diaries: Some Methodological Lessons

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## Abstract

Descriptions of how people use time can tell us much about quality of life, social and economic well-being, and patterns of leisure, work, travel, and communication. Self-administered activity diaries are one of the main methods available for capturing data on time use. This paper discusses some of the methodological issues surrounding the use of self-administered activity diaries as a tool for capturing data on communication and travel activities. Its main concern is to highlight the lessons learnt from the use of self-administered activity diaries as a supplementary method of data collection in a recent study. This study assessed whether different levels of access to, and use of, Information and Communication Technologies (ICTs) enable different paces of life in different communities, and how this process might be contributing to social and spatial polarisation. The insights gained into how activity diaries can be successfully applied are relevant to research within any discipline where this method of data collection is being considered.

**Keywords:** research methods; activity diaries; time use; time allocation; ICTs

**Suggested Citation:** Crosbie, T. (2006). Using activity diaries: Some methodological lessons. *Journal of Research Practice*, 2(1), Article D1. Retrieved [date of access], from <http://jrp.icaap.org/index.php/jrp/article/view/22/68>

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## 1. Introduction

Descriptions of how people use time can tell us much about quality of life, social and economic well-being, and patterns of leisure, work, travel, and communications. Self-administered activity diaries are one of the main methods available for capturing data on time use (Johnson, 1990; Nydon & Thomas, 1989). They have been used within a wide

range of disciplines to examine issues as disparate as community participation in leisure services (Baker, 2000) and the labour processes of further education lecturers (Avis, Bathmaker, & Parsons, 2001). Increasingly self-administered activity diaries are being used to examine the social and/or spatial issues arising from the use of Information and Communication Technologies (ICTs) in general and the Internet in particular (see Gershuny, 2002; Kenyon, 2004a, 2004b; Livingstone, 2002; Lyons & Kenyon, 2003). This paper discusses some of the methodological issues surrounding the use of self-administered activity diaries as a research tool. Its main concern is to highlight the lessons that have been learnt from the use of self-administered activity diaries as a supplementary method of data collection in a recent study. This study assessed whether different levels of access to, and use of, ICTs enable different paces of life in different communities, and how this process might be contributing to social and spatial polarisation. The insights gained from this study, into how activity diaries can be successfully applied, are relevant to research within any discipline where this method of data collection is being considered. However, they are particularly pertinent to those intending to use this method to explore the how the use of ICTs influences the ways in which people use time.

The remainder of this paper is split into four sections. Section 2 presents a brief introduction to activity diaries; Section 3 then goes on to highlight some of the difficulties encountered when using this research method and how these problems were resolved. Section 4 presents a short discussion concerning how activity diaries might be used most productively. The final section, Section 5, offers a few concluding remarks concerning the lessons that can be drawn from the research discussed in this paper.

## 2. Activity Diaries

Much of the early groundwork for the study of time allocation or time use was led by sociologists, such as Bevens (1913), Lundberg, Komarovsky, and McNery (1934), Sorokin and Berger (1939), and Reiss (1959). Activity-based research methods have been widely used in the field of anthropology (Harrison, 2000; Holmboe-Ottesen, Mascarenhas, & Wandel, 1989; Johnson, 1990; Nydon & Thomas, 1989; Pelto, Pelto, & Messer, 1989); they have also been used in psychology (Laurenceau & Bolger, 2005; Zelkind & Sprug, 1974) and agricultural economics (Clark & Haswell, 1970; Pimentel & Pimentel, 1979; Ruthenberg, 1980). However, the theoretical foundations of many activity-based research methods, and those underpinning the research discussed here, lie primarily in geography and more specifically in *time geography* (see Behrens, 2001). Time geography was pioneered in the 1960s and 1970s by the “Lund School” of human geography in Sweden. From this perspective, time and space are resources, and the primary determinants of the human experience are the constraints that restrict an individual’s utilisation of these resources (see, for example, Hägerstrand, 1970).

Essentially activity-based diary research involves the recording of a detailed log of how people allocate their time during the day, often focusing on particular activities pertinent to the research. The activities recorded by different studies employing activity diaries

include communications (Axhausen, 1995), travel (Harvey, 2003), leisure (Gershuny, 2002), marital and family processes (Laurenceau & Bolger, 2005), food production and preparation (Nydon & Thomas, 1989) and labour processes (Avis, Bathmaker, & Parsons, 2001). There are also variations in whose activities are recorded, depending upon the focus of the research. For example, some activity diaries focus on household activity patterns and others on the activities of individuals (Axhausen, 1995; Harvey, 2003; Pelto, 1989).

Another difference found in activity-based diary research is between researcher-administered and self-administered diaries. As the names suggest, the former involves a researcher collecting data through interview or observation and using that information to complete a diary, and the latter involves the research participants completing diaries as they go about their daily routine. In the research discussed in this paper, it was decided to use self-administered activity diaries, as direct observation of respondents was impractical and completing diaries by interview requires respondents to recall their activities--allowing a greater chance of errors compared to the case where respondents note down their activities as they take place (Johnson, 1990, Informant Diaries section, para. 1).

The approach adopted in the research discussed here drew primarily on activity diaries used in research concerned with travel and communications activities. Activity diaries focusing on travel are sometimes described as “travel diaries,” typically these are designed to capture information on the origin and destination of the trip, departure and arrival times, mode(s) of transport used, and whether or not the traveller was accompanied (Kenyon, 2004a). Those activity diaries which focus on communication activities are often referred to as “communications diaries” (Kenyon, 2004a). In general, these are designed to record the time and mode of communications activities, persons involved in those activities, and the direction of communication (see Anderson, McWilliam, Lacohee, Clucas, & Gershuny, 1999; Gershuny, 2000; Mokhtarian & Salomon, 2002). There are some studies, including the one discussed in this paper, which attempt to combine travel and communications approaches to designing activity diaries to explore the questions surrounding communications, mobility, and social polarisation (e.g., Kenyon, 2004a, 2004b; Lyons & Kenyon, 2003).

This paper does not dwell on the physical design of activity diaries, which is already well documented elsewhere (see Axhausen, 1995; Harvey, 2003; Kenyon, 2004a); rather its main focus is on issues of research methodology outside of the physical design of activity diaries, such as how activity diaries are disseminated and returned and how the different levels of detail with which research participants complete open ended questions within activity diaries can be reconciled. The latter issue is referred to as the problem of *comparative reliability* (Marshall, 1998, p. 562).

### **3. The Research**

Within the research discussed in this paper, self-administered activity diaries and questionnaires were used to supplement the main form of data collection which was face-to-face interviews. This small-scale predominantly qualitative study was designed to examine how the interactions of multiple ICTs (that is landline telephones, mobile telephones, and the Internet) work cumulatively across multiple sectors to influence the logistics of daily life and experiences of time and space for a relatively privileged and a relatively disadvantaged neighbourhood within one UK city. The central aim of the project is to understand how uneven access to ICTs, with their supports for new time-space dynamics and logistical practices within everyday life, influence the grounded realities of social inclusion and exclusion within two contrasting place-based neighbourhoods, that are simultaneously socially and economically poles apart, yet are geographically very close within the same city. The communities chosen as the focus of the study are the electoral wards of Blakelaw and Jesmond in Newcastle-upon-Tyne, the former being among the 20 per cent most deprived wards in England and the latter being among the most affluent 20 per cent.

From the outset of the research it was intended that the information gained from the activity diaries would be used to supplement the interview material, which was the primary method of data collection. The diaries were designed to record when, where, with whom, and how people communicate electronically and when, how, where, and why they travel. Questions designed to uncover research participants' travel and communication patterns were also an integral part of the interview schedules. Unfortunately it was not possible to use the interviews to cross reference the information gained from the activity diaries, because the initial diary respondents did not volunteer to take part in further research and many of those interviewed did not complete an activity diary. These issues are revisited later in the paper.

As indicated earlier, the diaries were considered to be a secondary method of capturing data on people's travel and communication patterns, which could be used to augment the information gained from the interviews. It was decided to use self-completion activity diaries in this way, as they are argued to be a valid method of gathering data concerning events that are difficult to accurately recall (Corti, 1993, para. 2), but those working on the project did not have any experience of using this form of data collection and were therefore reticent to rely on it too heavily. Especially as those using activity diaries have found that "[t]he reliability of the data [from self-administered diaries] can be very high or very low, depending entirely on how well-prepared the informants are, and how committed to the research goals they are" (Johnson, 1990, Informant Diaries section, para. 1). Incidentally, the way in which self-administered diaries were used has allowed the assessment of their value and limitations as a supplementary method of data collection without compromising the goals of the research project.

### 3.1. Designing Activity Diaries

One of the early decisions made when designing a self-administered activity diary concerns whether to use an open format, allowing respondents to record activities and events in their own words, or to use a more structured format where all activities are pre-categorised. In this research it was decided to attempt to integrate both these formats, by pre-coding the activities with which the study was concerned and also providing a space for respondents to describe these activities (see Figure 1 which presents the example of a correctly completed page of the diary used to illustrate how the diary should be completed).

Activity	Night			Morning			Please tell us about this activity
	4 am 0400	5 am 0500	6am 0600	7am 0700	8am 0800	9am 0900	
1 Travel by car / taxi							Took Taxi from home to local train station in Hartlepool to catch train to work
2 Travel on foot / bicycle							On journey to work walked from Haymarket metro station to office in Claremont road
3 Travel by public transport							On journey to work travelled by train and metro to Haymarket metro station in Newcastle
4 E-mailing / instant messaging							Received and Replied to work related internal and external e-mails - external sent to Durham and London. - external received from Teesside, York and Hull
5 Telephone call - fixed line							Telephoned national rail enquires from home to check train was running - also made internal work related telephone calls
6 Telephone call - public call box							
7 Mobile phone call							Called taxi from company in H/pool for son to go to work. Called son to make sure he was out of bed.
8 Text / picture message							Received and replied to text message from girl friend in Hull to arrange lunch time meeting in Newcastle
9 Surfing the web - PC							
10 Surfing the web - mobile							
11 Surfing the web - digitalTV							
12 Other (please specify)							

Figure 1. Example of a correctly completed page of the activity diary.

The next crucial stage of the design process involved deciding the length of time for which the activity diary should record activities. It was decided that asking respondents to record their activities for two days would provide sufficient data for the purposes of the project, without exhausting the good will of potential research participants. To ensure that the diaries captured data on both weekends and weekdays, respondents were asked to record their travel and communication activities on a working /school day and a non-working/non-school day (Exhibit 1 contains the instructions given to the respondents on how to complete the activity diary).

The decision to restrict the diaries to two days and the ways in which different activities were coded were both informed by the selection of postal administration as the dissemination method for the diaries. It was reasoned that keeping the length of the diaries to a minimum might increase the response rate. In a further attempt to encourage participation in the research, each potential participant was offered a small gift voucher for completing the activity diaries. As we shall see, it was unfortunate that due to the financial and time constraints of the project, it was not possible to use personal visits to administer the diary, which is the preferred method of disseminating activity diaries (Corti, 1993).

### **3.2. Problems with Response Rates**

The postal administration of the activity diaries and the questionnaire was also used to recruit interviewees for the project. This approach was chosen because the research was designed to explore differences in lifestyle created by different levels of access to and use of ICTs. Therefore to make one ICT, such as a landline telephone, integral to the data collection would have excluded those that either did not use, or did not have access to, that particular ICT. This is more significant than maybe expected, for example 5 per cent of those living in one of the electoral wards studied did not have a landline telephone.

Initially, 400 activity diaries were posted to respondents selected from a data set of all the adults living in the two areas with which the research was concerned. However, the response rate from this approach was less than 3 per cent. When compared to the 25 per cent response rate obtained from the postal administration of the questionnaire, also used within the study; this indicates a problem with activity diaries. The reason for the poor response rate from the activity diaries maybe that while most people have filled in numerous questionnaires and therefore completing them is somewhat intuitive; completing an activity diary is not intuitive in this way. It demands that the research participant reads and digests a page of instructions (see Exhibit 1).

*Exhibit 1. Instructions on how to complete the activity diary.*

**How to complete the diary**

1. A number of activities are listed on the left hand side of each of the tables presented on the following pages; these should cover most of the ways people communicate electronically and travel around. If there is not an appropriate description in this list for one of the ways you travel or communicate electronically, please use the row marked other (Code 12) at the bottom of the table and write what you were doing at the time in the "please tell us about this activity" section of the table.
2. **It is important** that one of the days you record your travel and communications activity is a **working day** and the other is a **non-working day**. If you do not have formal employment or educational activities, please tell us about **one mid-week day** and **one day at the weekend**, and **WRITE THE DATE AT THE TOP OF EACH PAGE**.
3. Please **try to record all of your travel and communication activities, for the whole of the two days**. We understand that there might be gaps in the table when you are not travelling or using communications technology.
4. In the "please tell us about this activity" section please tell us
  - where you were travelling from and to and the reason for your trip
  - where you were and where the person you were contacting (or were being contacted by) was at the time of the call text message, etc., and the reason for this communication
  - which Web site you accessed and why
 If you have too many communication activities to describe in this way, please be more general. For example, you could describe 10 fixed line telephone calls made at work as either internal or external work-related telephone calls.
5. If you make a mistake, please just cross it out.
6. An example of a completed section of the table is given. In this example the person
  - took a taxi from home to local train station (Code1)
  - travelled by train and by metro to work (Code 3)
  - walked from metro station to work (Code 2)
  - received and replied to e-mails (Code 4)
  - called national rail enquires by telephone from home (Code 5)
  - called son on a mobile telephone (Code 7)

It seems having to read and digest a page of instructions deterred many potential research participants from completing the activity diary. This appears to have occurred even though the instructions were kept to the bare minimum (see Exhibit 1), in that they were written as clearly and concisely as possible, as advised in the literature (Axhausen, 1995; Corti, 1993; Harvey, 2003; Kenyon, 2004b). All respondents that completed the diaries disseminated by post were retired persons. Therefore, it seems only those with time on their hands completed the diaries, adding weight to the argument that the diaries were complicated and time consuming.

The activity diaries also reduced respondents' willingness to take part in further research. Some 30 per cent of those who filled in the questionnaire indicated that they were prepared to take part in further research, but none of the few respondents that completed the activity diaries indicated that they were prepared to do so.

Given the time and financial constraints of the project, it was decided that asking interviewees to fill in an activity diary at the end of the face-to-face interviews and return

it by post in a pre-paid envelope, provided a way to improve upon the response rates obtained from the postal administration of the activity diaries. This greatly increased the response rate to almost 50 per cent. Had the time and financial constraints of the project not prevented it, these response rates may have been further increased by personally picking up the completed activity diaries.

### **3.3. The Quality of Data Collected**

Another problem with the activity diaries concerned the level of accuracy with which respondents completed them. In some cases the diaries were only partially completed, for example, five respondents recorded their travel and communications activities for a single day, rather than the two days requested, while six respondents neglected to fill in the face sheet information concerning gender and age, etc. The second of these difficulties was solved by time-consuming telephone calls to obtain the information omitted.

Problems were also encountered with the comparative reliability (Marshall, 1998, p. 562) of the data collected, or in other words, the different levels of detail with which the activity diaries were completed caused some difficulties. 30 per cent of respondents filled in the diaries very carefully allowing the capture of information concerning the number and time of their communication and travel activities and the reason for those activities. However, almost 70 per cent of respondents paid much less attention to detail, often merely indicating that they had made numerous telephone calls, etc., during the entire day, although in these cases the data captured on the time of travel activities was more time specific. It has been possible to use the data obtained from the activity diaries to compare when, how, and where the people living in the two geographical areas under examination travel and to make some limited comparisons between the amount and types of electronic communication activities they undertake.

Unfortunately, due to problems with the response rate and the level of detail with which the diaries were completed, the findings from the diary based phase of the research are based on both less rich data than expected and a smaller data-set than anticipated. The total number of satisfactorily completed activity diaries obtained was a mere 32, out of a total of 450. Twenty-four of these were generated out of those disseminated during the 50 interviews, giving a return rate of 48 per cent on these particular activity diaries. Given the amount of time, energy, and effort that designing and administering the activity diaries entailed, they yielded a very small amount of data in comparison to the wealth of data contained within the transcripts of the fifty face-to-face interviews, also conducted as part of this project.

## **4. Discussion**

The response rate received from the postal administration of the activity diaries was less than 3 per cent. Given the time and effort involved in personally delivering the activity diaries, explaining how they had to be filled in, and requesting their return by post, the response rate was still modest--even at 48 per cent.

It appears to be necessary for researchers to deliver and collect the activity diaries, making contact with the respondents in the process, in order to obtain a satisfactory response rate while using this method of data collection. This has obvious time and cost implications for a research project using activity diaries.

Still, this does not solve the problems caused by the different levels of detail and accuracy with which respondents complete activity diaries. Here an obvious solution for researchers is to go through the completed diaries with respondents. Again this is time consuming and costly. Indeed, using an interview to clarify diary entries may require a third visit to respondents, to allow the researcher time to examine the interviewee's initial responses within the activity diary and tailor the interview schedule to cover the omitted information. Therefore, in some cases, it may be more cost-effective to include a researcher-administered diary within a face-to-face interview, thus, avoiding the expense involved in hand-delivering and collecting the diaries.

It must also be noted that when using activity diaries to examine issues arising out of the use of ICTs, neither the clarification of the responses given by means of an interview nor using researcher-administered diaries may completely solve the problems encountered with the level of detail offered by respondents. It is possible that electronic communications have become so integrated within the daily lives of some individuals that recalling and /or recording each of them becomes impossible for those individuals. Thus, for individuals that have a large number of electronic communications, it may be more profitable to use automatic electronic methods of recording these activities and then use this information as the basis for an interview.

Setting the above problem to one side, it would seem that the most profitable way of employing self-administered activity diaries is some form of diary/interview method, where the diary keeping period is followed by an interview asking detailed questions about the diary entries. This places activity diaries at the centre of the research project, as they become the main form of data collection upon which any other methods of data collection employed in that project build. However, the research demonstrated that using activity diaries, rather than more traditional forms of surveys, reduces respondents' willingness to take part in the research. Consequently, it is expedient to offer potential research participants a substantial incentive to take part in a project employing activity diaries, unless they have a personal reason for commitment to the research, as maybe the case in some medical research, for example.

## **5. Conclusions**

Due to the pervasive nature of ICTs, often people fail to record their ICT-mediated communication activities accurately. This suggests the desirability of some form of automatic recording of communication activities via these technologies. Activity diaries leave much to be desired when used as a supplementary method of data collection. This indicates that activity diaries are only productive if employed as the main form of data

collection upon which any other methods of data collection may build. Projects using activity diaries require careful costing in terms of both time and money.

## Acknowledgements

The research reported in this paper is part of a project entitled “Multispeed Cities: The Logistics of Living in an Information Age,” funded by the Economic and Social Research Council (ESRC). The author gratefully acknowledges the funding provided by the ESRC.

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*Received 12 August 2005*

*Accepted 9 December 2005*

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