



# Analysing mobility biographies with the life course calendar: a retrospective survey methodology for longitudinal data collection



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## ABSTRACT

Transportation research is in need of longitudinal data to better understand travel behaviour. This paper describes a new survey method to collect longitudinal data, called the life course calendar. We discuss the need for and the uses of this instrument with reference to specific case study material and explore to what extent the life course calendar is suitable for the study of individual life courses and travel behaviour. In the first part of this article we give an overview of current research on the causal relationships between certain life events and travel behaviour. Based on the outcomes of the literature review we analyse life course calendars of 646 respondents. Considering the explorative character of our case study material the results are quite promising. Most notably information on car purchases, on relocations, and changes of the work place has been well recorded which indicates that the life course calendar is suited for the study of changes of spatial contexts and accessibility. The data analysis has provided initial results on the distribution of key events over the life course and on the relation of such events to changes in travel behaviour. Significant effects were found for key events such as relocation, change of job, birth of first child, separation/divorce, moving in with partner and retirement. The life course calendar can be advantageous, especially if it is employed to supplement extensive panel studies.

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## 1. Introduction

It has become widely acknowledged in the field of transportation research that travel behaviour is to a great extent routinized and develops over time (e.g. the special issue on routines in Transportation (Gärling and Axhausen, 2003)). Thus, an improved understanding of people's choices and decision-making for travel must take into consideration this decision process over time and pay attention to the development and change of routines. For instance, the role of spatial determinants of travel could be reconsidered by using longitudinal data. It is undisputed that the built environment has a particularly strong impact on travel behaviour (Naess, 2012; Stead and Marshall, 2001) but what happens if people change spatial context due to relocations or after a change of work places has not been adequately investigated.

A small number of studies have recently put forward the concept of mobility biographies (e.g. Scheiner, 2014; Zhang et al.,

2014). This approach aims to conduct an integrative analysis of individuals' mobility decisions in the context of choices and events in other domains of individuals' lives. Moreover, this approach seeks to trace the interrelation of such choices with key events from an individual's life course. Key events accompanied by changes in spatial context and accessibility were shown to have significant influence on travel behaviour (see Section 2.2).

The majority of travel behaviour research relates to cross-sectional data and neglects the temporal dimension of travel decision-making. Thus, many transport researchers ignore the effect of previous learning experiences and of key events in the life course on people's and household's mobility decisions. Instead of explaining travel behaviour based on the evolvement of people's decision making process, current studies frequently limit their causal understanding to socio-demographics or related personal and household characteristics at the cost of neglecting individual rationalities.

One reason for these limitations in travel behaviour research may be the lack of reliable and representative longitudinal data. Likely, the most common method to gather longitudinal data is the panel study where the same individuals are asked similar questions at different points in time. Thus scholars are able to gain a

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fragmentary overview of the particular development of individuals. Nevertheless, panel studies have several drawbacks regarding the selectivity and drop-out rate of respondents (cf. Kitamura and Bovy, 1987; Zumkeller et al., 2006). Alternative methods to gather longitudinal data are repeated cross-sectional surveys (trend studies), cohort and pseudo panel studies as well as retrospective surveys (cf. Stopher and Stecher, 2006). Those studies are an option to gain sufficient data but also have various drawbacks. Besides methodological problems the most striking obstacles are costs and time.

Besides panel surveys, there have been other methodologies employed in transport research for assessing travel behaviour changes over a longer period of time. Sometimes before and after studies or stated preference surveys are conducted to study the impact of certain events (e.g. residential relocation (Bamberg, 2006) or structural changes, for example changes of the transport infrastructure (Fuji and Gärling, 2005) on travel patterns. Also, travel diaries for longer periods (weeks or even months) are a useful method to capture the variability and rhythms of daily travel behaviour (Schlich and Axhausen, 2003). Another method, the narrative interview, is one of the most commonly practiced retrospective survey methods in social sciences. Qualitative interviews mainly function as explorative tools in the area of travel research. Such interviews serve to uncover fundamental correlations from which scholars deduce new hypotheses (e.g. Schwanen et al., 2012).

The objective of this paper is to contribute to the further exploration of innovative research methodologies for gathering longitudinal data. We focus on the life course calendar, a retrospective survey technique, which can be described as a year-by-question-grid with a horizontal time axis and a vertical thematic axis. We ask if new retrospective survey techniques like the life course calendar can be used for gathering quantitative data sets on the longitudinal development of people's travel behaviour and, thus, for creating a tool for assessing people's mobility biographies more efficiently compared to panel data.

For this purpose we focus on four central questions:

- which key events of the life course should be considered in a life course calendar?
- how can we design a life course calendar as an efficient survey instrument?
- what kind of data and which empirical results can be expected from this survey instrument?
- where are the limitations of this survey instrument?

We explore these questions in the following sections. In Section 2 we review the present state of academic work on mobility biographies and related approaches for explaining travel behaviour from a longitudinal perspective. Section 3 contains an overview on the present scientific knowledge of retrospective data and life course calendars. Section 4 introduces our case study, namely the case study area and the survey instrument employed. In Section 5 we examine selected empirical results of the case study. For example, we present the number of key events detected and analyse some of the correlations between key events and other factors. In Section 6 we discuss several strengths and limitations of the survey instrument for further research.

## 2. Background: previous research on key events and mobility biographies

It has been argued that the dominant static perspective in the field of travel behaviour research and the use of cross-sectional survey data is inadequate to detect trends at the individual level.

This limits our understanding of the dynamics of individual travel behaviour. Moreover, this approach leads to an insufficient analysis of long-term mobility decisions and the role of routine behaviour. Longitudinal surveys and qualitative methods should be favoured over cross-sectional surveys because only the former make it possible to analyse cause-impact relationships between relevant factors. For instance, a residential relocation or change of work place is often accompanied by a change of spatial context which may be followed by an adaptation of travel behaviour. A deeper understanding of the process of behavioural change and the interrelationships between spatial contexts, attitudes and travel behaviour can only be achieved by using longitudinal data.

Taking these considerations into account, some theoretical approaches assert that a life course perspective is crucial for travel behaviour research. The concept of mobility biographies is one example which especially emphasizes the importance of key events. As shown below, several empirical studies proved the importance of key events for travel behaviour research. However, there is a lack of empirical data that allows for the analysis of relationships between key events, life courses and travel behaviour over longer periods of time.

### 2.1. Mobility biography approaches

The concept of mobility biography introduces a new perspective to the study of travel behaviour. Different approaches exist. Some concentrate on the importance of habits and context changes in an individual's mobility biography (Lanzendorf, 2003; Scheiner, 2007) and refer to ideas of the life course approach (Giele and Elder, 1998). Particular events in a person's life course (e.g. decisions regarding residential locations, change of job, starting a family) are considered important for shaping daily travel behaviour. Other approaches analyse the interaction of mobility biographies and social networks (Axhausen, 2008). These approaches emphasize the importance of certain events for the extent of an actor's activity space.

Lanzendorf's (2003) concept draws on approaches from the area of life course research, in particular Salomon's (1983) life style approach. The concept examines relationships between particular life events and changes in behaviour. Lanzendorf emphasizes the importance of routine behaviour. Life events are understood as key triggers for changes in routine behaviour. The analysis divides the actors' life course into three different domains. Particular kinds of life events are assigned to each domain: the so called 'life style domain', the 'accessibility domain', and the 'mobility domain'. The life style domain comprises events in context of demography, profession and leisure. Within the accessibility domain spatial contexts like residential and job location as well as leisure and other locations are included. Changes of car and season ticket ownership as well as changes in distances travelled are included in the mobility domain. Interrelations between the domains are taken into account. The order of the domains is not strictly hierarchical. Each domain is further divided into sub-domains. Their number varies according to the object of research. Two previous studies have examined the applicability of the mobility biography concept (Lanzendorf, 2004, 2010; Prillwitz, 2007).

However, until today existing mobility biography approaches are rather fragmentary. Other studies which do not prescribe a specific biographical approach have also called for a more dynamic understanding of travel. Schönfelder and Axhausen (2009) suggest an approach which considers mobility consequences of 'personal projects'. Beige and Axhausen (2008) analyse long-term and mid-term mobility decisions during the life course on the basis of data that has been collected via a quantitative retrospective survey using a life course calendar. The focus of their work is the relationship between the place of residence, the work place, corresponding

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