



## Changes to commute mode: The role of life events, spatial context and environmental attitude



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### ABSTRACT

It has been suggested that commuting behaviours become habitual and that changes to commute mode are more likely at the time of major life events. However, evidence to support this has so far been limited to analyses of small-scale samples. To address this evidence gap, we use two waves of panel data from the UK Household Longitudinal Study (2009/10 and 2010/11) to identify and explain the prevalence of individual change in commute mode from year to year amongst a representative sample of the English working population ( $n = 15,200$ ). One third of those that cycle or get the bus to work, and one quarter of those that walk to work, are shown to change commuting mode by the following year. Car commuting is more stable, with only one in ten car commuters changing mode by the following year. Commute mode changes are found to be primarily driven by alterations to the distance to work which occur in association with changing job or moving home. Switching to non-car commuting becomes much more likely (9.2 times) as the distance to work drops below three miles. High quality public transport links to employment centres are shown to encourage switches away from car commuting and mixed land uses are shown to encourage switches to active commuting (walking and cycling). Switches away from car commuting are found to be more likely (1.3 times) for those with a pro-environmental attitude. The attitude orientation is shown to precede the behaviour change, demonstrating evidence of 'cause and effect'. Overall, the study shows that changes in commuting behaviour are strongly influenced by life events, spatial context and environmental attitude.

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## 1. Introduction

Transport policies in urban areas are often designed to encourage people to adopt non-car transport in order to reduce pressure on scarce road space and to improve the quality of the urban environment. Policies are particularly targeted towards managing *commuting* behaviours, as it is during the morning and evening peak commuting times that transport networks are under the most pressure. However, it has been shown that daily car commuting becomes habitual and is repeated with little or no conscious consideration of alternatives (Gardner, 2009). For this reason it is a challenge to encourage people to adopt new commuting behaviours, even if improvements are made to public transport services or to walking and cycling environments. Whilst there has been substantial research into the factors associated with commuting by different transport modes, there has been less attention given to identifying the factors associated with *changes* to commute mode, the focus of

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this paper. It is important to understand what prompts people to change commute mode if effective policies and measures are to be developed to influence commuting behaviours.

The 'habit-discontinuity hypothesis' posits that habitual behaviour may become weakened when interrupted by a contextual change (Verplanken et al., 2008). It can be expected that people are more likely to change commuting mode if there is a contextual change to their life situation – for example through a *life event* like moving home. This paper examines how the likelihood of changing commute mode is influenced by life events, while also accounting for socio-demographics, transport resources, spatial context (urban form and transport supply) and environmental attitude. The paper begins with a review of existing knowledge on the determinants of commute mode decisions which clarifies the knowledge gaps and intended contributions of our study. We then introduce the data and analytical framework used to analyse changes in commuting mode. The results are presented before the paper finishes with a discussion of the implications for research and policy.

## 2. Literature review

The main focus of the review is on *longitudinal studies* that have investigated factors associated with *changes* to commute mode. However, to provide context we start by discussing mode choice models estimated from cross-sectional data.

### 2.1. Cross-sectional evidence on determinants of commute mode choice

The usual assumption made in mode choice models is that commuters evaluate the attributes of transport modes available to them and choose the option that provides the greatest overall utility (Ortúzar and Willumsen, 2011). Mode choice models include, as explanatory variables, attributes of transport modes (usually travel times and costs) and socio-demographic characteristics of individuals to recognise that tendencies to use modes may vary in the population. After including modal attributes and trip maker characteristics, there are usually unexplained preferences for particular modes and these are represented by alternative specific constants in the utility function. More recent work has sought to improve explanation of differences in individual mode preferences by incorporating *subjective variables* relating to perceptions and attitudes in mode choice models. For example, Johansson et al. (2006) found that attitudes towards flexibility and comfort, as well as pro-environmental inclination, influenced commute mode choices, in addition to instrumental modal attributes like commute time and cost.

Urban planners have an interest in how urban form influences travel behaviour and have also looked more broadly at the influence of the built environment on commute mode choices. They have shown that commute mode choice can also be influenced by land use density, mix and design (Cervero, 2002). The question has been raised, however, as to whether the built environment has a *causal* influence on commute mode choices or whether people *self-select* into residential neighbourhoods that suit their pre-existing commute mode preference. Studies of 'residential self-selection' have tended to confirm that the built environment does have an independent effect, after controlling for measures of attitudinal self-selection (e.g. Schwanen and Mokhtarian, 2005).

### 2.2. Longitudinal evidence on determinants of change to commute mode choice

Data sets which include repeated observations of the commuting behaviour of the same individuals over time are scarce and therefore evidence on determinants of *changes* to commute mode is limited. Panter et al. (2013) obtained repeated observations, 12 months apart, of the commuting behaviour of 655 workers in Cambridge. They tested the impact of baseline measures of personal and household characteristics, built environment characteristics (objective and subjective) and attitudes towards car use. They found uptake of walking to work was associated with not having children, perception of convenient public transport and lack of free workplace parking. Uptake of cycling to work was predicted by perception of convenient cycle routes and more frequent bus services. The study did not test the influence of *change* variables for events occurring in people's lives or any changes in external situational factors.

#### 2.2.1. The influence of life events

Dargay and Hanly (2007) showed through a descriptive analysis of the British Household Panel Survey ( $n \sim 5000$ ), that 17.6% of commuters changed mode between years. This figure increased to 28.1% for those who moved home, 32.7% for those that changed employer and 44.6% for those that changed both home and employer.

Oakil et al. (2011) conducted a multiple regression analysis of the relationship between a range of life events and commute mode changes. They used data from a retrospective survey capturing 21 year life histories of nearly 200 respondents in the Utrecht region (Netherlands). Switches from commuting by car were associated with changing to part time work, changing employer, and separation from a partner (one year before the commute mode change). Switches to commuting by car were associated with birth of the first child, changing employer, and separation from a partner (one year before the commute mode change). After controlling for other factors, residential relocations were not significant. Data limitations prevented an examination of the role of spatial context (i.e. urban form and transport supply).

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