



Walking down the habitual lane: analyzing path dependence effects of mode choice for social trips



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ABSTRACT

In the field of transportation, several studies have researched commute mode choice and its dynamics in the short and in the long term. Relatively less is known about mode choice for discretionary and more flexible activities, such as social visits. These choices are dynamic and depend on personal habits and preferences, reflected to some extent in the history of similar choices. This study adopts the theory of path dependence to take life cycle dynamics and habitual preferences into account. Using a dataset collected in the Netherlands in 2011, a multinomial logit model of mode choice was developed. Results suggest that mode choices for social activities are path dependent, yet not entirely. There is also evidence of switching towards faster and more flexible modes after a life cycle event.

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1. Background

Social trips are unique because they are both discretionary and obligatory in nature. There is flexibility in terms of mode choice, duration, location, time of the day, etc. but at the same time people are obligated to make social visits. Some of these visits tend to be regular, such as, periodical visits to children and parents and some are irregular in nature. In transportation research, however, this facet of travel behaviour is rather under-investigated, despite the increasing number of social trips every year. In the Netherlands, for example, more than 15% of all trips and more than 20% of the total volume of passenger kilometres travelled are made for social visits.

To address this research gap, in this study, we concentrate on mode choice for social trips. Travel choices, mode choices in particular, are reported to be habitual in several occasions in travel behaviour studies (Gärling and Axhausen, 2003; Pendyala et al., 2000). Habitual behaviour implies repeating the same choices over and over again without much thought and deliberation (Gärling and Axhausen, 2003; Gärling and Rise, 2002). Repetitive selection of a certain choice option forms and represents the attitude towards that choice. Social psychology theories defines attitude as a combination of past behaviour, intention and situation which eventually

determines individuals behaviour (Eagly and Chaiken, 1993). Therefore past behaviour can be a strong indicator of habitual choices. The possibility of habit and intention to change behaviour is found to be reciprocal, i.e. the stronger determinant personal habit is the weaker the intention becomes (Triandis, 1977). Thus habits and intentions can be persuaded to change behaviour.

Scholars argue that habits are not resistant to change (Bamberg et al., 2003) yet depends on the perception and habitual preference towards a travel mode (Abou-Zeid and Ben-Akiva, 2012; Kamruzzaman et al., 2013). Bamberg et al. (2003) showed that a change in residence and a free travel pass increased the use of public transport irrespective of their past habits. However, investigating the effects of land use patterns and residential dissonance, scholars report that preference prevails built environment characteristics for mode switch behaviour to public transport (Kamruzzaman et al., 2013). Detailed research was also conducted to persuade mode choices by offering incentives (Abou-Zeid and Ben-Akiva, 2012; Abou-Zeid et al., 2012; Fujii and Kitamura, 2003) and by generating awareness (Garvill et al., 2003). While Fujii and Kitamura (2003) report positive attitude towards public transport of a group of students who were offered a free one month bus pass, Garvill et al. (2003) report no significant change in the relationship of habit and behaviour. In the latter case however no incentive was provided to the participants. Abou-Zeid et al. (2012) and Abou-Zeid and Ben-Akiva (2012) conducted extensive analysis of mode-switching behaviour in Switzerland and MIT respectively by offering free public transport pass. In Switzerland none of the respondents completely switched to public transport.

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While in MIT 30% did switch, they were more cost conscious and positive towards public transport use.

Nonetheless, perhaps the most likely incentive to motivate travel mode choice changes are life cycle events. Empirical evidence report changes in travel mode (Scheiner, 2014; Scheiner and Holz-Rau, 2013) and changes in car ownership and commute mode due to life cycle events (Oakil et al., 2014; Prillwitz et al., 2006; Verhoeven et al., 2007) and their temporal dependences (Oakil, 2013). However, how and if life cycle events may trigger changes in social travel choices is not known. Social networks are not static. They change with life cycle events, in particular (Sharmeen et al., 2010; Sharmeen et al., 2014a). Therefore the choices related to social travel would also be influenced by them. Moreover, empirical evidence suggest that life cycle events induce changes in social activity and travel time allocation (Sharmeen et al., 2013) and need (Sharmeen et al., 2014a). Mode choice for social trips therefore could also shift. This choice potentially should reflect one's preference, awareness to environmental sustainability and economic and social status. We assume that people may wish to maximize their preference, comfort and flexibility during those trips and choose accordingly. Therefore, the choices are more likely to be derived from habits and attitudes as opposed to work and shopping trips governed by institutional and situational boundaries. The findings would provide insights towards people's preference and habitual behaviour.

Scholars have documented several factors that affect mode choice for social and leisure trips. van den Berg et al. (2012) found effects of socio demographic variables, location and distance on mode choice for social trips. Schmöcker et al. (2008) studied shopping trips of senior citizens in the UK. They report that age and disability interaction and marginal costs related to a particular mode influence mode choice. However, our knowledge about social travel mode choice is still limited.

Particularly, from a long term dynamics point of view, studies related to social travel mode choice are rare. The study addresses this issue. The aim of the paper is to investigate the mode choice for social visits in relation to life cycle events, taking past behaviour into account. We argue that like any other decision making analysis, mode choice for social trips should be studied taking habit and past behaviour into account. Habits and attitude are also represented by the commute mode choice. Furthermore, the modes individuals choose to commute to work every day may also influence the mode they choose for social purposes. By including these effects, we seek to find answers to an important research question:

Are mode choices for social trips path dependent or do people switch their mode choice for social trips after a life cycle event? If they do, in which direction do they switch towards?

The findings would also indicate to what extent are people driven by their habit and inherent preferences in terms of mode choice for social trips, in the sense that if they keep on choosing the same mode before and after life cycle events and the same mode they choose to commute with.

This study presents results of analyses of mode choice dynamics in response to lifecycle events. To capture the dynamics of lifecycle events were considered as triggers to these changes. Data used for the study were collected through an event-based retrospective survey carried out in late 2011 in the Netherlands. Detailed information on social network and activity dynamics was collected from among 703 respondents.

2. Theoretical framework

History matters in every aspect of decision making process of individuals. The process is termed to be path dependent if the decision goes in the same direction as it has before. Path dependence

has been used as a central concept to analyse historical inference in decision making process of institutions (Greener, 2002; Mahoney, 2000; Martin and Sunley, 2006; Pierson, 2000). The notion is widely used in political and economic geography. It was first explained by Noble Laureate Douglas North in his seminal book on institutional change and economic performances (Greener, 2002; Mahoney, 2000; Martin and Sunley, 2006; Pierson, 2000). He noted that path dependency is a way to narrow down the choice sets and to link decision making over time. In other words, it is a process that constraints future choice sets.

A number of terminologies are associated with the notion of path dependence, primarily used in policy evaluation studies. It was explained by terms such as 'reactive sequences' that are 'temporally ordered' or 'causally connected' (North, 1990). From human behaviour perspective the notions can be inferred as individuals react and respond towards a particular choice set which are associated with their choices at a preceding and/or similar incident. Economics and technology policy evaluation studies refer to the notion of increasing returns as the cost to revert from a path usually is very high (Pierson, 2000). Although cost might not always be the factor, habits and constrained choice sets may overtake decision making process. A classic example in this regard was reported by Greener (2002), is the use of QWERTY keyboards. Despite the fact that efficient alternatives exist and that the cost of a path divergence in this case can be recovered in just ten days by the increased efficiency achieved, the QWERTY still continues to be the standard version. This phenomenon was described as inheritance overtaking choice (Pierson, 2000). Habits, familiarity, inheritance and sense of belongingness therefore are of prime importance and could better explain the decision making process.

However one should be careful in making assumptions or deriving too simplistic conclusions based on path dependence effects only, particularly when testing new technologies. In those scenarios it is also important to understand the common sense and reasoning behind them. In a related study (Rose, 1991) examine history deposition effects in choice of residential neighbourhoods. In explaining the underlying process, they note that history influences choice in two ways. Under adaptive human behaviour perspective either individual becomes more tolerant to the negative attributes or more appreciative to the positive attributes associated with the choice that similar attributive features are chosen at a next stage. Under alternative hypothesis, one may become fatigued with a welcoming attribute or become rigid to an unwelcoming one. As a result of which soothing with a different or opposite set of attributes is chosen in the subsequent stage. They have found evidence towards the first hypothesis towards adaptive human behaviour.

In this study however without making any prior assumptions we are investigating social mode choice considering effects of history and habitual dependencies. The underlying motivation is explained here and the aspiration is that by incorporating path dependence effects we can better predict the choice of a particular travel mode for social travel purposes.

Inferring to the tendency to repeat habitual behaviour of individuals, we borrow from the path dependence theory of evolutionary economic geography and political studies to explain travel behaviour. While the theory can be used in diversified fields here we only imply that the history of choices affect the future traits. We have explained the theory in detail and tested it for frequency of social interactions in a previous study (Sharmeen et al., 2014b). Mode choice however is a flexible option and may change with life cycle events and situational changes or may remain the same owing to habitual preferences. Therefore in this study, we test whether adaptive and appreciative behaviour or fatigued and rigid attitude prevails towards mode choice for social trips.

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