



The influence of personal and trip characteristics on habitual parking behavior



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ABSTRACT

This paper discusses some results of a study on the influence of car drivers' characteristics on habitual parking behavior. First, the level of habitual parking behavior is determined in two ways: car drivers' regularity in choosing a parking facility and car drivers' self-reporting scores for habitual behavior. The data are collected using an internet based questionnaire that was distributed in Belgium and the Netherlands. The results show that car drivers regularly/often choose the same parking facility when visiting a central business area. In line with this finding, car drivers impute themselves as being highly habitual. A multinomial regression analysis shows that personal (gender, education, and country of residence) and trip (visit frequency) characteristics are significantly related to the distinguished habitual parking behavior levels.

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1. Introduction

With a variety of planning measures, both planners and operators of parking facilities try to optimize the use of the urban road network and connected parking facilities in their city or administration. This optimization is big challenge in many congested central business areas in European cities. Adopted planning measures include a variety of parking measures such as the change of parking tariffs, parking facility location, and number of available parking spaces. Insights into the effects of implemented parking measures on car drivers' decisions are still limited and not very convincing pointing in one direction (e.g., Marsden, 2006; Rye et al., 2008; Simicevic et al., 2013).

One of the comments often mentioned in practice concerns the sensitivity of car drivers to change parking facility as a reaction on implemented parking measures. Car drivers often state 'I always use the same parking when visiting a certain (shopping) destination'. This might indicate that, at least for some car drivers, parking choice is a habit in terms of always choosing the same parking facility when visiting a certain destination. According to Gärling and Axhausen (2003), it is important to consider habitual behavior because of its role in travel demand management strategies. They stated 'A choice that is non-deliberate may in fact

be difficult to influence with rational arguments (e.g., increased costs) since the person making the choice tends to discount relevant information'.

Empirical knowledge about habitual behavior in the transportation literature is limited and mostly restricted to mode choice behavior and repetitive behavior in comprehensive activity-travel patterns. In a study on household energy consumption, Heijs (2006) made a clear distinction between habit and habitual behavior. He defined habit as 'a mental structure, composed of a situation or domain, a related goal, a behavioral disposition to reach this goal and a cue (...), that is learned through reinforced repetition of the behavior in that particular situation and in response to that particular cue'. In addition, he describes habitual behavior as 'the manifestation of a habit in repeated, overt (non)behavior'. In the context of travel choices, Gärling and Axhausen (2003) gave an extensive overview of various aspects of habitual behavior; the role of habit in travel behavior, measuring habitual behavior, transition from choice to habit, and breaking bad travel habits. They defined habit as 'the repeated performance of behavior sequence'. In addition, habitual choice is defined as choosing to perform a behavior without deliberation. Based on findings in other studies, Gärling and Axhausen (2003) stated that travel habits exist if only a limited number of all possibilities are chosen over time. They suggest looking at long-term rhythms and intrapersonal variability (see also Schlich and Axhausen, 2003).

In 2009, Gardner investigated the effect of habit on the intention-behavior relationship within established commuting contexts. It appeared that in a stable travel context like

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commuting, habit and intentions were strongly positively correlated: a stronger intention results into a higher development of habits. Moreover, 'habit moderated the motivation–behavior relationship so that intention did not inform behavior where habit was strong'. More recently, [Chen and Chao \(2011\)](#) and [Chen and Lai \(2011\)](#) also presented results concerning habits and travel mode decisions in the context of commuting. Based on structural equation model analysis, [Chen and Chao \(2011\)](#) found both direct and indirect effects of habit on mode choice switching intentions toward public transport by private vehicle uses. They also found differences in the effects between motorcyclists and car users. In an empirical study in Taiwan, [Chen and Lai \(2011\)](#) found a significant influence of habit on mode choice behavior. It appeared that habit increases the choice probabilities for motorcycle use.

An examination of the literature, however, shows that the issue of habits in parking choice behavior has only received scant attention. One exception concerns the study of [Griffioen-Young et al. \(2004\)](#), who discussed habitual behavior more specifically in the context of parking. They stated that characteristic of habits is that they are performed without being preceded by a conscious thought process and, thus, directly influence (parking) behavior. [Griffioen-Young et al. \(2004\)](#) defined three factors that make up habits: the degree to which the decision is thought out, the familiarity with the parking location, and self-reported habit. In the data collection, they only asked respondents about the degree to which their parking decisions are dictated by habit. It appears that for many trips the choice where to park is likely to be driven by habits, developed as a result of having made comparable trips many times in the past. The authors admitted that this was not sufficient because they believe that habits guide 'many of our parking decisions'. This makes that additional research on the development and influence of habits is required.

The following research questions guided the search for more insights into habitual behavior in the context of parking.

- How can habitual behavior be defined in the context of parking?
- Does habitual behavior occur in the context of parking?
- Do personal or trip characteristics influence the level of habitual behavior in the context of parking?

The remainder of the paper is organized as follows. First, attention is paid to measurements of habitual behavior in the context of travel behavior. Next, the adopted research approach is discussed. This section is followed by a brief description of the data collection and the composition of the sample. Findings are presented in the following section. The paper ends with the conclusion and suggestions for future research on this topic.

2. Measuring habitual behavior

In general, habitual behavior can be measured using repeated measurement such as travel diaries over a longer time period [Schlich and Axhausen \(2003\)](#) or over a one-week time period: [Shannon et al. \(2006\)](#) and [Gardner \(2009\)](#). In the context of revealed behavior, indicators of habitual behavior can be annual vehicle miles (for mode choice), size of activity space (for destination choice), and occurrence of departure time (for departure time choice). Also other approaches or measurements can be used to determine habitual behavior, such as presenting respondents different choice situations and asking them to evaluate these situations (e.g., [Aarts et al., 1997](#); [Chen and Lai, 2011](#)). In [Aarts et al. \(1997\)](#), respondents were asked to mention as quickly as possible the first (mode) alternative that came to mind when facing 9 globally described trips (e.g., going to a supermarket). [Verplanken and Orbell \(2003\)](#) presented a self-report habit index to measure the strength of habit. The index is based on

twelve items related to features of habit: a history of repetition, automaticity, and expressing identity. Another, more sophisticated approach is suggested by [Han et al. \(2010\)](#) who related habitual behavior to the difference between individual's aspiration level and expected outcome. They assume that if a tolerance range is exceeded respondents will switch from habitual behavior to a conscious choice. Finally, [Chen and Chao \(2011\)](#) collected information concerning habits by asking respondents to indicate 'how often on average they use a motorcycle (or car) when commuting within a week'.

3. Research approach

To get more insight into the appearance of habitual behavior in the context of parking, the following research approach is adopted. First, it was decided to concentrate on trips to central business areas because of the following reasons.

- Central business areas are usually surrounded by a variety of parking facilities.
- Transportation planners have a clear focus on these congested but also economically important areas.
- When visiting a central business area, car drivers often have fewer things to carry compared to for example visiting a supermarket, and hence their choice is potentially less constrained.

For central business areas oriented trips different questions were posed related to the issue of habitual behavior. The first two questions concerned the frequency of car use and parking facility use ([Fig. 1](#)). A five points-scale was used ranging from 'Never' to 'Always'. The questions do not refer to habitual behavior directly but can be used to determine whether habitual (parking) behavior exists.

In the second question, respondents were asked to evaluate their parking choice behavior in the context of non-weekly shopping trips ([Fig. 2](#)). The answer ranges from 'Not habitual at all' to 'Strongly Habitual'. For those who could not rate their behavior, the answer 'I do not know' was added.

The questions were included in a larger internet based questionnaire concerning car drivers' travel and parking behavior in relation to CBD oriented visits. The questionnaire also included questions regarding the respondents' personal characteristics (gender, age, educational level, and location of residence) and travel behavior (visit frequency and trip purpose) when traveling to a city center.

4. Data collection

The respondents for this study were recruited in two different ways. Approximately 2500 invitation cards were distributed

The screenshot shows a web-based questionnaire interface. At the top left is the logo for 'universiteit hasselt'. The title of the questionnaire is 'Habitual Parking Behavior'. Below the title, there are two questions, each with a five-point Likert scale response options: 'Never', 'Rarely', 'Regular', 'Often', and 'Always'. The first question is 'How often do you use the car for non-weekly shopping?' and the second is 'How often do you choose the same parking facility for non-weekly shopping?'. At the bottom of the questionnaire, there are 'Previous' and 'Next' buttons. A small copyright notice 'Berg Enquête System © 2007 Design Systems' is visible at the very bottom.

Fig. 1. Part of the internet based questionnaire, car and parking use.

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