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The role of attitudes, transport priorities, and car use habit for travel mode use and intentions to use public transportation in an urban Norwegian public

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ABSTRACT

The present study aims to identify clusters of transport users and to examine the role of transport priorities, travel mode use attitudes, and car use habit on travel mode use. An additional aim is to test whether such factors predict intentions to use public transport and reported use of public transport. Data were collected via a self-completion questionnaire survey conducted in June and August 2013. Participants included a total of 1039 people who were randomly selected from the urban regions of Norway using the Norwegian population registry. Due to missing data on travel mode use variables the analyses were conducted with 546 observed cases. Two clusters of transport users were identified; individuals who primarily use public and health-promoting transport (e.g. public transportation users, bicyclists) and car users. Logistic regression analysis showed that older age, strength of the car use habit, and priorities of flexibility (e.g. prioritize being able to choose the exact time of travel) increased the odds of car use. Structural Equation Modeling showed that priority of convenience, priority of safety and security, and favorable attitudes towards public transport use were positive predictors of intentions to use public transportation, while car use habit was a negative predictor of both intentions to use public transportation and reported public transportation use. Traffic safety campaigns aiming to increase public transportation use in the urban Norwegian public could focus on increasing the attractiveness of public transport, particularly by improving flexibility of such transport.

1. Introduction

Increased car use in urban environments has negative effects, both at the individual and environmental level. Compared to individuals who travel more frequently with public (e.g. bus, metro, train, tram) or health-promoting transportation modes (e.g. walking or cycling), car users have a higher risk of accident involvement (Albertsson and Falkmer, 2005; World Health Organization, 2013). Also, frequent car use has detrimental effects on the environment, as they contribute to air pollution and increased CO_2 emissions. The population density in urban areas of Norway is currently experiencing a rapid growth (Eurostat, 2009).Thus, promoting public or health-promoting transportation use as an alternative to car use among the urban Norwegian public has the potential to contribute to reduction of environmental problems and individuals' traffic accident risk. Also, increased use of public transport in these areas may mitigate the pressure on the road systems.

The role of psycho-social factors, such as personal and environmental norms, habits, intentions and motivations, have been found to be associated with travel mode use by previous research (e.g. Bamberg et al., 2007; Rundmo et al., 2013; Steg, 2005; Verplanken et al., 1997). The present study specifically aims to investigate the role of transport priorities, travel mode use attitudes, and car use habit on travel mode use and test to what extent these factors predict travel mode use among individuals in a large and representative urban Norwegian sample.

There are multiple motivations that may underlie travel mode use, such as instrumental motivations (e.g. mobility and comfort), affective and symbolic motivations (e.g. power and prestige gained via driving) and pro-social motivations (e.g. reducing environmental pollution) (Bamberg et al., 2007; Nordlund and Garvill, 2003; Steg, 2005). Previous studies have focused more strongly on instrumental motivations. However, recent research (Steg, 2005) has suggested that affective and symbolic motivations could also promote car use. Motivations underlying travel mode use may reflect transport priorities (i.e. what individuals focus on and prioritize in the choice of travel mode use). What is defined as

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transport priorities in the present study is related to quality attributes (i.e. what motorists and public transport users believe are important quality factors for the choice of travel mode) of the chosen travel mode. Studies that examine what quality factors transport users prioritize in transportation are critical for promoting public transport use. An extensive research review on quality attributes of public transport that attracts car users show that physical (e.g. service reliability, accessibility, price) and perceived quality attributes (e.g. comfort, safety, convenience) of public transport, especially affective and motivational attributes, and service reliability and frequency, have an important role for attracting car users to public transport (see Redman et al., 2013). A recent study using the same data set as the current study showed that priorities of flexibility relates to a reduced tolerance of push measures aimed to promote use of public and health-promoting transport (Nordfjærn and Rundmo, submitted for publication). Despite a few studies examining the role of transport priorities for risk perception, risk mitigation and tolerance of push measures among Norwegian transport users (Nordfjærn and Rundmo, 2010; Nordfjærn and Rundmo, submitted for publication; Rundmo and Moen, 2006), the role of transport priorities for travel mode use has been overlooked in Norway.

Both attitudes (i.e. evaluations of public and private motorized transport) and intentions related to travel mode use are among the social-cognitive determinants of travel mode use. Despite the numerous studies related to attitudes towards safe driving, there are fewer studies examining the role of attitudes towards travel mode use (e.g. Bamberg et al., 2007; Heath and Gifford, 2002). In line with the Theory of Planned Behavior (Ajzen, 1991), these studies showed that attitudes have an influence on travel mode use of individuals. It has also been shown that in addition to socio-economic variables travelers' attitudes need to be examined to better understand the mode use of people in different transit markets, such as public transport use and ferry-riding (Outwater et al., 2003; Shiftan et al., 2008). Segments of mode users with different features could be identified by examining the attitudes, and this might help to better understand the reasons for travel choice among different mode users (Outwater et al., 2003; Shiftan et al., 2008).

Although some people may not have a possibility to choose between different modes of transport, they may have a cognitive readiness to do so if alternatives become available in the future. Therefore, it is also important to investigate intentions to use public transport in studies regarding psycho-social factors related to mode use. Previous studies that examined travel mode intentions within the conceptual framework of the Theory of Planned Behavior (Ajzen, 1991) showed that intention was a significant predictor of transportation across a range of modalities, such as bus use (Bamberg et al., 2003), and general public transportation use (Heath and Gifford, 2002).

A concurrent discussion in the transport research literature is whether travel mode use is an automatic scripted behavior, or a more deliberate and planned psychological process (Bamberg et al., 2003; Verplanken and Orbell, 2003). Travel mode use could be considered as a habitual behavior, because it may be carried out automatically without deliberate thinking due to repeated use. Also, psychological research shows that behaviors that have been frequently carried out in the past are a strong predictor of future behavior (Gärling and Axhausen, 2003). A previous research showed that participants who had a strong habit of using a particular travel mode (e.g. car) acquired less information and elaborated less about other available travel mode options (Verplanken et al., 1997). Some researchers even argued that attitudes, intentions and motivations lose their influence when the transport mode use becomes habitual and scripted (e.g. Gardner, 2009; Verplanken and Aarts, 1999).

1.1. Aims

The main objective of the present study is to examine the role of transport priorities, travel mode use attitudes, and car use habit on travel mode use among individuals in an urban Norwegian sample. An additional aim is to test these factors as predictors of both intentions to use public transport, and use of public transport by Structural Equation Modeling. The specific aims of the study are:

1. To identify clusters of transport users and to compare them on transport priorities, car use habit, travel mode use attitudes and intentions to use public transportation.
2. To examine whether transport priorities, car use habit and travel mode use attitudes predict reported travel mode use.
3. To test a model which uses transport priorities, car use habit strength, and travel mode use attitudes to predict intentions to use public transportation and reported public transportation use.

In line with previous studies (e.g. Gardner, 2009; Verplanken and Aarts, 1999) it is expected that attitudes towards transport mode use and transport priorities will have a weak influence on intentions to public transport use when the car habit is introduced in the tested model. It is hypothesized that strength of car use habit will have a strong positive relationship with the reported car use and a negative relationship to reported public transportation use (Gardner, 2009; Verplanken et al., 1997). Compared to car users, public and health-promoting transport users are expected to have more favorable attitudes towards public transportation. Also, since accident involvement risk with car use is higher than public transportation use (e.g. Albertsson and Falkmer, 2005), public and health-promoting transport users are expected to give higher priority to safety than car users.

2. Material and method

2.1. Sampling and procedure

A self-administered questionnaire was sent to the respondents who were randomly selected from the six urban regions using the Norwegian population registry in June and August 2013. A Norwegian firm with access to the registry carried out the sampling by electronic random selection of household addresses from the registry. Before the data collection, the study protocol was approved by the Norwegian Social Science Data Services (NSD). Inclusion criteria of the study were being resident in one of the six urban regions of Norway and being over 18 years old. The urban regions included in the study were: The central Oslo region in the urbanized south-eastern area of Norway ($n=2000$), the Skien and Porsgrunn area ($n=600$), the central Trondheim region in the mid-area of Norway ($n=1000$), the central Stavanger area in the south-west region ($n=1000$), the central Bergen region at the west coast ($n=1000$), and the Tromsø area ($n=600$) in northern Norway. Out of 6200 questionnaires delivered, 1039 were returned, resulting in a response rate of 18%. Nordfjærn et al. (2014) compared the present sample with the population in the six urban regions and found few differences in demographic characteristics between the present sample and the target population. The demographics of the present sample are also relatively in line with previous transport studies carried out in Norway with higher response rates (e.g. Backer-Grøndahl et al., 2009; Roche-Cerasi et al., 2013).

Intention to use public transportation was measured with a single item asking about the level of intention to use public transportation for daily travel from where the participants live.