



Commuting travel mode choice among office workers: Comparing an Extended Theory of Planned Behavior model between regions and organizational sectors



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ARTICLE INFO

Article history:

Received 20 February 2015

Received in revised form 20 October 2015

Accepted 11 November 2015

Available online 17 December 2015

ABSTRACT

Little is known about how contextual factors influence psychosocial determinants of travel mode choice. The reported study examined the effect of organizational sector and geographical region on an Extended Theory of Planned Behavior (TPB) model of commuting travel mode choice. Multigroup structural equation model analyses were conducted to test for sectoral and regional differences using survey data from office workers of four organizations. The results indicate that intention was very strongly related to commuting travel mode choice. Attitude, descriptive norm, and perceived control were also consistently associated with intentions. Personal norm, injunctive norm, and habit did not have (consistent) significant effects on intention or behavior in the overall models of short-distance and long-distance commuting. Most commute-related beliefs varied between organizational sectors and regions. The relevance of psychosocial determinants in the extended TPB model was generally similar across sectors and regions, except for the effect of injunctive norm which differed between regions. The results suggest that organizational-level as well as regional-level interventions have potential to change commuting travel mode choice. Transforming attitude, descriptive norm and perceived control is likely to be equally useful across contexts, although the potential for change in psychosocial determinants might vary between contexts.

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1. Introduction

Traffic congestion is an environmental, economic and social problem which has been estimated to cost approximately 1% of Gross Domestic Product (GDP) in Europe each year (European Commission, Mobility & Transport, 2011). Especially commuter rush hours are associated with congestion on a recurring, daily basis. Evidence suggests that ‘soft’, non-coercive policy measures – such as awareness raising and persuasive communication campaigns – targeted at commuter travel behavior tend to be effective, although reporting is likely biased and the mechanisms underlying intervention effectiveness remain ill-understood (Cairns et al., 2008; Moser and Bamberg, 2008; Richter et al., 2010). Effects of interventions aimed at reducing (commuter) car use vary greatly, suggesting that a better understanding of *how* interventions affect behavior is crucial (Cairns et al., 2010; Graham-Rowe et al., 2011).

Commuting travel studies have almost exclusively focused on individual-level, psychosocial determinants to examine non-coercive means to change behavior (Domarchi et al., 2008; Mann and Abraham, 2006; Panter et al., 2011). This is at odds with the substantial proportion of soft policy measures initiated through the workplace and limits the applicability of research findings to policy and practice (Cairns et al., 2008; Kearney and De Young, 1995–1996). Also in the wider literature on travel behavior, factors external to the individual have been under-researched. Most previous studies have examined travel mode choice for private or commuting purposes of individuals within a confined geographical region (Aarts and Dijksterhuis, 2000; Bamberg, 2006; Davidov, 2007; Gardner and Abraham, 2010; Van Vugt et al., 1996; Verplanken et al., 2008). Some have studied residents from diverse geographical locations, but did not examine regional differences (Steg, 2005; Thøgersen, 2006). Two exceptions are a study of the German urban agglomerations Bochum/Dortmund and Frankfurt (Bamberg et al., 2007) and another study of Taipei and Kaosiung in Taiwan (Chen and Lai, 2011). Both studies found regional

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differences in beliefs about public transport. However, the German study explained the regional difference in terms of sociocultural variation between the regions, whereas the Taiwanese study attributed the difference to the quality of public transport infrastructure. The comparison of two regions alone did not allow for disentangling the effects of regional infrastructure and other, contextual factors such as sociocultural background.

In the present study, we examined commuting travel mode choice among office workers employed in different organizational sectors located in two Dutch regions with varying degrees of public transport connectivity. We targeted office workers because they form the largest share in the Dutch working population, and possibly in developed countries more generally (Statistics Netherlands [CBS], 2010). We tested a Theory of Planned Behavior (TPB) model extended with personal norm and habit. We then examined to what extent organizational and regional differences influenced the extended TPB model. Although the model has been extensively used to study travel behavior, there are – to our knowledge – no studies which have examined the influence of contextual factors, such as regional and organizational factors, on TPB determinants of commuting travel behavior. This study aims to explore which parameters of psychosocial models of travel behavior such contextual factors influence. A better understanding of how contextual factors influence behavior could inform the design of more effective behavior change interventions.

1.1. Extended Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a generic social-cognitive model of behavior that has been successful at explaining travel behaviors (Ajzen, 1991; Gardner and Abraham, 2008; Kaiser et al., 2005). The basic tenet of the TPB is that attitudes, perceived norms and perceived behavioral control predict behavioral intention, which is the immediate antecedent of behavior itself (Fishbein and Ajzen, 2010, p. 39).

“Attitudes” are one’s overall evaluation of a behavior which includes instrumental and experiential components (Fishbein and Ajzen, 2010, p. 78–85). In the context of travel mode choice, attitudes towards behavioral alternatives may also significantly influence mode choice (Gardner and Abraham, 2010). There is also evidence that the moral evaluation (“personal norm”) of travel mode choice is a relevant determinant, over and above instrumental and experiential evaluations (Bamberg et al., 2007; Mann and Abraham, 2012). Some suggest a lack of discriminant validity between personal norm and attitude, while others maintain it should be considered a distinct construct (Bamberg et al., 2007; Kaiser, 2006). In contrast to attitudes, the influences of *other* people on the individual are reflected in “perceived norms”, which are the perception of other people’s evaluation of a behavior (Fishbein and Ajzen, 2010, p. 129–152). This can be reflected in beliefs about others’ (dis)approval of one’s own behavior (“injunctive norms”) and how others act themselves (“descriptive norms”) (Schultz et al., 2007). More so than with other social-cognitive variables, people might not perceive relevant norms and as a consequence, perceived norms would not play a role in behavior. Finally, “perceived behavior control” refers to a person’s evaluation of whether one has the necessary resources, knowledge and/or skills to perform a behavior (Fishbein and Ajzen, 2010, p. 153–178). Evidently, perceptions of control are linked to objective external circumstances. Commuting travel mode options are influenced by commuting distance and regional infrastructural constraints. The TPB postulates that these influences (i.e. commute-related situational factors and other background factors such as sociodemographic variables) on behavior are mediated through TPB constructs (Fishbein and Ajzen, 2010, p. 221–253).

Repeatedly performed behavior requires no or less deliberative evaluation so that it becomes a “habit”, which is characterized by a

degree of automaticity and unconsciousness (Fishbein and Ajzen, 2010; Verplanken and Orbell, 2003). Once behaviors are habitual, contextual cues like time and place may be more important than social-cognitive variables (Wood et al., 2005). A meta-analysis on psychological determinants of car use showed that both TPB variables and habit were associated with car use, although the effect of habit varied significantly between studies (Gardner and Abraham, 2008). Recent research has also found habit to be independently associated with commuters’ travel mode choice over and above TPB constructs (Chen and Chao, 2011; Chen and Lai, 2011; Murtagh et al., 2012).

1.2. Organizational sector

Whether an organization is in the public or private sector is one of the most salient features of an organization. Previous research has shown that environmental values influenced proenvironmental decision-making in the public but not the private sector (Nilsson et al., 2004). This raises the question whether the relevance of psychosocial determinants varies between organizational sectors and different contexts more generally. Particularly relevant to commuting travel mode choice in the Netherlands, is that the divide between public and private sectors is also linked to differences in organizational transport policies. The provision of company cars to employees is common practice in private organizations, whereas public organizations generally do not provide cars (Lo et al., 2013). The provision of company cars (to a subpopulation in the organization) might increase the number of car commutes and be related to more positive beliefs about car commutes.

1.3. Geographical region

Specifically relevant to travel mode choice for commuting purposes is the geographical location of an organization. Two Dutch provinces, Zuid-Holland and Limburg, were selected for this study to explore how contextual, regional characteristics influences psychosocial determinants of travel mode choice. Zuid-Holland is the most densely-populated and Limburg one of the less populated provinces in the Netherlands (CBS, PBL and UR, 2010). Public transport connectivity is better and traffic congestion more frequent in Zuid-Holland than in Limburg. Furthermore, the sampled organizations in Zuid-Holland had more limited parking facilities for their employees than the organizations in Limburg (Lo et al., 2013). Other geographic factors such as the built environment and land use may also contribute to regional differences in travel mode choice (Ewing and Cervero, 2010; Zhang, 2004). However, these were not considered in the present study because differences could not be documented in sufficient detail.

1.4. Present study

We first tested a TPB model extended with habit and personal norm to confirm that it provided an adequate account of commuting travel mode choice (H1).

Furthermore, we hypothesized that:

(H2a). Commute-related situational (i.e. regional and organizational) factors and sociodemographic variables do not explain additional variance in car use, over and above the extended TPB model.

(H2b). Organizational sector and region do not explain additional variance in car use, over and above attitude, personal norm, perceived norm, perceived control, habit and intention.

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