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Cycle commuting intention: A model based on theory of planned behaviour and social identity

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ABSTRACT

Although cycling as a mode of transport can provide various important benefits to cities and their transport systems, it accounts for only a small proportion of commuter trips in southern Europe. The aim of this study was to develop a new model based on Ajzen's (1991) theory of planned behaviour (TPB), but including social identity as an additional predictor variable to improve the explanatory capability of the TPB. We conducted a telephone survey of a representative sample of 595 non-cycle commuters in the Spanish city of Vitoria-Gasteiz, which has a moderate proportion of bicycle users (6.9%). Confirmatory factor analysis to test the model showed satisfactory overall measurement fit, and all sub-scales had high reliability and validity coefficients. The findings demonstrated the value of incorporating social identity into the TPB to capture motivational factors relevant to cycle commuting. The relationships between the factors in the model indicated that there is a strong link between identifying as 'a cyclist' and perceived self-efficacy with respect to cycling. Furthermore, the results suggest that a more specific measure of perceived self-efficacy, targeting concrete behaviours could be used to inform development of initiatives to promote urban cycling. Our data also revealed that, excluding control variables such as journey time, economic cost and distance, the psychosocial variables included in the model predicted 32% of the variance in car users' intention to start commuting by bicycle.

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1. Introduction

Since the mid twentieth century, many cities have prioritised the 'right to circulation' of cars, dedicating most of the unbuilt space to parking or to vehicle circulation to the detriment of other uses (Velázquez, Verdaguer, & Rueda, 2012). This approach is associated with important economic, environmental, and health costs (for an extensive review, see Van Wee, 2007; and, in particular, the negative economic consequences of congestion, Bilbao-Ubillos, 2008). The lack of physical space for non-drivers (pedestrians, cyclists, and public transport users) leads to, amongst other effects, a reduction in social interaction (Garrard, Rissel, & Bauman, 2012).

In Europe a reduction in car use has been a goal of community policy for a number of years (European Commission, 2007). Recently, the Horizon 2020 programme (European Commission, 2014) set a goal of reducing use of internal combustion vehicles in cities by half through promoting non-motorised trips and use of public transport.

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Cycling is feasible alternative to motorised transport in the context of city mobility, and there are good reasons to promote its use. Bicycles do not produce any noise or contamination and cycling does not use non-renewable resources; the energy required comes from the user, who also gets the benefit of cardiovascular exercise. Bicycles can be parked in very small spaces so the direct and indirect costs in the form of public infrastructure—are low. Lastly, cycling is a more equitable mode of transport, because almost everyone can gain access to a bicycle (Pucher & Buehler, 2008).

All of this means that better knowledge of attitudes to the bicycle and to cycling as a mode of transport, how such attitudes affect cycling behaviour and how they vary across cities is required so as to develop effective strategies for increasing bicycle use (Heinen & Handy, 2012). Beliefs about the advantages or disadvantages of bicycles may vary between populations or between different groups of transport users.

The decision to begin cycling, especially cycle commuting to one's place of work or study, requires some planning and may imply a high degree of cognitive processing by the user. Many studies have relied on the Theory of Planned Behaviour (TPB, Ajzen, 1991), a model grounded in social psychology, to explain the behavioural intention of bicycle usage (Bamberg & Schmidt, 1994; Burbidge & Goulias, 2010; De Bruijn, Kremers, Singh, van den Putte, & van Mechelen, 2009; Eriksson & Forward, 2011; Heinen, Maat, & van Wee, 2011; Muñoz, Monzon, & Lois, 2013). The aim of this study was to enrich the TPB by including social identity as a predictor variable, because behaviour is not determined by purely utilitarian considerations, but also by the symbolic consequences for one's self-concept and identity as a member of certain groups (Mannetti, Pierro, & Livi, 2004). The role of social identity may be relevant to the development of concrete policies, because social identity motivates action, increasing behavioural intention (Fielding, McDonald, & Louis, 2008). In the context of cycling behaviour, encouraging individuals to identify with 'cyclists' as a social group could increase the frequency of bicycle use, or lead to individuals becoming involved in activities stereotypically associated with urban cyclists in the broader sense.

2. Conceptual background

The TPB (Ajzen, 1991) posits that intention to perform a given behaviour is a function of the individual's attitude towards the behaviour, subjective norms and perceived behavioural control. The first component of the model, *attitude*, emerges from the individual's repertoire of relevant beliefs (usually numbering between 5 and 9). Beliefs are therefore conceived as the consequences of performing the behaviour. Attitudes depend not only on beliefs but also on an *appraisal of the importance* of those beliefs to the individual (Fishbein & Ajzen, 1975). The only studies of cycling behaviour to use the calculation method recommended by Fishbein and Ajzen (1975) and record relevant beliefs and consider their consequences were a study in Sweden which recorded 13 relevant beliefs (Eriksson & Forward, 2011) and a study in the Netherlands which recorded 14 (Heinen et al., 2011).

The next factor included in the model, *subjective norms*, has been defined as the "perceived social pressure to perform or not perform the behaviour" (Ajzen, 1987, p. 188). Attitude is the main determinant of behaviour at individual level but subjective norms are an important social influence on behaviour. Subjective norms can be estimated directly using a probability scale which captures the subject's perception of the type of behaviours that others expect him or her to perform or refrain from performing indirectly from two main factors *normative beliefs* and *motivation to comply* (Fishbein & Ajzen, 1975). Normative beliefs are beliefs about how other groups of people (*referents* e.g. co-workers) think the individual should behave. For example, the majority of one's co-workers might view cycling to work as rather extravagant, or typical of low-status people; alternatively the normative belief might be that cycling to work is modern, and typical of someone with ecological values who seeks to reduce pollution. Motivation to comply is simply an individual's motivation to adhere to the normative beliefs endorsed by his or her reference groups.

The third component of the TPB is *perceived behavioural control* (PBC) which is defined as the individual's perception of his or her capacity to execute a given behaviour. People usually choose to perform behaviours they think they will be capable of executing. The concept of PBC is very similar to that of self-efficacy (or even the same; see Bandura, 1982); it captures perceived capability to execute a given behaviour, for example, travelling to work by bicycle. In their extensive review of the TPB Armitage and Conner (2001) concluded that PBC is made up of two constructs, controllability and self-efficacy, although self-efficacy is more clearly defined and more strongly correlated with behavioural intention. Most research applying the TPB to cycling behaviour has measured PBC using only one or two items (e.g. De Bruijn et al., 2009 or Heinen et al., 2011); subjects have typically been asked to rate how feasible they think it would be to cycle to work, how capable they feel of cycling to work or how easy they think it would be to cycle to work.

The object of the TPB is to predict *behavioural intention*, this consists of "placing a person in a dimension of subjective probability that includes a relation between the person and some action" (Fishbein & Ajzen 1975, p. 288). Thus intention is established as the antecedent of behaviour and behavioural intention is assumed to be directly associated with the probability that an individual will perform a given behaviour (Ajzen, 1987; Bamberg, 2007). This component of the TPB is based on attitudes, subjective norms and PBC.

Some studies have assessed behavioural intention using self-report scales containing items such as 'I intend to use a bicycle in the next 3 weeks' (Eriksson & Forward, 2011) or 'I intend to use a bicycle as a means of active transportation in the next month' (De Bruijn et al., 2009). Another way to measure this construct sequentially or categorically, described by Bamberg, Fujii, Friman, and Gärling (2011), is to make levels of behavioural intention equivalent to the stages of the theory of self-regulated behavioural change (Bamberg, 2013). Bamberg's theory of behavioural change, which is in line with a proposal

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