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Cognitive construction of travel modes among high-mileage car users and non-car users – A Repertory Grid analysis

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ABSTRACT

Human and environmental health are important globally. Reduced car use could improve human health by promoting physical activity and consequent decreases in carbon dioxide emissions would help achieve greenhouse gas emissions targets. The aim of this study was to explore how travellers evaluate seven transport choices. We compared the evaluative spaces of two distinct groups of transport users: predominantly non-car users and above-average mileage car users. The Repertory Grid technique was used to elicit 448 constructs from 15 non-car users and 15 high-mileage car users. Thematic analysis, content analysis, cluster analysis, analysis of means and principal component analysis were used to identify similarities and differences between the construct systems. Results revealed that non-car users and high-mileage car users apply broadly similar constructs to evaluate transport modes. They differ, however, in the structure of their construct systems. Both groups share constructs related to time and route flexibility. Effects on the environment and benefits of physical activity were important for non-car users but not for high-mileage car users. Non-car users view travel modes with greater differentiation, while high-mileage car users use a looser construal of travel modes. We discuss implications for future intervention design and ramifications for policy and practice.

1. Introduction

In the UK, for example, car use accounts for 23% of overall greenhouse gas emissions (IEA, 2009). Despite rising concerns about air quality, lack of physical activity and fossil fuel consumption, 64% of journeys in the UK are by car (DfT, 2016). The number of driven kilometres is rising (Stradling et al., 2001; van Exel and Rietveld, 2011) and 2017 also saw a record sale of new cars in the UK (Kollewe and Carrington, 2017). Moreover, the poorest 10% of car-owning household devote more than 25% of their disposable income to purchasing and running a car (Gomm and Wengraf, 2013). This pattern can be observed across Europe. Car is the dominant mode of transport, accounting for an average of 83.4% of trips across the European Union (EEA, 2015; Eurostat, 2017). Thus, a decrease in individual car use to tackle CO_2 emissions remains a primary climate change target (European Commission, 2013; IPCC, 2013). Despite availability of new technologies involving electric mobility, forecasts show that adoption rates remain low and are not sufficient to meet desired carbon reduction targets (Wietschel et al., 2013).

Applied psychological research has investigated determinants of driving to inform population-based interventions designed to

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reduce car use. Quantitative, survey-based research, applying models such as the Theory of Planned Behaviour (Ajzen, 1991), Theory of Interpersonal Behaviour (Triandis, 1977) or The Norm Activation Model (Schwartz, 1977) to predict driving has sought to identify modifiable antecedents of car use (Bamberg and Schmidt, 2003; Forward, 2004; Galdames et al., 2011; Klöckner and Matthies, 2004; Wall et al., 2008). This work has highlighted the role of instrumental or utilitarian reasons for driving such as importance of travel costs (e.g. Steg et al., 2001), time efficiency (e.g. Joireman et al., 1997) and concerns about convenience and practicality (e.g. Steg, 2005). Rational-choice models provide useful guides to modifiable psychological antecedents of travel mode choice (see Hoffmann et al., 2017 for a review), but may oversimplify the psychological processes generating action (Sniehotta et al., 2014). For example, attitude questionnaires might not fully elucidate how these perceptions are interrelated or whether some perceptions are more important than others. Qualitative research into antecedents of travel mode choice has also explored the complexities of driving decisions and has identified a range of car use motivations. Consequently, we now recognise the importance of affective (e.g. Anable and Gatersleben, 2005; Domarchi et al., 2008; Gatersleben and Uzzell, 2007; Stradling et al., 2001) and symbolic (e.g. Haustein et al., 2009; Hong et al., 2008; Steg, 2005) motivations for car use. The importance of status, identification, enjoyment, feelings of autonomy or independence and valuing personal space all feature in driving preferences (Jensen, 1999; Mann and Abraham, 2006).

Quantitative and qualitative work has primarily focussed on a single travel mode and mode user group (Gardner and Abraham, 2007; Hoffmann et al., 2017). For example, drivers' reasons for car use (e.g. Bean et al., 2008; Handy et al., 2005), the experiences of bus users (Carreira et al., 2013) or cyclists' motivation for active commuting (Guell et al., 2013) were explored. Motivations towards alternatives to car use remain less well understood and the question arises whether similar motivations emerge for other modes. Moreover, direct comparisons of modes and mode users are surprisingly rare. Some studies have compared users' and non-users' perceptions of travel modes. For example, cycling motivations of regular and irregular cyclists (e.g. Fishman et al., 2012) or car versus bus users (Beirão and Cabral, 2007; Carreira et al., 2013; Guiver, 2007; Hiscock et al., 2002) were investigated. For example, Beirão and Cabral (2007) confirmed general dissatisfaction with public transport use but also highlighted the social aspects of bus use. Research has also shown that driving vs. using public transport can have different psychological consequences, highlighting increased psychosocial benefits gained by being the driver (Ellaway et al., 2003). Most relevant, Anable and Gatersleben (2005) compared different mode users' survey ratings of a variety of travel options for two different journey purposes. The authors found that evaluations can differ in their importance, depending on journey type, and identified several 'gaps' in how car users and non-car users evaluate a range of modes. However, their results were drawn from two different studies, conducted at different time points with different participants. To our knowledge, a study by Thomas et al. (2014) is the only qualitative research that explored knowledge and perceptions of carbon reduction and asked a range of mode users to evaluate different modes at the same time. This focus group study highlighted differences and similarities in perceptions of carbon emissions across five groups of mode users. Overall, however, a comprehensive view of perceptions of, and motivations to use a range of transport modes is yet to be developed. Identifying further similarities and differences between underlying perceptions of different travel modes by means of a novel methodology may elucidate new intervention targets and avenues for future research.

1.1. The Repertory Grid

The Repertory Grid (RepGrid) method was designed to investigate complex systems of perception and understanding through semi-structured interviews (Fransella et al., 2004). It is an operationalisation of Kelly's (1955) Personal Construct Theory. Kelly proposed that people use finite, bipolar constructs to understand the world around them. Although some have challenged the bipolarity of constructs (Goodrich, 1993), evidence supports this structure (see Riemann, 1990; Walker and Winter, 2007 for reviews). A construct describes a dimension in which two things are alike but different from a third (Stewart et al., 1981). By presenting participants with evaluative stimuli – "elements", the RepGrid process maps out individuals' evaluative spaces (Easterby-Smith et al., 1996; Fransella et al., 2004; Stewart et al., 1981). These elements are presented in groups of three, so this is known as the triadic elicitation procedure. Through contrasting and comparing elements, bipolar constructs can be elicited. Collectively, these create a two-dimensional grid, as opposed to in-depth uni-dimensional answers in a conventional qualitative interview. To complete the grid and reveal relationships between elements and constructs, participants rate the elements against elicited constructs which are being treated as semantic endpoints of a scale. For example, in deciding to travel, a person might apply the construct "cost effective" to transport mode A whereas the opposite "too expensive" may be applied to travel mode B. It is also assumed that constructs are organised hierarchically in subordinate and superordinate relationships of importance (Kelly, 1955; Lewis and Klein, 1985; Marsden and Littler, 2000; Neimeyer, 1993). Since its introduction in 1955, the RepGrid has been adapted (Bannister and Mair, 1968) to include, for example, the use of pictures to represent elements and ranking of constructs to reveal the structure of importance (Skippon, 2014). While RepGrid methods have been widely used in market research (e.g. Goffin, 1994; Jankowicz, 1990; Lemke et al., 2011; McEwan and Thomson, 1989) including vacation destination choice (e.g. Coshall, 2000; Pike, 2003) or perceptions of food (e.g. Embacher and Buttle, 1989; Gains, 1994; Russell and Cox, 2004; Thomson and McEwan, 1988), it found little application in transportation research to date (see Gkouskos et al., 2014; Skippon, 2014 for examples). Recently, Clauss and Döppe (2016) compared a wide range of travel alternatives (elements) including innovative options, e.g. sharing schemes, multi-modal travel apps and an 'ideal' mode. The study elicited 28 perceptual determinants (constructs) from 60 participants that were either car users or public transport users, living in an urban German city. Based on the elicited determinants, they explored how these new modes can be best promoted amongst a portfolio of existing alternatives.