Journal of Transport Geography 24 (2012) 512–521

Contents lists available at SciVerse ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo

On the use and potential of behavioural economics from the perspective of transport and climate change

Erel Avineri

Centre for Transport & Society, University of the West of England, Bristol, United Kingdom

ARTICLE INFO

Keywords:
Behavioural economics
Travel behaviour
Nudge

ABSTRACT

It can be argued that the main thinking in transport planning and policy making stem from neoclassical economics in which individuals are largely assumed to make rational, consistent, and efficient choices, and apply cognitive processes of decision making that maximise their economic utility. Research in behavioural sciences indicates that individuals' choices in a wide range of contexts deviate from the predictions of the rational man paradigm inspired the research agenda in the field of travel behaviour. New concepts and practices of government aim to apply some behavioural economics insights in the design of behavioural change initiatives and measures, an approach recently advocated in the US and the UK. This paper provides a brief review on the use and potential of behavioural economics from the perspective of transport and climate change, in two main contexts: travel demand modelling and design of behaviour change measures. The discussion of limitations and knowledge gaps associated with the implementation of behavioural economics to a travel behaviour context might contribute to the debate and help in defining research agenda in this area.

1. Introduction

Travel behaviour has been an area of great interest to practitioners and researchers ever since the introduction of transport modelling in the 1950s. The travel choices made by individuals – such as mode choices, route choices and time choices – all have a direct impact on the performance of transport systems and networks.

Increasing awareness that our travel behaviour generates positive and negative effects on our individual and collective wealth, health and well-being extended the application of travel behaviour research to a wider context. A range of negative and positive externalities associated with travel choices are been considered by transport researchers and practitioners more seriously than ever; such are, for example, transport-related CO_2 emissions which contribute to the problem of climate change (Chapman, 2007). In the European Union, the transport sector (excluding air travel) represents 18% of all CO_2 emissions (EEA, 2011, p. 36). Considerable reductions in emissions are required from the transport sector to meet environmental targets set by international organisations (such as UNFCCC, the United Nations Framework Convention on Climate Change), but it has been largely recognised that such targets cannot be fully met without substantial change to travel demand.

Modelling and understanding of travel behaviour have been long been applied in the field of transport, addressing three main goals: (i) to provide theoretic insights on why and how people travel; (ii) to estimate the properties of attributes associated with the travel choices (e.g. travel time, travel cost) and with travellers' characteristics (e.g. socio-demographics) in order to predict their future behaviour; and (iii) to test the possible outcomes of proposed infrastructure or policy changes, with an ultimate goal of making effective improvements to social and individual wellbeing through the development and implementation of a range of design, planning and policy measures.

This paper provides a critical review of the theoretical and practical application of concepts and theories associated with the emerging field of behavioural economics in the context of travel behaviour and the major challenges associated with it – climate change being one of them. It addresses the potential contribution of behavioural economics to two different although linked applied fields of transport research: the modelling of travel choices and the design of behaviour change initiatives. This paper is not intended to be a systematic review of behavioural economics; it aims to report on a selective sample of concepts from this field that might be of specific relevance to those who are interested in its application to transport and climate change context (for a wider background to behavioural economics see Metcalfe and Dolan, 2012, featured in this special issue). The paper concludes with the identification of several aspects that can be prioritized in the definition of research agenda in travel behaviour.

E-mail address: Erel.Avineri@uwe.ac.uk

0966-6923/$ - see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jtrangeo.2012.03.003

2. Incorporating behavioural notions in the analysis and development of travel behaviour

2.1. A brief history of travel behaviour models

Travel behaviour is seen by many as the physical outcome (or 'choice') exhibited by a traveller and captured by her revealed or stated preferences and actions. Travel behaviours commonly addressed by researchers and practitioners are route choices, mode choices, destination choices, and choices associated with the time to travel. Other actions that can be considered as travel behaviours might include vehicle purchasing and ownership (i.e. number and type of cars owned by household), acquisition of driving license and responses to its control and disposal; parking choices; and pooling or sharing travel arrangements. Micro-behaviours such as driving styles (e.g. speed, acceleration) are usually not associated with travel behaviour. Although it largely focuses on the aggregated behaviour of individuals, travel behaviour models and frameworks explore other levels of aggregation (e.g., household, organisation, community, and spatial units).

In most applied contexts of travel behaviour, the term is used to present the observed actions of travellers (as in the 'modelling' and 'prediction' contexts). The individual actions that are targeted by interventions and policy measures are also seen as 'behaviours'. It might be argued by some researchers in the field of travel behaviour that the dynamic economic, cognitive, psychological and social processes that lead to travel choices should also be seen as important elements of travel behaviour, and therefore included in a wider definition of it. This argument could be related to the proposition of the behaviourism philosophy in psychology that all things that humans do can be regarded as behaviours. However in this paper we will apply the more common use of travel behaviour as a term representing observed physical actions.

In his review on transport models, philosophy and language, Timms (2008) (following Pas, 1990), distinguishes two main eras of transport modelling: (i) A social physics era (stretching from the 1950s to the 1970s), characterised by the importation of analogies from traditional physics to transport modelling, and concerned primarily with the modelling of (aggregate) systems rather than people; and (ii) an economics era (stretching from the 1970s to the present day), which has been dominated by neoclassical economic concepts, focussing upon the representation of people as individual rational choice makers, interacting together to form a state of equilibrium.

The behavioural assumptions on travellers' choices, and their responses to policy interventions, can be traced back to economic theory and the paradigm of rational man. The development of travel behaviour models in the second era has been largely inspired by models of consumer choice; the principles of rational behaviour, such as individual's tendency to maximise her utilities were applied to traveller behaviour to simulate choices of destination, mode, route, and time. Although this modelling approach is based on statistical analysis demonstrating levels of association rather than behaviour notions, models of individual travel choice were regrettably termed 'behavioural' (Atkins, 1987). It was argued that this and other weaknesses in the 'traditional' models have had negative impacts efficiency of transport planning and policy making (e.g. Atkins, 1987). Gärling (1998) has made the observation that behavioural assumptions of mainstream travel behaviour models are almost always made without reference to existing theories in behavioural sciences (in particular psychology).

Ben-Akiva and Lerman (1985, p. 32) describe the theory of choice as a collection of procedures that define the following elements: (i) decision maker, (ii) alternatives, (iii) attributes of alternatives, and (iv) a decision rule. The attractiveness of an alternative in the mind of the traveller is described as a vector of the attribute values (which is later reduced to a scalar, 'utility', as an index of the attractiveness of an alternative). If travellers are expected to act as rational human beings, and specifically to exhibit consistency and transitivity in their choices (Ben-Akiva and Lerman, 1985, p. 38), then the way alternatives and attributes are presented to the traveller, travellers' set of attitudes and beliefs, social norms and habits should not matter much to choice making, and individuals should not be affected by what might be considered as irrelevant context. However, emerging research findings in travel behaviour research provide evidence on the important roles such (and other) psychological and social factors have on travel behaviours.

According to a range of theories in social psychology, behaviour is determined by beliefs and attitudes rather than utilities. In recent reviews (Anable et al., 2006; Bamberg et al., 2010) it is argued that most of the psychological research on travel behaviour change has primarily been guided by two theories: the theory of planned behaviour (TPB) (Ajzen, 1991) and the norm-activation theory (Schwartz, 1977). According to TPB, the relative strengths of individual's intentions to perform alternative behaviours guide the choice between them, where the determinants of intended behaviour are a set of individual's beliefs: attitudes toward behaviour, subjective norms and perceived behavioural control. Norm-activation theory accounts for pro-social motives and allocates a central role to personal norms. Although attitudes and believes, and their role in decision making, are explored in the field of behaviour economics, most behavioural economics would not consider social psychology theories (such as TPB) appealing for it postulates a quite strong of rationality. Although neoclassical economics and social psychology have different views of choice making, rational behaviour, in its broad meaning, is still largely assumed by theories such as TPB and norm-activation theory: individuals faced with choices are assumed to perform a high-level cognitive process, a process that can be largely described as a planned and consistent. Recently there have been attempts to enhance the utility-based framework by accounting for latent factors such as perceptions, attitudes, norms, and decision protocols (Ben-Akiva et al., 2002; Abou-Zeid et al., 2012). Whilst TPB, which assumes behaviour is a product of intention, provides powerful explanation of behaviour in a wide range of contexts, it can be also argued that some behaviour occurs with little or no pre-planned intent. In that aspect behaviour can be seen as impulsive, habitual or emotional rather than planned (see, for example, Gärling et al., 1998).

2.2. The relevance of behavioural economics to travel behaviour

Research in behavioural sciences, especially cognitive psychology, indicate that individuals' choices in a wide range of contexts deviate from the predictions of rational behaviour. Some of these deviations are systematic, consistent, robust and largely predictable (Tversky and Kahneman, 1974; Kahneman and Tversky, 1979).

Although many might see the roots and origins of behavioural economics in the work of Herbert Simon on bounded rationality and the studies of cognitive psychologists, such Amos Tversky and Daniel Kahneman, there have been influences from behavioural sciences on economics through its development since the 18th century. Actually, at the classical period (identified with the works of Adam Smith, David Ricardo, Thomas Malthus and John Stuart Mill), microeconomics was more closely linked to psychology. For example, Smith's Theory of Moral Sentiments (1759) proposed the incorporation of psychological insights into individual behaviour, including notions such as habits, customs, utility, fashion and concerns about social wealth, fairness and justice