

Estimating Human Energy Expenditure on Travel from Multi-Day Multi-Year GPS Data and its Implications about Stable Personal Travel Behaviour

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Abstract

Traditionally transport modelling is done based on Random Utility Theory (RUT), with the inclusion of socioeconomic variables, such as household size, car-ownership, job or employment status, cost or income, land use patterns, etc., to capture differences in tastes and preferences within the population. No studies in the past have used human energy expenditure on travel as an explanatory variable in their analysis. Some recent studies indicate that tiredness and fatigue may act as potential contributors to travel mode choice behaviour. In this study human energy expenditure on travelling is estimated from a personalised GPS travel survey from four States of Australia which covers all possible travel modes including walking and bicycling. The uniqueness of this GPS panel dataset is that the respondents provided travel data for at least two consecutive weeks for from three to seven years. In this paper we aim to test the hypothesis whether or not a person spends a fixed average amount of human energy on travelling and does it remains stable from year to year. This study also discusses the relationship of daily average travel time expenditures to human energy expenditures on travel and also age and gender effects on it. The outcome of the study will point out the importance of considering human energy expenditure as a potential variable in the transport model. It will also contribute to a new way to explain travel time budgets.

Keywords: human energy expenditure on travel, personalised GPS panel data, stable travel behaviour, travel time budget