Abstract
In and out of balance: Travel Time Budgets for individuals in the Netherlands

The concept of Travel Time Budgets (TTB) is a well-known phenomenon in transport behaviour research. This concept refers to the idea that individuals' average daily travel time, measured over a large group of people, e.g. a country, tends to be relatively constant (Mokhtarian & Chen, 2004). A large body of empirical findings show that on aggregate, people travel 70 minutes (+/-10) per day (Schafer and Victor (2000), Ahmed and Stopher (2014)). However, literature reviews emphasise that although on an aggregate level stability is observed, travel time expenditures of individuals are not constant but show variability. Still, the underlying mechanisms explaining the regularity on aggregate level are not well understood (Mokhtarian and Chen (2004), Ahmed and Stopher (2014)). In this context we distinguish Travel Time Expenditures (TTE), which are the actual time expenditures on travel that can be empirically measured, and TTB, which refer to an unobserved mental target that cannot be measured directly.

Travel time budgets (TTB) are used regularly in the public debate to discuss the usefulness of transport infrastructure investments that accelerate travel. TTB also interacts with the proliferation of ICT-trends such as telecommuting and ICT use during travel, because these trends reduce (experienced) travel time (not by accelerating travel, but by replacing it or by enabling multitasking). In order to better assess societal and policy implications of these trends, TTB can be of help and theory explaining TTB is needed.

Many different explanations were offered in literature (Mokhtarian and Chen (2004), Ahmed and Stopher (2014), van Wee, Rietveld, and Meurs (2006)) for the stability of travel time budgets, which can be categorised along originating disciplines (Höjer and Mattsson (2000), Peters, de Wilde, Clement, and Peeters (2001)). These are biological disciplines (proposing a territorial man that wants to expand his territory), economical disciplines (proposing a rational man who seeks to maximise the utility from travel, finding an optimum travel time expenditure) and sociological disciplines (proposing a constrained man who has obligations and limitations which constrain the amount of time that can be or needs to be spent on travel). We conclude that travel time expenditure (TTE) on a personal level is a balancing act, in which individuals base their personal optimum travel time (TTB) on instinct/preferences, personal needs and personal constraints. Individuals can be thrown 'off balance' regarding their TTB because of several factors, resulting in individual travel time variability. Besides external factors (e.g. economic or spatial developments, policy measures), variability may arise because of their own travel (related) decisions on different time scales: daily (which mode or route shall I take today), weekly/monthly (e.g. scheduling work, social life, recreational activities) and yearly (or even longer, such as job choice, housing location, vehicle purchase, family planning). Travel time is not the only consideration in these decisions nor do individuals have full control over them.

With this background, the aim of this research is to assess the variability in people's travel time expenditures over time. In particular, we are interested in assessing which patterns of travel time expenditure exist, and how stable each pattern is. If people –at an individual level- are indeed inclined to converge to a "70 minute per day" pattern, this can shed light on the underlying mechanisms for the observed stability of travel time expenditures at the aggregate level. To achieve this aim we used longitudinal data on travel time expenditures from The Mobility Panel Netherlands (MPN) (Hoogendoorn-Lanser et al. (2015). This is a three-day diary based dataset on travel behaviour and our analysis includes 11800 respondents from 6400 households that participated on average 2.7 years in the panel. We estimated various Latent Class Transition Models (LTA) to model transitions between travel time expenditures for successive years, with up to 7 states regarding latent classes of TTB. Additionally, we added covariates such as education level, gender,

employment status, car ownership; spatial environment and also life events (changing jobs, moving, changes in household composition). Preliminary results show a high level of stability in transition patterns on the individual level. In all models there is a probability of around 80% of staying in the same TTB-class from year to year for the latent classes that are near 70 minutes per day, and decreasing stability for higher or lower TTB-classes.

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Ahmed, A., & Stopher, P. (2014). Seventy Minutes Plus or Minus 10 — A Review of Travel Time Budget Studies. *Transport Reviews, 34*(5), 607-625. doi:10.1080/01441647.2014.946460

Höjer, M., & Mattsson, L. G. (2000). Determinism and backcasting in future studies. *Futures, 32*(7), 613-634. doi:10.1016/S0016-3287(00)00012-4

Mokhtarian, P. L., & Chen, C. (2004). TTB or not TTB, that is the question: a review and analysis of the empirical literature on travel time (and money) budgets. *Transportation Research Part A: Policy and Practice, 38*(9-10), 643-675. doi:10.1016/j.tra.2003.12.004

Peters, P., de Wilde, R., Clement, B., & Peeters, P. (2001). A constant on the move? Travel Time, Virtual Mobility and Constant Travel Time Budgets.

Schafer, A., & Victor, D. G. (2000). The future mobility of the world population. *Transportation Research Part A: Policy and Practice, 34*(3), 171-205. doi:10.1016/S0965-8564(98)00071-8

van Wee, B., Rietveld, P., & Meurs, H. (2006). Is average daily travel time expenditure constant? In search of explanations for an increase in average travel time. *Journal of Transport Geography, 14*(2), 109-122. doi:10.1016/j.jtrangeo.2005.06.003