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How in-vehicle activities affect work commuters' satisfaction with public transport

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ABSTRACT

Research has recently questioned the commonly held opinion that travel time is valued as negative, arguing that engagement in activities during travel may make these trips more enjoyable or productive. Satisfaction with travel has to date been assessed using utility-based models or measures of productivity of the trip. The present study is the first to assess the influence of activities performed during travel on public transport users' subjective well-being. To this end, a survey was conducted in Sweden in 2010 in which activities during the work commute by public transport were recorded and subjective well-being during travel was measured retrospectively using the Satisfaction with Travel Scale (STS). Results show that talking to other passengers has the strongest positive effect on STS, whereas activities related to entertainment and relaxation lead to lower STS, possibly since engaging in these activities reflect unsuccessful attempts to abate boredom. In addition, it is found that activities during travel may have a more positive effect on the commute back home, suggesting that the mindset related to the destination influences travel satisfaction.

1. Introduction

For many workers in modern societies the commute to and from work accounts for a significant part of their daily time use. Given its repetitive character satisfaction with the daily work commute may have a significant influence on life satisfaction and emotional well-being. Previous studies of emotional well-being (Kahneman et al., 2004a) identified the work commute as one of the least appreciated activities during the day. In contrast, Olsson et al. (in press) showed that users' evaluations of the work commute are dominantly positive. In addition, various studies have reported that satisfaction with the work commute varies between individuals and contexts. In a study of drivers (including work commuters) in The Netherlands, Ettema et al. (2010b) investigated the factors accounting for differences in the evaluation of the car trip. They found that apart from socio-demographics, the satisfaction with the trip was influenced by driving conditions (crowdedness, road layout, maintenance works). While initial work into cognitive and affective evaluations of car driving has been conducted, similar studies of the satisfaction with commute trips made by public transport (PT) are limited.

The satisfaction with the commute trip by PT users has been investigated using utility-based mode choice models (Carrasco et al., 2005; Hess et al., 2007; Newman and Bernardin, 2010) deriving the satisfaction (utility) of a travel mode from observed choices of this mode. These studies typically find that PT trips have a lower utility than car trips, and that travel time by PT is valued more negatively than travel time by car. These models primarily aim to predict market shares correctly by focusing only on choices. However, the lower utility predicted by utility-based models do not necessarily imply that trips made by PT are negatively experienced by those who choose to travel by PT. In this vein Ettema et al. (2010c) (see also Kahneman, 2000) note that *decision utility*, which is the expected utility prior to a trip, is in general not equal to *experienced utility* defined as an aggregation of momentary experiences during a trip. Since it has been shown that individuals usually overpredict the intensity of both positive and negative emotions (Pedersen et al., 2011), it is concluded that insight into how public transport commuters experience their commute and the factors that influence their commute experience is limited. Yet, such information is clearly valuable in order to assess transport policies, for instance such policies promoting more sustainable forms of travel. It would therefore be desirable to directly measure the evaluations by work commuters using PT.

A relevant notion when discussing the experience of work commutes is that despite negative travel time coefficients in mode choice models, qualitative studies (Jain and Lyons, 2008; Redmond

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and Mokhtarian, 2001; Line et al., 2011) suggest that travel in itself may be positively evaluated. In particular, in interviews travelers indicate that, when given the choice, they would prefer a 10–15 min commute over a shorter one. Some indicate that they appreciate travel time as a buffer between the work and private sphere as a period they can use for contemplation and having time for oneself. Mokhtarian et al. (2001) note that the valuation of travel time may be positive if travel has an intrinsic value (e.g. traveling in a scenic environment) but also if activities during the trip make the trip more enjoyable or productive. For instance, reading or listening to music may make a trip more enjoyable, whereas the opportunity to work during a trip makes it more productive. Applying a utility-theoretical framework, Ettema and Verschuren (2007) provided evidence that travel time of car and PT users is valued as less negative when listening to music. However, this study was based on inferred experienced utilities and did not measure the direct experience of PT trips.

Public transport trips differ from car trips in that they do not require active participation of the traveler in driving and navigation, thereby allowing PT users to be engaged in other activities during their trips. In a study of activities during travel, Ettema et al. (2010a) showed that especially train passengers showed higher levels of engagement in working, reading and resting, but also in making mobile phone calls. A study in the UK by Lyons et al. (2007) confirms the involvement of train passengers in a variety of secondary activities, and notes that train passengers also actively prepare for these secondary activities by carrying materials or equipment. Common activities during train travel include reading for leisure (by 53% of passengers), window gazing/people watching (56%), working/studying (26%), talking to other passengers (16%) and sleeping/snoozing (13%). Travelers reported that involvement in the activities made their trip more productive or enjoyable. It is noted that the opportunities to engage in activities while traveling by PT are expected to increase in the years to come with the increasing market penetration of Smartphones, which allows for a wider range of internet-based activities, such as browsing, social networking, navigation, and so forth (Lyons and Urry, 2005; Line et al., 2011). Given the variety of options for secondary activities by PT users, the question becomes relevant to what extent activities during travel influence the satisfaction with the daily work commute made by PT.

It is concluded that there is limited knowledge about experience of work commuters by PT and what factors influence this experience. In particular, the issue of the impact of engagement in activities during the trip is still unclear. The present paper addresses this issue using empirical data collected in the three largest urban areas of Sweden. Work commuters living in these areas recorded characteristics of their regular commutes to and from work (including in-vehicle activities) and their satisfaction with the commutes measured with the Satisfaction with Travel Scale (STS) (Ettema et al., 2011; Friman et al., in press) described in the next section. Section 3 describes the survey that was carried out to measure STS and also presents selected sample characteristics. Section 4 describes the results of regression analyses that were conducted to investigate the relative importance of activities during travel for travel satisfaction. Finally, Section 5 draws conclusions from the results and charts avenues for further research.

2. The Satisfaction with Travel Scale (STS)

It has been shown in previous research that there are differences between expected and experienced outcomes of decisions, such as the decision to travel to work (Ettema et al., 2010c). Pedersen et al. (2011) showed, for instance, that car drivers' prediction of their appreciation of PT trips is lower than their actual evaluation when making the trip. Thus, using utility-based theories that derive utility from choices based on predicted evaluation will probably provide a biased estimate of how trips are experienced. To overcome this problem, we developed a method aimed at directly measuring travel satisfaction rather than deriving satisfaction from observed choices. In this respect, we build on an extensive body of research on subjective well-being (SWB). In this research (see Ettema et al., 2010c, for review) validated measurement scales for measuring subjective well-being or happiness have been developed. SWB is defined as individuals' satisfaction with their lives consisting of an affective component, encompassing the emotional experiences of episodes during specified time intervals, and a cognitive component consisting of a judgment of life satisfaction. Although the affective component (also labeled emotional well-being) refers to momentary experiences, affective states may linger for longer periods (hours or days) and are then referred to as mood. Emotional well-being is commonly measured using self-report scales such as PANAS (Watson et al., 1988) or the Swedish Core Affect Scale (SCAS) (Västfjäll et al., 2002; Västfjäll and Gärling, 2007). The cognitive component of SWB (life-satisfaction judgments) is measured using multi-item measures such as the Satisfaction with Life Scale (SWLS) (Diener et al., 1985; Pavot and Diener, 1993; Slocum-Gori et al., 2009) or the single-item Eurobarometer scale (Eurobarometer, 2008).

Two approaches have typically been followed in measuring emotional well-being. Experience sampling intercepts participants in the action to ask them about their affective state (e.g. Killingsworth and Gilbert, 2010). In contrast, the day-reconstruction method (DRM) (Kahneman et al., 2004b) or the event-reconstruction method (Schwarz et al., 2009) asks respondents afterwards to recall previous experienced episodes reporting their emotional state during these episodes. The latter introduces a potential bias, since individuals are not only limited in predicting their emotional experience (as discussed above), but they also make errors remembering affective states, since emotions are fleeting (Robinson and Clore, 2002; Schwarz and Xu, 2011; Xu and Schwarz, 2009). Nevertheless, validation studies have indicated that the DRM provides an acceptable approximation of experience sampling methods, while being less costly and more convenient to implement.

To measure the experience of the work commute by PT, we have developed and used an adaptation of cognitive and affective SWB scales to the travel domain (see Table 1). The Satisfaction with Travel Scale (STS) was designed to include both affective and cognitive components related to daily travel. Affective items were selected based on the two dimensions (valence and activation) assessed by the Swedish Core Affect Scale (SCAS, Västfjäll et al., 2002), derived from the affect grid (Russell, 1980, 2003). The endpoints of each scale are defined as combinations of the valence and activation dimensions. Six scales were devised, three which distinguish between positive deactivation (e.g. relaxed) and negative

Table 1
The Satisfaction with Travel Scale (STS).

Positive deactivation–negative activation (STS_PD)
Very hurried (−3) – Very relaxed (3)
Very worried (−3) – Very confident (3)
Very stressed (−3) – Very calm (3)
Positive activation–negative deactivation (STS_PA)
Very tired (−3) – Very alert (3)
Very bored (−3) – Very enthusiastic (3)
Very fed up(−3) – Very engaged (3)
Cognitive evaluation (STS_CE)
Worst I can think of (−3) – Best I can think of (3)
Very low standard (−3) – Very high standard (3)
Worked very poorly (−3) – Worked very well (3)