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Satisfaction with travel and subjective well-being: Development and test of a measurement tool

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ABSTRACT

Subjective well-being (SWB) that includes individuals' cognitive and affective evaluations of life in general is proposed to be a more appropriate measure capturing the benefits individuals derive from travel improvements. We develop and test a measure of travel-related SWB, the nine item self-report satisfaction with travel scale (STS). In a survey of 155 undergraduates, STS, mood ratings, and ratings of SWB were collected for three hypothetical weekdays differing in travel mode, travel time, access to bus stops, and daily activity agenda. The results showed that STS is reliable and differentiates between changes in travel conditions. STS, mood, and to some extent SWB were shown to be affected by travel mode (bus vs. car), travel time, access to bus stops, and the number of activities in the daily agenda.

1. Introduction

Car-use reduction is on the political agenda in many countries due to the accelerating adverse effects of motorized traffic on human environments and public health (e.g., Hensher, 1998; Vlek, 2007; OECD, 2008). Successful car-use reduction depends on individual changes of travel, in particular that car users switch to more environmentally friendly travel modes. Over the past years various studies have investigated how car users' mode choice can be influenced. Many of these studies have focused on the effects of soft transport policy measures (Richter, Friman, & Gärling, in press; Richter, Friman, & Gärlin, 2010), also referred to as travel feedback programs (Fujii & Kitamura, 2003; Fujii & Taniguchi, 2006; Taniguchi & Fujii, 2007), which aim at making car users voluntarily switch travel mode by providing customized information about sustainable alternatives, primarily public transport services. Yet, the effectiveness of soft transport policies to influence car use is limited if the existing level-of-service of public transport cannot compete with the car (Beale & Bonsall, 2007; Brög, Erl, Ker, Ryle, & Wall, 2009). Therefore, improvements of public transport services are needed in order to achieve a more substantial car-use reduction. This raises the question of what improvements of public transport services are attractive to car users such that they switch to public transport. Various previous studies provide some information in this respect. In Eriksson, Friman, and Gärling (2008) interviews with employees who commuted by car to work showed that the further to work or bus stops, the more the participants desired increased frequencies and shorter travel times but less often lower fares. In another study

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Eriksson, Friman, Ettema, Fujii, and Gärling (2010; see also Horeni, Gärling, Loukopoulos, & Fujii, 2007) employed an experimental simulation to further investigate car users' switching to public transport. The main results showed that shorter travel times as well as high access to bus stops led to greater bus use. However, constraints imposed by a busy daily activity agenda led to larger car-use, in particular if car costs were low. The present study is a continuation of this study focusing on how switching from car to public transport affects satisfaction with travel and as a consequence satisfaction with the daily routines. The focus on satisfaction with travel and daily routines is relevant both from a viewpoint of the implications of policies for well-being, but also since travel that is experienced as more satisfactory is more likely to be sustained over a longer period.

Currently, utility theory is the dominant account of how travel-related choices of activity, destination, and travel mode are made (McFadden, 2001). Assessments of people's satisfaction with their travel are similarly based on this theory (e.g. in cost-benefit analyses). Utility measures used for the appraisal of policies, or for investigating the consequences of people's travel choices in general, are thus derived from observed choices. Yet, it is doubtful whether utility derived in this way is a valid measure of travellers' satisfaction, since choices are frequently made under constraints and lack of complete information.

The current application of utility theory in cost-benefit analysis is based on the utility derived from observed choices (termed *decision utility*). However, it has been shown (Wilson & Gilbert, 2003) that anticipated and actual experiences may differ considerably. Specifically, the intensity of both positive and negative experiences is usually underestimated. As a consequence, to properly assess the benefits of travel improvements, one should measure *experienced utility* rather than rely on decision utility (see Ettema, Gärling, Olsson, & Friman, 2010, for a more elaborate discussion).

As an alternative to experienced utility, subjective well-being (SWB) has been proposed as a measure of people's satisfaction with outcomes of choices (Kahneman, 1999). SWB encompasses judgments of availability of material and immaterial resources that are important for being satisfied with one's life as well as enduring feelings of pleasantness (e.g. Diener & Biswas-Diener, 2008; Diener & Suh, 1997). Since SWB refers to satisfaction with life in general, it is assumed to be relatively stable across time. Yet, there is still an interest in understanding how changes in SWB depend on context-specific factors, including various forms of consumption (Diener & Seligman, 2004). An important research question raised by Ettema et al. (2010) and Jakobsson Bergstad et al. (2009c) is whether and how changes in travel context (e.g. switching travel mode or improved level-of-service of public transport) will cause changes in SWB. If it is possible to find a relationship with travel context, SWB has the potential of becoming a new powerful tool for policy evaluations (Diener, 2006).

Diener, Emmons, Larsen, and Griffen (1985) posited that SWB consists of three components: (1) intensity, frequency, and duration of positive affect (PA), (2) intensity, frequency, and duration of negative affect (NA), and (3) a cognitive judgment of satisfaction with life as a whole (see also Arhaud-Day, Rode, Mooney, & Hear, 2005). The affective components may be assessed by self-reports of specific immediate emotions or moods (Stone, Shiffman, & DeVries, 1999). In such self-reports, participants report their affective experience during an episode or activity. An alternative is to obtain retrospective self-reports on rating scales such as the *Positive and Negative Affect Scale* (PANAS, Watson, Clark, & Tellegen, 1988) or the *Swedish Core Affect Scale* (SCAS, Västfjäll, Friman, Gärling, & Kleiner, 2002; Västfjäll & Gärling, 2007) derived from the affect circumplex defined by a valence (pleasantness–unpleasantness) and activation (activation–deactivation) dimension (Russell, 1980, 2003; see also Diener & Emmons, 1984). While retrospective self-reports refer to how people feel in general or have felt during a past period (last day, week, month, or year), the same scales may be used to measure current mood, that is how people feel at the moment. Immediate approaches measure direct affective responses, retrospective approaches measure the memory of such responses, which may be biased due to memory distortions (Kahneman, 2000). Still, Kahneman, Krueger, Schkade, Schwarz, and Stone (2004) found high correlations between immediate and retrospective measurements. Cognitive SWB may be assessed by means of the five-item *Satisfaction with Life Scale* (SWLS) (Diener et al., 1985; Pavot & Diener, 1993) or a single-item question (Eurobarometer, 2008; World Values Survey, 2005).

At an individual level, both the affective and cognitive components of SWB are partly explained by stable, genetically influenced personality traits (Tkash & Lyubomirsy, 2006). It is estimated that about 50% of the variance in SWB is accounted for in this way (Lyubomirsky, King, & Diener, 2005). Specifically, extraversion and low emotional arousability lead to higher SWB than do introversion and high emotional arousability (Weiss, Bates, & Luciano, 2008).

Other research has demonstrated that SWB depends on life circumstances, explaining about 10% of the variance (Lyubomirsky et al., 2005). People with a higher income have higher SWB (e.g., Clark & Oswald, 1996; Ferrer-i-Carbonell, 2005). SWB usually has a U-shaped relationship to age (Diener & Suh, 1997), being at its lowest when people are around the age of 40, and then gradually increasing. Marriage tends to increase, divorce or death of spouse to decrease SWB (Diener, Suh, Lucas, & Smith, 1999). Education increases SWB, although more strongly in less wealthy countries. Unemployment reduces SWB, in particular if there is little social support (see Argyle, 1999). The results for sex are mixed, some studies showing that women have higher SWB than men, others that there are no differences, and still others that sex differences vary across the life course (Tesch-Römer, Motel-Klingebiel, & Tomasik, 2008).

Previous research also provides evidence for the impact of activity performance on SWB. Pychyl and Little (1998) proposed that SWB significantly depends on progress towards life goals, and that activities organised in projects are instrumental for such progress. Oishi, Diener, Lucas, and Suh (1999) showed that to some extent daily life satisfaction is explained by the types of activities that people perform. Gadermann and Zumbo (2007) found that daily hassles increase negative mood and have a negative impact on SWB. Further support for a negative impact on SWB was provided by van Emmerik and Jawahar (2006) who found that work-related stress associated with time pressure negatively affects current mood both in the