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Measuring soft measures within a stated preference survey: the effect of pollution and traffic stress on mode choice

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Abstract

The objective of this research is to study the extent to which information on pollution and individual stress has on the choice to shift from private car to Park and Ride. A Stated Preference experiment was built where the reduction of CO_2 and stress are attributes of the experimental design. Results showed that the utility to Park and Ride increases with the level of awareness, 2) the more individuals consider receiving information about stress useful, the more they tend to behave sustainably, 3) aspects associated with stress appear to have a greater influence on travel choice than environmental aspects.

1. Introduction

Several actions and measures have been developed in an attempt to mitigate the harmful emissions produced by the transport sector and in particular by road traffic. These mostly refer to vehicle technology (greater efficiency in terms of both consumption and production of polluting emissions), type of fuel (bio-fuel, hydrogen, and electricity), economic tools and institutional controls (pricing policies, incentives, taxes, *etc*.), and information and communication technologies. Although powerful, these measures have not proven sufficient to solve the problem (Schwanen *et al*., 2011).

Thus, in recent years, research has increasingly focused the attention on measures and policies that affect individuals' behaviour and in particular what motivates their decisions. Information provision is the most common

measure used to promote behaviour change (Abrahamse and Matthies, 2012): "A person who has an attitude that suggests that it would be consistent for him or her to use the car less cannot bring about behaviour change if that person does not know how to change" (Ampt, 2003). It has been observed that measures that increase individual awareness can produce enduring changes, as a result of mindful decisions. This forms the basis of the concept of "soft measures", also referred to as "Voluntary Travel Behaviour Change" (VTBC) programmes (Ampt, 2003) or "Smarter Choices" (Cairns *et al*., 2004), *i.e.* programmes aimed at motivating the voluntary reduction of car use. The underpinning assumption is that people ignore what environmental problems their travel behaviour produces, or they are unaware of what they could do to conserve the environment (Schultz, 2002). VTBC programmes thus typically provide information about: a) the negative (mainly environmental) effects of current behaviour and b) how individuals can change their current behaviour to mitigate its negative effects.

Under various names and forms VTBC programmes have been implemented mainly at a personal or community level (such as mass communication), especially in Australia, UK, Japan, Germany, and Austria among others (Ritcher *et al*., 2011). The advantage of using a personalised approach (the so called "Personalised Travel Planning" (PTP)) instead of mass communication lies in the fact that tailored information directed to each single individual cannot be easily disregarded by the car-user (Gärling and Fujii, 2009). Personalisation is the most effective means of reducing or eliminating barriers to obtaining information and of promoting behaviour change (Gärling and Fujii, 2009). The greater the level of customisation of a PTP programme (and the longer the data-collection period), the more effective it will be.

IndiMark (TravelSmart) and Travel Blending are two well-known examples of PTP approaches. Both target individuals and households and are based on providing information on how to travel in a more sustainable way, reducing car use (Bonsall *et al*., 2007). IndiMark is a social marketing approach aimed at improving knowledge of the transport system. It is an "individualised" programme because it addresses individuals, but not quite "customised" (Stopher, 2005) inasmuch as participants are only asked if they are interested in reducing car use and they are then provided with a package of general information. This allows the programme to be implemented on a large scale. In the first TravelSmart implemented in 2000 in South Perth, Australia, more than 15,300 households were contacted and around 6,000 participated. After this, other projects were conducted in various parts of the world including Australia, Sweden, Germany, UK, USA. The Travel Blending approach instead aims to reduce the number of car journeys providing individuals with specific suggestions that consist of a mix or a "blend" of their travel choices based on their activity patterns. Therefore it is an individual customised programme. Since the Travel Blending approach provides quantitative feedback tailored to each individual's trips, the scale is much smaller than in the Travel Smart programmes. The studies carried out in Australia (Rose and Ampt, 2001; Richter *et al*., 2011) with 1,000 households, are the largest. Studies conducted in Japan (Taniguchi *et al*., 2003; Fujii and Taniguchi, 2005) on similar programmes use samples of around 200 households, while those carried out in Nottingham and Leeds are based on a sample of approximately 100 households. Lastly the study conducted in Italy uses a sample of 109 individuals (Sanjust *et al*., 2014).

The kind of information provided in these studies on PTP mostly concerns: travel time, mileage travelled, travel cost, time spent in non-working activities, CO_2 emitted, calories burned. These studies assess the overall effectiveness of the programme comparing the number of trips by car before and after implementation of a soft measure. However, none have analysed actually what information provided is the lever for behaviour change. Nor have they measured the relative importance of the soft measures compared to other improvements in the supply characteristics. Meloni *et al*. (2013) measured the effect of awareness on the increase in calories burned, but they use revealed preference data, where participants were given a personalised travel plan that included (i) information about the transport system, (ii) the recommended travel plan and (iii) a cost/benefits table with the monetary costs and calories burned for the current travel mode (car alone) and for the recommended travel plan (car + light rail). When several kinds of information are provided in a package, as typically happens in VTBC programmes, it is possible to measure the effect of the package as a whole, but not to disentangle the effect of the different information contained therein. Because the cost/benefits were computed for each individual based on the trips indicated, Meloni *et al*. (2013) were able to estimate separately the effect of the two kinds of information provided: monetary costs and calories burned. However, there might a confounding effect between these two measures and the other information provided in the PTP. Also a large sample is needed to estimate the effect of these two measures, because monetary costs and calories burned vary across respondents, but each respondent gets only one value for