

A Latent Variable Model to Capture the Difference Between Tourists' and Residents' Mode Choice in Leisure Trips

ABSTRACT

For many years, socioeconomic factors and the attributes of transport alternatives have been the key elements considered in most models used to support stakeholder planning (Shiftan et al., 2008). However, the decision making process (in our case mode choice behavior) is also influenced by psychological factors such as attitudes, perceptions, motivation to comply that in turn are influenced by the opinions and behaviors of the decision makers' social environment (Van de Bos et al., 2013; Abou- Zeid & Ben-Akiva, 2011; Rose & Hensher, 2004; Brock & Durlauf, 2001; Polydoropoulou et al., 2013; Kamargianni et al., 2014).

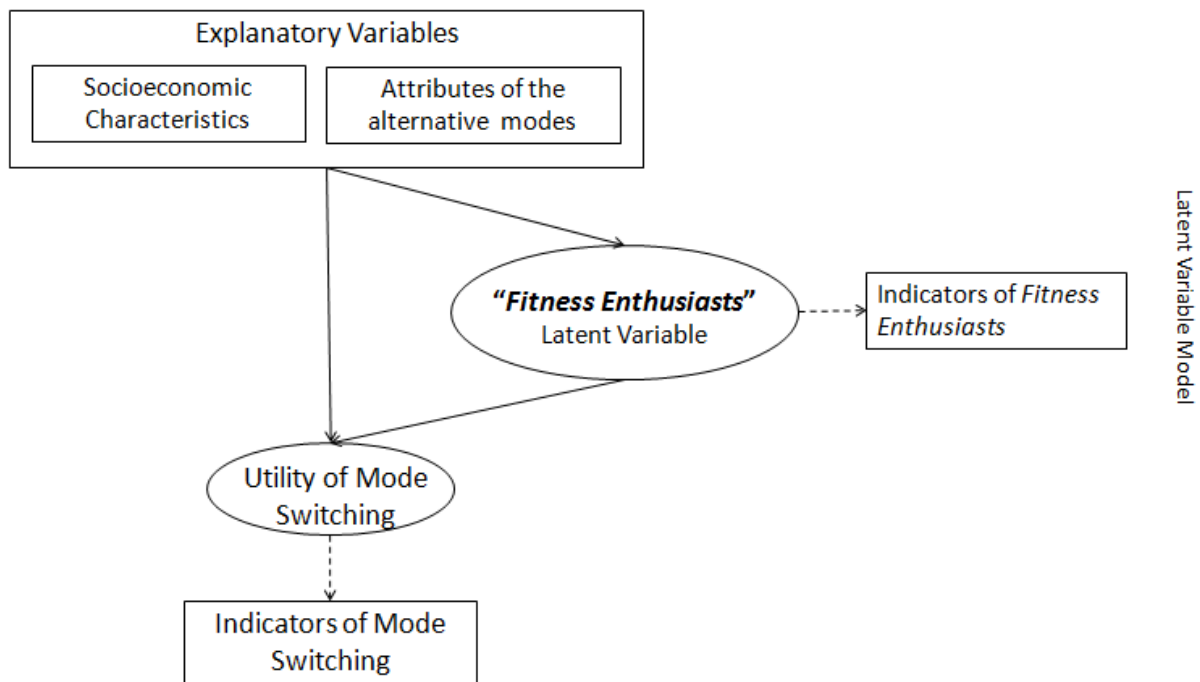
Despite the fact that there are several studies for individuals' mode choice, they focus on work purposed trips and mainly in urban areas. Instead of that, in literature there are not many studies comparing the mode choice of residents and tourists in insular areas regarding their mode choice for leisure trips. The innovation of this research is the investigation of travel behavior in insular areas, as most of the existing research work focuses on urban environments.

This paper aims at investigating the decision making behavior of inhabitants and tourists in insular areas by developing a hybrid choice model where the perception of "fitness enthusiasm" is inserted as a latent variable.

The indicated methodology in this research is Error Component Latent Variable Models and the general model framework is represented by Figure 1.

The framework consists of two components. The measurement model describes the relationship between the indicators and the latent factor, while the structural model explains the psychological factors as a function of personal characteristics and other characteristics, as well as the final choices as a function of the latent variables and the individual characteristics and the attributes of the alternatives. The utility obtained from choosing an alternative mode of transport is a function of: (a) the traveler's socioeconomic characteristics, (b) their attitudes towards fitness, and (c) the attributes of the alternative modes of transport. The attitudes are unobserved and are measured by indicators and the utility is measured by the choice indicator.

FIGURE 1 Modeling Framework



Data collected includes approximately 250 individuals and 200 tourists. For the model estimation we use Stated Preference observations (SP experiments were presented to each participant).

The SP experiments presented to the individuals the weather conditions, the purpose of their trip and asked them to choose the transport mode that they would use for their short and long distance trips (less/more than 1.5km). The experiments have randomly six of the following alternatives: 1. Walking, 2. Bicycle, 3. Electric bike, 4. Bike sharing, 5. Car-sharing, 6. Park & Ride, 7. Autonomous Bus, 8. Use the same mode I use now.

The attributes of the alternatives are travel time, travel cost, walking time from origin to the point where the mode is available and waiting time to hire the mode, and comfort communicated through the existence of sidewalks and bike-paths.

We collected psychometric indicators regarding participants' attitudes towards active transport to construct the latent variable "Fitness Enthusiasm"; indicators regarding the perceived active transport loving behavior of participants.

The indicators of *Fitness Enthusiasm*, presented in Table 1. The respondents were asked to indicate their agreement with a statement on a seven-point Likert scale, where 1 means "completely disagree" and 7 means "completely agree".

TABLE 1 Descriptive Statistics of the Respondents' Attitudes and Perceptions

		Mean	Std. Dev.
<i>IF1</i>	I exercise daily	4.03	1.697
<i>IF2</i>	Walking keeps me fit	4.61	1.658
<i>IF3</i>	I cycle to my daily activities in order to be fit	3.20	1.655
<i>IF4</i>	I use my bicycle to get physical exercise	3.77	1.448
<i>IF5</i>	Exercising is in my lifestyle	3.95	1.556
<i>IF6</i>	I choose longest routes to exercise while commuting	3.55	1.657

The aim of this paper is to identify how fitness enthusiasm variable affect inhabitants' and tourists' mode choice. This paper adds to the investigation of travel behavior in small communities and insular areas, as most of the existing research work focuses on urban environments. The results offer insights for tailored policies focusing on switching modes and promoting environmental friendly transport modes for short distance trips.

REFERENCES

1. Abou-Zeid, M., and M. Ben-Akiva (2011). The Effect of Social Comparisons on Commuter Wellbeing. *Transportation Research Part A: Policy and Practice*, Vol. 45, No. 4, 2011, pp. 345–361.
2. Brock, W., and S. Durlauf (2001). Discrete Choice with Social Interactions. *Review of Economic Studies*, Vol. 68, pp. 235–260.
3. Kamargianni, M., C. Bhat, A. Polydoropoulou and S. Dubey (2014). Investigating the Subjective and Objective Factors Influencing Teenagers' School Travel Mode Choice – An Integrated Choice and Latent Variable Model
4. Polydoropoulou, A., M. Kamargianni, and A. Tsirimpa (2013). Car Use Addiction vs. Ecological Consciousness: Which one Prevails on Mode Choice Behavior? In book: *Travel Behavior Research*.
5. Rose, J.M., and D.A. Hensher (2004). Handling Individual Specific Availability of Alternatives in Stated Choice Experiments. Presented at *7th International Conference on Travel Survey Methods*, Los Suenos.
6. Shiftan, Y., M.L. Outwater, and Y. Zhou (2008). Transit Market Research Using Structural Equation: Modeling and Attitudinal Market Segmentation. *Transport Policy*, Vol. 15, pp. 186–195.

7. Van den Bos, R., W.J. Jolles, and J.R. Homberg (2013). Social Modulation of Decision-Making: A Cross-Species Review. *Frontiers in Human Neuroscience*, Vol. 7, No. 301, pp. 1–16.