Assessing planning decisions by activity type during the scheduling process

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Abstract
Several operational models using the rulebased framework to simulate the underlying process of activity scheduling have been developed. Some of them are SCHEDULER (Golley et al. 1994), ALBATROSS (Arentze et al. 2000) and TASHA (Miller and Roorda 2003). These models are potentially more theoretically satisfying and potentially more policy sensitive than those that simulate the outcome of the aforementioned process. Unfortunately many of the models currently in operation were created using travel survey data, resulting in a need to make assumptions about the underlying activity scheduling process.

TASHA, for example, makes assumptions for various components of activity scheduling, including the following:

-o TASHA assumes a priority-based procedure for generating activities, in which the order of activity types to be inserted into a person’s activity schedule is deterministic (work, school, joint social/recreation/personal business, joint shopping, individual social/recreation/personal business, and finally individual shopping). While there is some empirical basis that this is on average the most likely order in which activities are inserted into the activity schedule (Roorda and Miller, 2005), the assumption of determinism is too strong. The degree of pre-planning and the likelihood of rescheduling of activities of all types are potentially better represented stochastically.

-o Because no data are collected for in-home activities in the underlying travel survey data, TASHA does not attempt to distinguish between in-home activity types, even though there may be significant substitution effects between some types of in-home activities and out-of-home activities that require travel.

-o The frequency of joint activities is assumed to be independent of the frequency of individual activities. These activities could well be subject to substitution effects as well.

Currently, data describing some very specific aspects of the activity scheduling process are available. Following the seminal attempts by Hayes-Roth and Hayes-Roth (1979) using a verbal protocol, Ettema et al. (1994) developed Magic, a computer programme for self completion of activity (re-)scheduling tasks. Doherty and Miller (2000) developed CHASE, a computer-aided self-interview of activity scheduling for households, allowing users to record their scheduling decisions over a multi-day period. Other similar software running on the Internet or on handheld computers, were used by Lee et al. (2000), Lee and McNally (2001) and Rindsf?ser et al. (2003). Ruiz (2005) used the Internet as the only method to collect data on the activity scheduling process. The Toronto Activity Panel Survey (Roorda and Miller, 2004) used several methods to collect activity scheduling data, including CHASE in the first survey wave.

In this paper multivariate probit models are used to explore the existence of different scheduling mechanisms for each activity type underlying the with whom decision, activity location choice, preplanning and rescheduling. Preliminary results show that planning of basic needs activities is more related to household characteristics than the rest of the activity types analyzed. On the other hand, planning of routine/in advance or in the same day basic needs activities, is better explained by variables related to the final schedule characteristics. To explain whether respondents rescheduled the activities before executing them, variables related to the final schedule are more important in recreation/entertainment and social activities than in basic needs activities. To explain whether activities are conducted at-home, both recreation/entertainment and social activities are better explained by final schedule activities.

In large families, household obligations are more likely to be realized with other people and basic needs are more likely to be realized alone. Surprisingly, recreation/entertainment activities are less likely to be realized with others in large families. Basic needs, recreation/entertainment and social related activities are more likely to be realized with others in 2-adult households with children or children+teens. Recreation/entertainment related activities are more likely to be realized with others in 2-adult households with teens.

At present, additional analyses are being carried out using a larger data set with more disaggregated information about activity types. The findings of this research are particularly important as a contribution to improve the TASHA model. The paper will also outline a set of recommended algorithm changes to TASHA to take advantage of the knowledge gained from the analysis of activity scheduling process data.