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Social networks and joint/solo activity–travel behavior

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ABSTRACT

The social dimension of activity–travel behavior has recently received much research attention. This paper aims to make a contribution to this growing literature by investigating individuals' engagements in joint activities and activity companion choices. Using activity–travel diary data collected in Hong Kong in 2010, this study examines the impact of social network attributes on the decisions between solo and joint activities, and for joint activities, the choices of companions. Chi-square difference tests are used to assess the importance of social network variables in explaining joint activity behavior. We find that the inclusion of social network attributes significantly improves the goodness-of-fit of the model with only socioeconomic variables. Specifically, individuals receiving emotional support and social companionship from family members/relatives are found to more likely undertake joint activities with their family members/relatives; the size of personal social networks is found to be a significant determinant of companion choices for joint activities; and activity companions are found to be significant determinants of travel companions. The findings of this study improve the understanding about activity–travel, especially joint activity–travel decisions.

1. Introduction

Individuals' daily activities and travel may be performed independently or jointly with others. Activity–travel analysis and modeling has distinguished solo (or independent) and joint (or shared) activities (Scott and Kanaroglou, 2002; Zhang et al., 2002). It is estimated that more than 50% of individuals' daily out-of-home activities and travel are conducted jointly with others (Srinivasan and Bhat, 2008). The pursuit of joint activities may involve not only household members for activities such as household maintenance but also friends and other non-household members for socializing and recreational activities. The decision-making process for joint activities is quite different from that for solo activities, because conducting activities jointly or traveling together with others needs to comply with the coupling constraints suggested by Hägerstrand in his time geography framework and further specified by Miller (2005) and Neutens et al. (2010) as the necessary space–time conditions of proximity in space and synchronicity in time as well as the accessibilities prescribed by social hierarchies for joint activities. Underlying the joint activities are the interdependencies and linkages between the activity–travel patterns of different individuals. Decisions about undertaking joint activities significantly shape the activity–travel patterns of the individuals involved. Studying joint activities will generate more insight into individuals' daily activity–travel behavior. More importantly, knowledge about joint/solo activities is critical for the accurate evaluation of individuals' responses to transportation policy measures (Gliebe and Koppelman, 2002; Vovsha et al., 2003; Srinivasan and Bhat, 2008). For instance,

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to accurately estimate the effect of policies such as High Occupancy Vehicle lanes or High Occupancy Toll lanes, it is critical to analyze joint activity–travel behavior (Vovsha et al., 2003); changes in individuals' activity–travel behavior in response to transportation policy measures may lead to changes in the activity–travel behavior of others with whom the joint activities are conducted. The secondary impact of policies will not be captured if the joint activity–travel behavior is not considered (Srinivasan and Bhat, 2008).

Much research has been conducted to examine the interactions between household members in time allocation and the tradeoffs between joint and solo (or individual) engagement in activities. Literature on modeling household time allocation to independent and shared activities incorporating intra-household interactions has been established (Zhang et al., 2002, 2004; Wang and Li, 2009). Interactions between household adult members, especially household heads, in the decisions about engagement in solo and joint activities have been explored and modeled in several studies (Golob and McNally, 1997; Scott and Kanaroglou, 2002; Gliebe and Koppelman, 2002). Joint activities with non-household members have also received research attention, especially in recent years (Fujii et al., 1999; Kapur and Bhat, 2007; Srinivasan and Bhat, 2008; Sharmeen and Ettema, 2010). The existing studies have explored the differences between solo and joint activities and the patterns and characteristics of joint activities (Srinivasan and Bhat, 2008). The influence of individuals' socio-economic status on solo/joint activity engagement and choice of activity companions has also been examined (Srinivasan and Bhat, 2008). There are also studies investigating the impact of spatial settings of individuals' home on choices between solo and joint activities (Fan and Khattak, 2009; Sharmeen and Ettema, 2010), as well as the implications of urban form, land use and mobility for participation in social activities and the potential for social interactions (Farber and Páez, 2011; Farber et al., 2013).

However, to the best of our knowledge, hardly any study has analyzed the linkage between individuals' social networks and their engagement in joint activities/travel and their choice of activity/travel companions. As Axhausen (2008) suggests that, instead of exclusively focusing on an individual's socio-demographics, values, lifestyles, and attitudes, one should include personal social networks as an explanatory factor of travel behavior. We assume that individuals' joint activity behavior is likely to be influenced, if not determined by their personal social networks. Social networks have been reported as a significant explanatory variable of social activities and travel (Carrasco and Miller, 2006; Dugundji et al., 2008). It is reasonable to hypothesize that the nature and characteristics of individuals' social networks may significantly influence their solo/joint activity behavior and determine, for example, with whom they conduct what activities, where and for how long, etc. To fill in the gap in the literature and substantiate this hypothesis, this study will explore the role of individuals' social networks in shaping their daily joint activity and travel participation and their choice of companion. Using activity–travel diary data collected in Hong Kong in 2010, this study employs the structure equations model to examine the interrelationships between social network attributes, decisions between solo and joint activities and the choices of companions in the case of joint activities.

The rest of the paper is organized as follows: The next section reviews the studies on joint activities and the choices of activity/travel companions and the studies on the linkages between social networks and activity–travel behavior. Section 3 discusses the motivations for joint activities and presents the conceptual model for this study. Data collection and definitions of variables are also explained. In Section 4, the empirical findings based on modeling results are presented and discussed. Concluding remarks are presented in the final section.

2. Literature review

As mentioned in the previous section, a significant part of our daily activities are performed jointly with others (Srinivasan and Bhat, 2008). While there are a number of studies on modeling household interactions and time allocation (e.g., Zhang et al., 2002, 2004), this literature review focuses on the empirical studies of joint activities, which is a major theme of the present study. Gliebe and Koppelman (2005) examined the influence of household and personal attributes on the household decisions of performing out-of-home activities independently or jointly with household members. Households with one or no workers were found performing more joint activities than those with more workers. Fujii et al. (1999) reported that individuals were more likely to conduct out-of-home activities independently than jointly with family members. They preferred to perform in-home activities jointly with family members. The presence of children was found to be a negative factor for joint activities of household heads (Kostyniuk and Kitamura, 1983; Scott and Kanaroglou, 2002; Gliebe and Koppelman, 2005). However, Scott and Kanaroglou (2002) reported that the presence of children younger than 6 years in one-worker households was a contributing factor to household heads' joint participation in out-of-home activities. Using the American Time Use Survey data, Srinivasan and Bhat (2008) identified the differences between solo and joint activities (with both household and non-household members), explored the characteristics of joint activities and examined the choices of activity/travel companions. The study reported a number of important empirical findings concerning joint activity behavior: (1) joint activities tended to have longer duration than solo activities and were more likely to take place during certain time periods of weekdays; (2) joint activities varied in purpose, type of companions, and day of the week; and (3) the choice of activity/travel companions was determined by the purposes and timing of joint activities as well as individuals' socio-economic status (Srinivasan and Bhat, 2008). Using the same dataset, Kapur and Bhat (2007) employed the multiple discrete–continuous extreme value model and examined the influence of the socio-economic characteristics of households