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## Transportation Research Part A

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# Residential relocation and changes in travel behavior: what is the role of social context change?

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## ABSTRACT

Life events such as residential relocation are considered important triggers of changes in the travel behavior of individuals because they usually result in significant changes to the built and social environments of travel behavior. A number of studies have examined the link between residential relocation and changes in travel behavior focusing on the effects of the changes in built environment. However, very few studies are concerned with the relationship between residential relocation and changes in personal social networks and neighborhood social environments and the effects of these on travel behavior. On the basis of longitudinal panel data from a two-wave household travel diary survey conducted in Beijing from 2011 to 2013, the purpose of this study is to examine to what extent residential relocation will lead to changes in residential social environment and personal social network, which trigger adjustments to travel behavior. A structural equations model is developed to empirically verify the hypothesized link. The findings highlight the importance of changes in social environments and personal social networks for explaining travel changes induced by residential relocation. The present study offers an application of using real panel data to investigate the role of social network and social environment in the relationship between residential relocation and travel behavior change. The study contributes to both the literature on life events and travel behavior and that on social networks and travel behavior.

## 1. Introduction

Individuals' activity-travel patterns are dynamic in both the short run and the long run. It is believed that important life course events such as being married or having a child are the key triggers of changes in individuals' activity-travel behavior in the long term (e.g., Oakil et al., 2014; Prillwitz et al., 2007; Scheiner and Holz-Rau, 2013b; Sharmeen et al., 2014a, 2014b). Residential relocation is regarded as one of the key events in an individual's life course capable of triggering changes in travel behavior (e.g., Oakil et al., 2014; Prillwitz et al., 2007; Scheiner and Holz-Rau, 2013a; Sharmeen et al., 2014a). Understanding the changes in activity-travel behavior induced by residential relocation may provide valuable insights into modeling, predicting, and managing activity and travel demands (Roorda and Ruiz, 2008). How residential relocation induces changes in travel behavior, therefore, has become an area of interest in transportation studies in recent years. Over the last decade, a number of studies have investigated how and to what extent individuals adjust their travel behavior after residential relocation (e.g., Aditjandra et al., 2012; Buchanan and Barnett, 2006; Krizek, 2003; Prillwitz et al., 2007; Scheiner and Holz-Rau, 2013a). These studies have mostly focused on the changes in the built environment (induced by residential relocation) as the triggers of travel behavior adjustments. We argue that residential relocation

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leads to changes in not only residential built environment, but also residential social environment and possibly personal social network, which may also trigger travel behavior adjustments. However, to the best of our knowledge, hardly any study has paid attention to this issue.

For individuals, the space-time constraints and opportunities that profoundly shape their daily activity-travel behavior are defined by not only the physical and institutional contexts, but also the social aspects of their living environment, such as their personal social networks and neighborhood social environments (Farber et al., 2013; Miller, 2005; Neutens et al., 2011; Van Acker et al., 2010). When an individual moves home especially from one neighborhood to a distant another, she/he may find him/herself in a somehow different built environment and social environments. Further, one may gain and/or lose some members in their social networks (e.g., friends/neighbors), and the spatial distribution of social network members may also change (Oishi, 2010; Sharmeen et al., 2014b). The importance of personal social networks and neighborhood social environments in shaping activity-travel behavior has been verified in the literature (e.g., Carrasco and Miller, 2006, 2009; Van den Berg et al., 2013; Wang and Lin, 2013). Hence, it is necessary to explore whether and how residential relocation leads to changes in personal social network and neighborhood social environment and in turn how these changes induce travel behavior adjustments.

The purpose of the present study is to address this research gap in the current literature. Specifically, we make use of a panel data collected in Beijing from 2011 to 2013 to explore the links between residential relocation, changes in social contexts and travel behavior adaptations. We adopt the change-score modeling approach and focus on changes in social environment and travel behavior before and after home move. Changes in socio-demographics and the built environment are controlled. Our results underscore the importance of changes in social environments and personal social networks for explaining the link between residential location and travel behavior adjustment.

The remainder of this paper is organized as follows: In Section 2, we review the relevant literature. In Section 3, we present the conceptual framework underpinning the empirical part of this study and explain the modeling approach. In Section 4, we introduce the data and variables as well as the modeling approach. In Section 5, we present and discuss the empirical results. In the final section, we discuss the contributions and limitations of this research and offer suggestions for future directions.

## 2. Literature review

### 2.1. Residential relocation and travel behavior change

The topic of residential relocation and travel behavior change has become a focus of research interest in recent years (e.g., Aditjandra et al., 2012; Buchanan and Barnett, 2006; Krizek, 2003; Prillwitz et al., 2007; Scheiner and Holz-Rau, 2013a). Generally, activity-travel patterns are assumed relatively habitual and stable when the behavior environments stay unchanged. Residential relocation, which usually leads to changes in the behavior environment, therefore, is believed to have at least the potential to change individuals' activity-travel patterns (Prillwitz et al., 2007). Some recent studies embedded residential relocation in the framework of the life course (e.g. Scheiner and Holz-Rau, 2013b; Sharmeen et al., 2014a, 2014b). A number of studies have examined the ways in which travel behavior changes in response to a change in residential location.

Studies have examined the changes in travel distance and travel time in response to residential relocation. Næss (2005) investigated travel pattern changes associated with residential relocation in Copenhagen. The study reported that the amount of travel (in terms of trip length and frequency) significantly increased for those who moved home further away from the city center. From a mobility biography perspective, Prillwitz et al. (2007) studied the impact of residential relocation on daily commuting distance and found that moving home from a regional core to a non-core area significantly increased daily commuting distance. Buchanan and Barnett (2006) explored how moving to a suburban neighborhood changed individuals' travel distance for different trip purposes and how relocating in such a way affected their modal split in Christchurch, New Zealand. They found that moving to a suburban neighborhood resulted in a substantial increase in travel distance for work/education and shopping and a small increase in travel distance for recreation. There was, however, little change in the travel modal split, which remained heavily dependent on the car. Krizek (2003) investigated the linkage between changes in neighborhood-level urban form and changes in travel behavior for residential movers. The study showed that relocating to neighborhoods with better access to local amenities decreased vehicle miles traveled. In terms of the relocation effects on travel time, Yang (2006) reported that relocating from the central to the suburban districts in Beijing resulted in about 30% increase of commuting time. A study in Sydney by Burnley et al. (1997) reported that most of the individuals who moved from the urban center to the outer suburbs experienced a substantial increase in commuting time and a significant decrease in their contact with friends and relatives. Cervero and Day examined the effects of relocation to the suburbs on commuting behavior in Shanghai, China, and observed a significant increase in both commuting time and commuting cost for individuals who had relocated to the suburbs. However, moving to a residence near a suburban railway station significantly moderated the effects of relocation on both commuting time and commuting cost such that these were both lower for individuals who had relocated near railway stations.

Studies have also investigated the impact of relocating home on mode choice and car ownership (Prillwitz et al., 2006; Yang, 2006; Buchanan and Barnett, 2006). Cao et al. (2007) employed a quasi-longitudinal design to examine the associations between changes in neighborhood built environment and that in driving and walking behavior. They reported that increase in accessibility (to both regional and local amenities) was the most important factor in reducing driving and that enhancements to some qualities of the built environment such as attractiveness, safety, physical activity options and opportunities for socializing might increase walking. Applying a similar research and analytical design, Aditjandra et al. (2012) conducted a study in the UK and found that relocating to neighborhoods with better access to public transport led to less driving and that with better accessibility to regional shopping

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