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The influence of built environment on travel behavior of the elderly in urban China

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ABSTRACT

Along with the aging trend of the world population, the status and determinants of the travel behavior of the elderly have been gaining more attention in planning and research. Most of the existing research has focused on the influence of socio-demographics and built environments, while the impact of socio-cultural backgrounds has attracted less attention. Regarding the influence of built environments, previous studies have mainly focused on general elements such as density, and land use mixture, while specifics about how built environments influence the elderly have largely been ignored. This paper, therefore, attempts to investigate how socio-cultural settings, interacting with built environments, affect the travel behavior of the elderly in urban China. Particularly, we will examine the impacts of a set of built environment attributes on daily activity participation and the travel distance of the elderly in Nanjing. Based on quantitative and qualitative data, we found that special social and cultural contexts make the travel pattern of Chinese elderly and the determinants of that pattern different from those of their western counterparts. Specifically, it was found that public transportation accessibility instead of auto transportation accessibility, vegetable markets instead of supermarkets and convenience stores, open spaces and parks along with chess and card rooms instead of gyms and sports centers are more decisive in affecting the travel behavior of the elderly. These findings offer insights for policy making on distributing appropriate public facilities for the elderly in urban areas, especially in new towns in urban China.

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1. Introduction

The whole world is aging; both the number and proportion of older people is increasing in post-industrial countries and developing nations. It is projected that by 2050, 21 percent of people will be more than 60 years old (WHO, 2002). While health care and the fiscal challenges of the growing aging population have been well recognized and thus have attracted the attention of the public, the transportation implications of aging societies are also far-reaching and have become a topic of growing interest in planning and research (Paez et al., 2007; Schwanen and Páez, 2010; Moniruzzaman et al., 2015).

Given the abundance of work on the travel behavior of the elderly and its determinants, we believe that the current paper makes a threefold contribution to the existing body of knowledge. First, while most of the existing research has focused on the influence of socio-demographics and built environments on the travel behavior of the elderly (Stead, 2001; van Acker

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et al., 2010), the impacts of socio-cultural backgrounds have attracted less attention. Social and cultural norms could exert profound influences on personal and psychological factors, such as lifestyle, habits and values, and therefore result in different personal preferences, attitudes towards transportation modes, special activities and facilities that could influence their behavior (specifically, travel behavior) (Ohnmacht et al., 2009; Scheiner, 2010). However, there is still rather limited empirical research explicitly focusing on how and to what extent the socio-cultural contexts influence the elderly's travel-activity behavior.

Second, while previous studies have mainly focused on the general elements of the built environment, such as density, diverse land use and transportation provisions (Wang and Chai, 2009; Feng et al., 2013), the specificity of the elderly are largely ignored. For example, due to deteriorating physical conditions, the elderly are more inclined to use local facilities and engage in non-work activities because most of them are retired (Schwanen and Páez, 2010). These specificities might cause the travel patterns and needs of the elderly to be quite different from the general population. Obviously, more built environment indicators are needed to ensure that the specific requirements of this large population group are not being ignored when promoting traditional solutions such as providing various facilities using the standard of general population.

Third, existing literature has drawn disproportionately on data from urban areas in western countries (Paez et al., 2007; Cao et al., 2009; Moniruzzaman et al., 2015). As such, very little is known about the mobility of the elderly in the rest of the world, especially in China, where the aging process seems to be occurring much faster than elsewhere (WHO, 2002). Different cultures tend to have different understandings of leisure and leisure behavior, and therefore, people from different cultural backgrounds tend to have different preferences toward leisure activities and facilities. For instance, in a recently published paper, Loukaitou-Sideris et al. (2016) found that there is different perception of park use and preferences for park design among older people of different cultural background (African-American, Hispanic-American, Asian-American). Given the special social and cultural context in China and its development stage, studies of China can provide further and perhaps more complete insights into the travel behavior of the elderly and its determinants. In contrast to the west, for cultural and economic reasons, household structure is also quite different in China in that substantial portions of the elderly population still co-reside with their adult children (Goh, 2009; Feng et al., 2015). A recent survey in Shanghai found that more than 50 percent of children under the age of three are being raised by their grandparents (Goh, 2009). These grandparents generally care for their grandchildren and share some of the household responsibilities, such as daily shopping, cooking and other household chores (Feng et al., 2015). Obviously, the special roles seniors play in co-residence households tend to have profound effects on their mobility patterns and needs for facilities.

In addition, urban China is transforming from a stage in which non-motorized transportation modes were dominant into a stage with massive motorization (Pan et al., 2009). Although car ownership rates and the numbers of people driving have been increasing exponentially in recent years, when entering retirement, most of the elderly still walk, cycle and take public transportation instead of drive. According to Feng et al. (2013) the rate of driver's license ownership for the elderly is only 4% in 2008. In other words, hot topics for western academics and governments, such as driving-related issues including car reliance (Rosenbloom, 2001), safety problems (Paez et al., 2007), and low mobility, due to needing to relinquish a driver's license are not relevant in the Chinese context.

However, the elderly in China may face their own transportation problems. In the last three decades, Chinese cities have undertaken dramatic spatial transformation and expansion, which is known as the regeneration of old city districts and new-town building in the suburban areas. New developments in Chinese cities, however, are generally being built according to the typical modernization of western style: wide roads, supersized city blocks, relatively low density and single land use (Cervero and Day, 2008; Pan et al., 2009). Not only is the general urban form imitating the western model but so are the facility provisions, which typically replace vegetable markets and card/chess rooms with supermarket/convenience stores and gym/sports centers, respectively (CAUPNET, 2014). Do these transformations and developments fit in the Chinese context? Can they meet the needs of Chinese elderly?

We pose the following research questions for this article: what is the travel behavior of the elderly in China? What are the determinants of the travel patterns of the elderly? Specifically, we attempt to investigate how the special socio-cultural settings in China, interacting with socio-demographic attributes and built environments, affect the activity participation and daily distance travelled by the elderly in Nanjing. Quantitative and qualitative data about the travel information of the elderly in Nanjing are used. We answer these research questions in the following five sections. The second section starts with a review of the relevant literature on the status and determinants of the travel behavior of the elderly. Section three presents an overview of the research design. Next, we turn our attention to a descriptive analysis of our dataset. This is followed by a number of regression models in section five. The sixth section discusses the conclusions and policy implications of our analyses.

2. Literature review

Over the last few decades, extensive research has been carried out on the status and determinants of the travel behavior of the elderly from different perspectives. It has been widely acknowledged that although seniors' travel appears to be more mobile and diversified than earlier generations of seniors (Schwanen and Páez, 2010), their mobility levels still lag behind that of younger age cohorts. The elderly tend to participate in fewer activities and travel shorter distances (Moniruzzaman et al., 2015). Regarding determinants of travel behavior, the literature generally discerns two main groups

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