Journal of Transport Geography 59 (2017) 146–155

Contents lists available at ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo

Residential self-selection and travel behaviour: What are the effects of attitudes, reasons for location choice and the built environment?

Dick Ettema *, Roy Nieuwenhuis

Utrecht University, PO Box 80115, 3508 TC Utrecht, The Netherlands

ARTICLE INFO

Article history:
Received 19 April 2016
Received in revised form 30 January 2017
Accepted 30 January 2017
Available online 20 February 2017

ABSTRACT

In studies of the effect of built environment on travel behaviour, residential self-selection is an increasingly important issue. Self-selection implies that households locate in places that provide them with conducive conditions for their preferred way of travelling. In these studies, it is assumed that attitudes toward different travel modes are an important factor in location choice, and that households are unconstrained in choosing their preferred residential location. This paper challenges these assumptions, by distinguishing between the more passive travel attitude and travel considerations as a deliberate reason to locate in a certain place. Based on a survey among 355 recently relocated households in Dutch TOD locations, we find that the association between travel attitude and residential environment is weak, and that the association between travel attitude and travel as a factor in location choice is moderate at best. Multivariate models show that both travel attitude and travel being a reason for location choice influence travel mode use, suggesting that travel attitude is insufficient to fully reflect self-selection processes. In comparison to other travel modes, train travel is most influenced by the fact whether residents deliberately chose to live in an environment conducive to using this mode.

1. Introduction

Over the past decades many studies have investigated how the built environment (BE) influences travel behaviour (e.g. Cervero, 2002; Chen et al., 2008). It is typically found that people living in more urbanised areas more often use bus, tram and subway, due to the closer proximity of origins and destinations to public transport facilities (e.g. Cervero and Kockelman, 1997). In addition, it is found that factors such as density and mixed land use are associated with higher shares of walking and cycling (Faulkner et al., 2009; Saelens and Handy, 2008). An ongoing debate regarding how to interpret such research findings focuses on the phenomenon of residential self-selection (RSS). RSS is commonly defined as the process by which households choose their residential location based on their desired and expected travel behaviour (Boarnet and Sarmiento, 1998; Chatman, 2009; Van Wee, 2009; Cao, 2015). As a consequence, preferences for and attitudes toward travel modes will systematically differ between different geographical settings, and explain at least part of the observed differences in travel behaviour between locations. These attitudes may be related to the use of travel modes, but also to travelling in the first place (Cao and Ettema, 2014; De Vos and Witlox, 2016). This would imply that the built environment effect found in the above mentioned studies cannot be interpreted as a pure built environment effect, and that the effect is therefore overestimated.

An expanding literature has reported methodological and empirical studies of RSS, using various methods of controlling for the systematic variation of travel attitudes between locations (see Bohte et al., 2009; and Mokhtarian and Cao, 2008 for methodological reviews). Handy et al. (2005) found, using a sample from North-California, that attitudes toward travel modes play a dominant role in explaining differences in travel behaviour, implying a RSS effect. Cervero and Duncan (2002) used a nested logit model to simultaneously model location choice and commute mode in the San Francisco Bay Area (USA), and found that both decisions were correlated, implying a self-selection effect. They report that about 40% of the decision whether to commute by rail is explained by residential self-selection. Cao et al. (2006) investigated the influence of neighbourhood characteristics on strolling and pedestrian shopping in Austin (TX), and found that RSS influences walking frequency for both purposes, but that RSS plays a bigger role in explaining pedestrian shopping. In addition, they found that neighbourhood characteristics such as safety and shade influence strolling frequency, whereas availability of walking connections, perception of stores and comfort of walking influenced pedestrian shopping frequency. Cao et al. (2009a) investigated the influence of the built environment on the frequency of non-working car, transit and walking trips. They found that for all modes, built environment characteristics directly influenced trip making, but also via self-selection, as indicated by the significant effect of attitudes toward various travel modes. They report that both the direct effect of BE and the self-selection effect are strongest for walking behaviour, compared to other travel modes. Scheiner (2010) found in a German context, that self-selection

* Corresponding author.
E-mail address: d.f.ettema@uu.nl (D. Ettema).

http://dx.doi.org/10.1016/j.jtrangeo.2017.01.009
0966-6923/

played only a minor role in explaining trip distances, and primarily in the context of shopping. In majority, studies on RSS (see Cao et al. (2009b) for a review of empirical studies) suggest that RSS is at play and explains part of the correlation between built environment and travel, but also that there is an independent effect of built environment, that often outweighs the RSS effect (Naess, 2009).

Recently, increasing attention has been given to heterogeneity in residential location choice and travel preferences. Schwanen and Mokhtarian (2004) were among the first to note that inconsistencies exist between residential location and travel preferences. That is, while urban environments mostly attract residents with a larger preference for public transport (PT) use and active travel and suburban environments mostly attract residents with a larger preference for car use (termed consonants), urban environments will also host residents with a larger preference for car use, and suburban environments will also host residents with a preference for PT use and active travel (termed dissonants). They found that dissonants in urban environments would commute more often by car than consonants, and dissonants in suburban environments would commute less often by car than suburban consonants. More recently, De Vos et al. (2012) replicated this outcome in a study in Flanders (Belgium), and also found differences between consonants and dissonants living in a similar environment in terms of train use, bus/tram use, walking and cycling. Cao (2015) found a similar interaction between attitude toward PT use and living in a suburb. His study indicates that for suburbanites, their attitude toward PT use has a larger influence on PT use than for urbanites. Kamruzzaman et al. (2013) found that TOD residents with a preference for car use where less likely to use PT, whereas people not living in TODs are more likely to use PT if they have a positive attitude toward PT.

The reported interactions between residential location and travel preference imply that households do not necessarily reside in areas that match their travel preferences. One reason is that residential location choice is affected by many other considerations than travel implications (Cao and Chatman, 2016). The literature on residential relocation and housing careers provides overwhelming evidence that a host of other factors influence residential location decisions (e.g. Clark and Huang, 2003; Van Ham and Clark, 2009), including the dwelling characteristics in relation to the household's needs, aesthetics of the dwelling and neighbourhood, neighbourhood safety and social atmosphere. These factors are usually mentioned by movers as being more important than the options offered for travel by specific modes (Naess, 2009; Chatman, 2009). For instance, Lund (2006) describes that of households living in transit oriented developments (TOD) in California, only one third mentions access to public transport as a main reason for residing there, and type and quality of housing, housing cost and quality of the neighbourhood are mentioned much more often as reasons for living in the TOD.

A few studies have investigated the effect of travel being a reason for location choice on travel behaviour. Frank et al. (2007) found that if walkability was a reason for location choice (measured with different indicators), the number of walking trips was higher, both in low and high walkable areas. Kamruzzaman et al. (2015) report that if accessibility of places was a more important reason for location choice, people more often use PT.

Importantly, travel related reasons for location choice cannot be equated to travel preferences (i.e. attitudes toward travel modes) in the context of residential location choice. For instance, someone with a positive attitude toward PT may choose to live in a suburb, because of a strong desire for a large dwelling and a green environment. Also, someone with a positive attitude toward PT may choose to live in a TOD, but mostly because of the quality of the neighbourhood rather than the PT facilities. More generally, for travel attitudes, we can distinguish two situations: the residential location being in line with one's travel attitude (also referred to as consonant, e.g. someone with a positive attitude toward PT living near a railway station) or the residential location not being in line with one's travel attitude (dissonant). Treating 'access to the travel mode being a reason for location choice' also as a binary variable, we can distinguish between four types of outcomes, as illustrated in Table 1.

The question then is, whether the reason for location choice has an independent impact on travel behaviour, in addition to travel related attitudes. If such an independent effect exists, it might have an additional effect next to the travel attitude, if travel was a reason for location choice. Consider two households with a positive attitude toward public transport who move into the same urban area, but one deliberately to live close to public transport facilities, and the other because of the aesthetics and liveliness of the environment. As indicated by Stanbridge and Lyons (2006), the first household will in subsequent stages of the relocation process more actively look for options to actually use public transport and take preparations, probably resulting in a higher use of public transport as compared to the second household. To our knowledge, the only study that combined both attitudes toward travel modes and reasons for residential location choice so far is Naess (2009). He found, among others, that travel related reasons for locating in an area (e.g. whether proximity to public transport stops played a role) had an impact on households' travel behaviour, but that travel attitudes also influenced travel behaviour.

The aim of the present study is to further extend our insight into the process and effects of RSS, by distinguishing between households' attitude toward travel modes and their actual reasons to choose a specific residence. In particular, we will answer the following research questions:

1. To what extent do travel attitudes and travel as a reason for location choice differ: do those with a positive attitude toward a travel mode also have access to that mode as a reason for location choice?
2. To what extent do travel related reasons for location choice and travel attitudes have independent effects on travel behaviour?

These questions will be answered for different travel modes, since we cannot safely assume that RSS based on attitudes toward car, PT and active modes works in the same way. Our analyses take place on data obtained from recent movers into three areas in/near The Hague in The Netherlands, differing in accessibility by various travel modes, who reported their travel attitudes, reasons for moving into their residence and current travel behaviour by various modes.

The paper is organized as follows. Section 2 discusses the data collection and modelling approach. Section 3 presents the results of descriptive analyses, aimed at getting insight into the role of travel attitudes and reasons for relocation across locations. This is followed by the results of Poisson regression analyses, in order to assess the extent and type of self-selection effects for various travel modes. Finally, Section 4 draws general conclusions about travel attitudes and reasons for location choice in relation to residential self-selection, and discusses avenues for further research.

Table 1
Examples of combinations of travel attitude and travel as a reason for location choice.

	Travel is a reason for location choice	Travel is not a reason for location choice
Attitude toward travel mode in line with residential location (consonant)	Someone with a PT preference choosing to live in a TOD because of access to stations	Someone with a PT preference choosing to live in a TOD because of housing quality
Attitude toward travel mode not in line with residential location (dissonant)	Someone with a PT preference living in a car dependent area because of a car dependent work location	Someone with a PT preference living in a car dependent area due to housing market restrictions