Transportation Research Part A 103 (2017) 211–222

Contents lists available at ScienceDirect

Transportation Research Part A

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

A comparison of car driving, public transport and cycling experiences in three European cities

Ruth Woods [a,*], Judith Masthoff [b]

[a] School of Applied Social Studies, Robert Gordon University, Aberdeen AB10 7QG, Scotland, United Kingdom
[b] Department of Computing Science, School of Natural and Computing Sciences, University of Aberdeen, Aberdeen AB24 3FX, Scotland, United Kingdom

ARTICLE INFO

Article history:
Received 1 September 2015
Received in revised form 5 June 2017
Accepted 19 June 2017
Available online 23 June 2017

Keywords:
Cycling
Public transport
Car
Attitude
Satisfaction
City

ABSTRACT

Private car use in large cities causes congestion and pollution, and should be reduced. Previous research has shown that private cars are preferred over public transport, but it is not known whether that preference holds in large cities that attenuate the usual benefits of car travel. The small body of research comparing cycling with car driving has found a preference for cycling, but it is not clear what that preference is based on, nor its generalizability, particularly beyond those who already cycle frequently. The current study, which was undertaken as part of the EU-funded project, SUPERHUB (SUstainable and PERsuasive Human Users moBility in future cities), compares liking and experiences of car driving, public transport and cycling in three European cities: Barcelona, Helsinki and Milan. Cycling was liked significantly more than car driving and public transport, and was rated significantly more positively than or equivalent to cars on many attributes, including flexibility and reliability, indicating an important role for cycling in the reduction of urban car use. Public transport was rated significantly less positively than car driving for some attributes (e.g. flexibility, reliability) but more positively for others (e.g. value for money, safety), demonstrating that in large cities, the usual advantages of car driving over public transport are considerably attenuated. Almost all these findings were replicated across all three cities, suggesting that they can be generalised. Most city dwellers already use more than one mode regularly, which may support mode change campaigns. In particular, a substantial proportion of car driver commuters already enjoyed cycling on a regular basis, suggesting the potential for mode switching, via multimodality to overcome the obstacle of journey distance.

1. Introduction

1.1. The challenge of cars in cities

Cars are a ubiquitous aspect of most contemporary societies, seen by many people as a necessity (Mann and Abraham, 2006), with far reaching implications for our lives, including place of residence, participation in activities, family function and sociability (Featherstone, 2004; Gärling et al., 2002; Jensen, 1999; Sheller, 2004). This extensive use of private vehicles contributes to degradation of the local and global environment in several ways. Motorised transport produces at least one

* Corresponding author.
E-mail addresses: r.woods3@rgu.ac.uk (R. Woods), j.masthoff@abdn.ac.uk (J. Masthoff).

http://dx.doi.org/10.1016/j.tra.2017.06.002
0965-8564/

sixth of global anthropogenic carbon emissions, and also emits other pollutants, such as carbon monoxide and nitrogen oxides, that reduce air quality (Greene and Wegener, 1997). Roads and car parks take up valuable space, and private vehicle use increases noise, congestion and road accidents (Greene and Wegener, 1997).

Most, if not all of these problems are more serious in urban areas (Batterbury, 2003), especially large cities. It is therefore particularly desirable to reduce private vehicle use in cities, by encouraging people to travel by other, less destructive modes: public transport and active travel. Although also relying on motorized vehicles, public transport can alleviate the problems of private vehicle use through its greater efficiency in transporting large numbers of people per vehicle. Active travel such as cycling is perhaps the most desirable of all, producing little or no air or noise pollution, and providing cardiovascular exercise (Pucher and Buehler, 2008) with substantial benefits for long term health (Celis-Morales et al., 2017) and consequent financial benefits in the form of healthcare savings (Jarrett et al., 2012). These modes are also very cheap, making them potentially the most equitable modes of travel in cities (Pucher and Buehler, 2008).

Travel behaviour is based partially on our preferences, attitudes, and perceptions of different modes (Gardner and Abraham, 2008). So in order to reduce car use in cities, we need to understand people's experiences of, and attitudes towards car driving relative to the alternative modes of public transport and active travel. Our understanding should also take gender into account, as in some countries at least, men drive more than women do (Colley and Buliung, 2016). Of course, attitudes towards transport modes are only part of the explanation as to why any particular journey is made by any given mode (see e.g. Nkurunziza et al., 2012; Tin Tin et al., 2010), but they are nevertheless an important component of transport choice (Bamberg et al., 2003).

1.2. Car driving versus public transport

Most people enjoy travelling by car more than by public transport (Mann and Abraham, 2006; Páez and Whalen, 2010; Turcotte, 2005). Travellers find car travel more exciting than public transport (Anable and Gatersleben, 2005; Gatersleben and Uzzell, 2007). Car travel is seen to offer greater privacy, protection, autonomy, freedom and control than public transport (Anable and Gatersleben, 2005; Beirão and Cabral, 2007; Ellaway et al., 2003; Mann and Abraham, 2006; Steg, 2003). Cars are also powerful expressions of personal identity, status, and maturity (Ellaway et al., 2003; Gatersleben, 2007; Mann and Abraham, 2006; Steg, 2003), in a way that is not usually true of public transport. Car travel is often experienced as cheaper (Anable and Gatersleben, 2005), more flexible, convenient and predictable (Anable and Gatersleben, 2005; Beirão and Cabral, 2007; Steg, 2003), and more comfortable (Beirão and Cabral, 2007; Steg, 2003) than public transport. Finally, public transport journeys tend to take longer than equivalent private vehicle journeys, and commuters are generally less satisfied with longer commutes (Turcotte, 2005).

Public transport is sometimes viewed more positively than driving on certain dimensions. It was seen as more environmentally friendly and healthy than car travel in one UK study (Anable and Gatersleben, 2005), and participants in a Portuguese study claimed that public transport was less stressful, more relaxing, cheaper, more sociable and less polluting than car driving (Beirão and Cabral, 2007). The finding that public transport was perceived in this study as cheaper than car driving differs from Anable and Gatersleben's (2005) study in which participants held the opposite opinion. This contrast demonstrates that some grounds for preferring cars can be reversed. Nevertheless, overall, people tend to prefer car driving, a preference that seems to be based on many different journey attributes, making the problem of mode switching look rather intractable.

This preference for car travel held true across all the countries in which the research cited above was conducted: Canada (e.g. Turcotte, 2005), the Netherlands (e.g. Steg, 2003), Portugal (e.g. Beirão and Cabral, 2007) and the UK (e.g. Anable and Gatersleben, 2005). It is not yet known whether it would hold true in other locations, particularly in large cities where the odds are stacked more in favour of public transport, via the provision of extensive public transport networks and/or via limitations on car travel (for instance, congestion, charges, and parking problems). The only comparative research we could find that was conducted in a large city was Beirão and Cabral's (2007) qualitative study of public transport and car users in Porto, Portugal. It is noteworthy that this study did find some advantages for public transport over car travel. It is plausible that in large cities, car driving is not preferred over public transport to the same extent as in other (urban, suburban and rural) settings. By recruiting from three large European cities, the current study offers a unique opportunity to assess the extent to which private vehicles are preferred over public transport in settings which (to varying degrees) motivate public transport travel and penalise private cars.

1.3. Car driving versus cycling

While public transport is generally seen as inferior to car driving, there is intriguing evidence that the opposite is true of cycling. Three Canadian studies found that cyclists enjoyed their commute more than either car drivers or public transport users (Páez and Whalen, 2010; Turcotte, 2005; Willis et al., 2013), although they do not tell us why this is so (Willis et al., 2013). Willis et al. (2013) found that cyclists' satisfaction was not related to built environment characteristics (such as intersection density) or trip characteristics (such as distance and slope). Anable and Gatersleben (2005) found that cyclists in the UK experienced their journey as cheaper, less stressful, and more predictable, environmentally friendly, healthy, freeing and exciting than drivers or public transport users did, and as flexible, convenient and controllable as drivers' (although it is unclear whether pairwise comparisons between modes were statistically significant). In another British study, journeys