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# Changes over time in population level transport satisfaction and mode of travel: A 13 year repeat cross-sectional study, UK

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## ABSTRACT

**Aim:** The aim of the study was to examine changes over time in satisfaction with usual transport mode, explore individual and area level characteristics as mediators in the likelihood of transport satisfaction, and whether any changes in transport satisfaction varied by these factors over time. **Methods:** Adults from West Central Scotland, United Kingdom, who participated at both waves of the repeat cross-sectional ‘Transport, Health and Well-being Study’ conducted in 1997 (n = 2735) and 2010 (n = 2024) were assessed. Individuals completed a detailed postal questionnaire at both time points including self-rated satisfaction with usual transport mode (using a seven point scale subsequently dichotomised to a binary outcome of satisfied (1–2) and other (3–7)). Participants reported usual transport mode for travel to various destinations. A multilevel logistic regression model was used and individuals were nested within areas (c. 4000 population). **Results:** At the 2010 sweep, two thirds (n = 1345) of individuals were satisfied with their transport choice. Those with fair/poor health were less satisfied with their usual transport compared to those in better health (Odds Ratio (OR) 0.49, p < 0.001). Access to a car was associated with overall transport satisfaction (OR 2.63, p < 0.001) and the effect of deprivation on transport satisfaction was mitigated when adjusted by household car access. Transport satisfaction increased more from 1997 to 2010 for retired individuals compared to those in employment (OR 1.40, p = 0.032), and for those who travelled by public transport (OR 2.39, p = 0.005) and using multiple modes (OR 2.19, p < 0.001) compared to those who travelled by car. **Conclusions:** The proportion of those who travelled using public transport, active modes or by multiple mode increased journey satisfaction over time at a greater rate than those who travelled by car, highlighting that continued efforts should be made to promote these more active transport modes which have potential to impact on health.

## 1. Introduction

Transport patterns, in terms of both access to and choice of transport, are structured by social inequality (Rydin et al., 2012), and lack of transport choice can lead to individuals (particularly those on low income) experiencing poor access to goods, services, and the inability to participate in society (Bocarejo and Oviedo, 2012). Knowledge of individuals’ use and experience of transport is important for furthering our understanding of the factors which are important for public health. Current public health strategies are

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aimed at encouraging the population to be more active (World Health Organisation, 2015), and active travel (walking, cycling) are viewed as having potential to reduce levels of obesity (Flint et al., 2016) and better mental health compared to travelling by car (Rissel et al., 2014). However, there is little known of the extent to which satisfaction with transport mode varies for different groups (e.g. gender, age, socio-economic status, employment, area of residence) and how this changes over time. Understanding transport satisfaction can inform national and local policy aimed at providing a sustainable transport infrastructure which can have important national and international benefits for both health and the environment (Cohen et al., 2014; Rydin et al., 2012; Sallis et al., 2016).

Travel mode choice is often dependent on where people live, for example those residing within suburban areas may be more likely to live in areas that they can travel to by car (De Vos et al., 2016). Whereas mixed-use neighbourhoods (i.e. mix of residential, service, commercial etc. uses) have facilities nearby that are easily accessed on foot (De Vos et al., 2016). The availability of transport varies between different community groups, which has implications for health (Mackett, 2014). Individual transportation decisions can also affect health and these decisions are not equal across neighbourhoods (American Public Health Association, 2016), those who experience the least benefit and most disbenefit from transport are often those already socially disadvantaged in many other ways (Cohen et al., 2014). This disadvantage has a historical context where those living in inner city areas that are generally serviced with good public transport infrastructure have suffered by the predominant development of streets for cars, meaning the reduction in safe routes for walking and cycling; this impact has been greatest for the poorest communities who traditionally relied on these free means of transport (Power, 2012). Outside of large urban centres, suburban low cost housing was often hastily constructed with inadequate public transport infrastructure resulting in those without access to a car having poor mobility (Power, 2012).

People may choose to live in an area that suits a lifestyle in terms of travel mode, access to various destinations, and dietary and physical activity preferences (Clark et al., 2010). However, a substantial proportion of people are unable to exercise choice (e.g. public sector housing tenants who are bound by the availability and location of public sector housing) and do not reside in their preferred neighbourhoods, and can therefore face difficulties in travelling by their preferred transport mode, particularly for utilitarian journeys rather than for leisure (Bergstad et al., 2011). Living in a rural or urban area can impact on health and wellbeing (Levasseur et al., 2015), through factors such as differences in transport provision and this can contribute to inequalities that influence health (Mackett, 2014). The built environment (both in urban and suburban neighbourhoods) can impose restrictions on the travel mode choice, often forcing disempowered residents to use a travel mode which is not the preferred one and sometimes older adults will move from rural to urban areas to have better access to services (Levasseur et al., 2015).

People may try to maximise their happiness and satisfaction when making transport mode choice, incorporating remembered experiences from previous decisions when contemplating future decisions (De Vos et al., 2016). Trip satisfaction is affected by both the characteristics of the trip and the individual (St-Louis et al., 2014), and the provision of good public transport is associated with higher levels of use (Dalton et al., 2013). However, it remains to be determined how close one's perception reflects reality, how the modes may differentially affect activity, and how to improve the understanding of the differences (Ding and Gebel, 2012).

It has been suggested that research should better conceptualise walking as an ambient activity; i.e. something enjoyed rather than incidental to everyday life (Whybrow, 2014) and that to encourage walking urban spaces should be constructed so that walking is both achievable and enjoyable (Pooley et al., 2014). For older people socio-economic factors are associated with utility cycling (journeys to work), however there is limited evidence of the role of socio-economic position with active travel (Heesch et al., 2014). The prevalence of active travel can increase for those without a car compared to those who have car access (Pucher et al., 2011); however there have been few studies that have adequately controlled for car ownership when describing transport mode choice. Many studies have used area based summaries of car ownership from national surveys rather than individual level data, particularly for active travel (Panter and Jones, 2010).

In building transport infrastructure which encourages journeys to be completed actively or using public transport infrastructure it is important to firstly understand current satisfaction with transport modes to a range of destinations, which adequately controls for car access, urbanicity, socio-economic and health status, and explore variations in these over time.

The aim of this study was to:

- (1) Examine self-rated satisfaction with transport mode,
- (2) Explore the impact of journey destination, sex, and age, education, car access, urban/rural classification, health and socio-economic status as moderators of the likelihood of transport satisfaction, and;
- (3) Explore whether any changes in transport satisfaction over time varied by these factors.

## 2. Methodology

### 2.1. Study population

The data used were from our 2010 repeat of our 1997 postal survey 'Transport, Housing and Well-being' (THAW) of a random stratified sample of adults in eight local authority areas in the West of Scotland. THAW 2010 was based on THAW 1997, a study designed to examine three objectives, firstly, the statistical associations between long term morbidity and mental health and well-being on the one hand, and housing tenure and car ownership on the other (while controlling for socio-demographic and psychological characteristics); secondly, the role of housing quality, residential environment, and use of cars, in influencing illness and psychological health; and thirdly the meaning of housing tenure and car ownership in people's daily lives (Macintyre et al., 2003). THAW 2010 draws on respondents from the same geographical areas (due to its socially heterogeneous composition) to our 1997 postal survey and uses a very similar postal questionnaire to the previous study. As with our 1997 survey, our random sample of

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