



Commuting and wellbeing in London: The roles of commute mode and local public transport connectivity



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ABSTRACT

Objectives. To explore the relationships between commute mode, neighbourhood public transport connectivity and subjective wellbeing.

Method. The study used data on 3630 commuters in London from wave two of Understanding Society (2010/11). Multivariate linear regressions were used to investigate how commute mode and neighbourhood public transport connectivity were associated with subjective wellbeing for all London commuters and for public transport commuters only. Subjective wellbeing was operationalized in terms of both a positive expression (life satisfaction measured by a global single-item question) and a more negative expression (mental distress measured by the General Health Questionnaire). Logistic regression was also used to explore the predictors of public transport over non-public transport commutes.

Results. After accounting for potentially-confounding area-level and individual-level socioeconomic and commute-related variables, only walking commutes (but not other modes) were associated with significantly higher life satisfaction than car use but not with lower mental distress, compared to driving. While better public transport connectivity was associated with significantly lower mental distress in general, train users with better connectivity had higher levels of mental distress. Moreover, connectivity was unrelated to likelihood of using public transport for commuting. Instead, public transport commutes were more likely amongst younger commuters who made longer distance commutes and had comparatively fewer children and cars within the household.

Conclusion. The findings highlight the heterogeneity of relationships between commute mode, public transport connectivity and subjective wellbeing and have implications for intervention strategies and policies designed to promote commuting behaviour change.

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1. Introduction

A growing literature suggests that the means by which people travel to and from work, that is, their commute mode can significantly affect their health and wellbeing. Active commuting, such as walking and cycling, and even commuting by public transport, as opposed to driving, increases daily physical activity with associated health benefits (National Institute for Health and Care Excellence, 2012; Flint et al., 2014; Laverty et al., 2013; Pucher et al., 2010; Stathopoulou et al., 2006; Wanner et al., 2012). It has also been proposed that non-car commuting may be associated with higher self-reported, or subjective, wellbeing (Humphreys et al., 2013; Martin et al., 2014; St-Louis et al., 2014), operationalised as both higher life satisfaction (Stutzer and

Frey, 2008) and lower mental distress, e.g., fewer symptoms of depression and anxiety (Roberts et al., 2011). The benefits of subjective wellbeing are increasingly recognised by governments worldwide (Office of National Statistics, 2013), not least because psychological ill-health places a large burden on health and social care (Roberts et al., 2011). Thus, improving our understanding of how commuting relates to subjective wellbeing offers important insights into reducing the burden of disease and ill-being among commuters.

Several questions remain unanswered. First, previous studies tended to collapse different transport modes (e.g., bus and train; walking and cycling) into over-arching categories (i.e., public transport and active transport, respectively; Flint et al., 2014; Martin et al., 2014). However, there may be important differences in commuter experiences of these different travel modes. Second, few have investigated the effects of public transport infrastructure quality near one's residence, i.e., the level of 'neighbourhood connectivity' (Chng et al., 2015). Connectivity may simultaneously affect: a) public transport use; and b) public transport commuter wellbeing. For example, while we might expect people to

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use public transport more often if available, some studies suggest that people may be unaware of transport options (Beirão and Cabral, 2007). No previous studies of the relationship between connectivity and wellbeing among public transport users were found.

Finally, the limited studies that considered relationships between commute mode and wellbeing focused on whether certain modes are associated with either: a) positive wellbeing (e.g., life satisfaction; Stutzer and Frey, 2008), or b) (reduced) mental distress (e.g., symptoms of anxiety and depression; Humphreys et al., 2013; Martin et al., 2014; Roberts et al., 2011), and tended to assume that one is the inverse of the other. However, research in positive psychology suggests that, although related, these measures should be considered separately (Kahneman and Krueger, 2006; Seligman, 2002). For example, research examining relationships between wellbeing and urban green space found that controlling for one facet of wellbeing (life satisfaction) did not eliminate the effects of green space on the other (mental distress) or vice versa, suggesting that urban green space may act to improve wellbeing both by decreasing negative symptoms and promoting positive outcomes through different mechanisms (White et al., 2013). A richer understanding of the relationship between commute mode and wellbeing may be gained by considering both aspects, e.g., cycling to work might promote wellbeing by encouraging positive emotions (which are known to be associated with physical activity in general; Stathopoulou et al., 2006) and/or by reducing mental distress, e.g., anxiety associated with traffic jams.

1.1. The present study

This study explores these issues using cross-sectional data from the Understanding Society panel survey (also known as the UK Household Longitudinal Study, UKHLS). In particular, we focused on a sub-sample of participants residing within Greater London and commuted to work. This sub-sample was chosen because London's public transport infrastructure, relative to the rest of UK, is well developed and accessible, and neighbourhood-level public transport connectivity data (Transport for London, 2010) could be merged with existing individual-level data. We investigated four key questions: 1) Are subjective wellbeing relationships with commute mode homogenous within mode categories (e.g., are all public transport modes associated with similar wellbeing results)?; 2) Are commute mode relationships with wellbeing the same for positive and negative wellbeing measures – or independent?; 3) Are individuals living in neighbourhoods with good connectivity more likely to use public transport to get to work?; 4) Is wellbeing higher among public transport users with good connectivity?

Our analyses controlled for a range of sociodemographic factors known to be associated with wellbeing (Dolan et al., 2008) and relevant observable commute-related factors, such as number of cars in the household and commute distance, which are also important in the present context.

2. Methods

2.1. Data source and sample

The sample was drawn from wave 2 (2010/11; $n = 54,597$) of the UKHLS (University of Essex, Institute for Social and Economic Research and National Centre for Social Research, 2013), a longitudinal panel survey of 40,000 UK households that began in 2009. Participants are surveyed annually on their socioeconomic circumstances, attitudes, and behaviour via a computer-assisted personal interview. Detailed study and sampling methodology information is reported elsewhere (Lynn, 2011). The commuting module in wave 2 explores commute behaviour. Participants were categorised as commuters if they were in employment and worked somewhere other than at home.

The samples used for analyses were commuters in London ($n = 3630$) who provided data for one or both of the main dependent

measures (life satisfaction, $n = 2704$; General Health Questionnaire, $n = 2694$). The appropriate UKHLS cross-sectional weight was applied to improve the sample's population representativeness, thus sample sizes reported are weighted respondent samples rounded to integer values.

2.2. Measures

Positive wellbeing was measured using the single-item global life satisfaction question “How dissatisfied or satisfied are you with your life overall?”, with responses ranging from “not satisfied at all” (1) to “completely satisfied” (7). Mental distress was measured using the 12-item General Health Questionnaire (GHQ), a widely used and validated instrument in patient and general populations (Goldberg et al., 1997; Goldberg and Williams, 1991), on a 36-point Likert scale with increasing levels of distress.

Commute mode was assessed using responses to the question “How do you usually get to your place of work?” Responses were categorised as either a) car/van (the reference category in subsequent analyses); public transportation b) train; c) bus/coach; d) underground; and active transport e) walking, and f) cycling. The remaining travel mode observations (car/van passengers [1.91% of total observations], taxi [0.98%], motorcycle [0.11%] and combination of modes [1.07%]) were excluded due to small sample sizes. A binary public transport variable (reference category [ref] = non-public transport) was also derived for further analysis.

Connectivity was operationalised using the London-based ‘Public Transport Accessibility Level’ (PTAL) dataset (Transport for London, 2013), which measures public transport network density in small geographical areas, after accounting for walking access time, service availability and reliability (Transport for London, 2010). The PTAL is categorised into 6 levels from 1 (very poor or low accessibility) to 6 (excellent or high accessibility). Further information is available elsewhere (Transport for London, 2010). For current purposes, in part due to relatively small sample sizes, we collapsed the 6-point scale into a binary variable reflecting either i) ‘Poor’ connectivity (i.e., Level 1 [very poor] to Level 3 [moderate]); or ii) ‘Good’ connectivity (i.e., Level 4 [good] to Level 6 [excellent]). This data is specified at the geographical unit of a Lower Layer Super Output Area (LSOA). There are 4835 LSOAs in London with an average population of 1720 (2012 data). As UKHLS provides individual-level LSOA data (with special licence access), we were able to assign specific LSOA PTAL values to specific individuals to reflect their neighbourhood's connectivity. Subsequent analyses used ‘Poor’ connectivity as the reference category.

To account for potentially observable confounding variables, covariates included in the fully adjusted models were age, sex (ref = male), presence of work-limiting illness or disability (ref = no illness), monthly household income (quintiles equalized using the Organisation for Economic Co-operation and Development modified scale indexed to March 2012, ref = lowest quintile), educational attainment (high school qualifications, degree or above, ref = no qualifications), London congestion zone location (derived by identifying LSOAs that are located within the 2007–2011 boundary that includes the Western extension; ref = outside congestion zone), month of interview, commute distance, number of cars in the household, and the urban density (number of people per km²), indices of deprivation (income, employment, education, crime rate and environment) and percentage of green space of the LSOA in which they lived.

2.3. Statistical analysis

Previous research suggests it makes little difference whether wellbeing variables are treated as linear or ordinal data (Ferrer-i-Carbonell and Frijters, 2004), so the current analyses operationalised life satisfaction and GHQ as continuous variables.

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