Travel Behaviour and Society 6 (2017) 19–31

Contents lists available at ScienceDirect

Travel Behaviour and Society

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

Gross polluters for food shopping travel: An activity-based typology

Giulio Mattioli *, Jillian Anable

Institute for Transport Studies, University of Leeds, 1-3 Lifton Place, Leeds LS2 9JT, UK

ARTICLE INFO

Article history:
Received 13 August 2015
Received in revised form 29 April 2016
Accepted 30 April 2016

Keywords:
Food shopping
Emissions distribution
Social practices
Travel behaviour
Sustainable transport
Urban form

ABSTRACT

To address the failure of sustainable transport policies to bring about significant change, researchers have proposed to 'tame the few', targeting the minority sectors of the population responsible for a disproportionate amount of emissions. At the same time, activity- and practice-based approaches are increasingly proposed as the way forward for transport and energy research. In this article, we develop an approach inspired by both developments, by focusing on the car- and carbon-intensive food shopping practices of the 20% of households with the longest car travel distance as recorded in the National Travel Survey of Great Britain (NTS 2002-2010) for this activity. We present a four-cluster typology of gross polluters, highlighting the crucial role of frequency and the existence of a small but growing group of low-income, older households with 'Shopping intensive' travel patterns. These results suggest that, while the households with the worst climate impact have a distinct socio-demographic profile, broader sections of the population are recruited into gross polluting patterns of food shopping travel. Also, while built environment policies remain key, significantly reducing transport emissions in this area requires a broader approach, taking into account the relationships between food shopping and eating practices.

1. Introduction

With transport the only sector where greenhouse gas (GHG) emissions have increased since 1990 in the EU-27 (EC, 2012), there is clearly a chronic gap between goals and accomplishments in the field of sustainable transport policy. According to Gössling and Cohen (2014), this is mainly explained by the existence of strong 'transport taboos' – i.e. "fundamental, yet ignored (...) barriers to the implementation of significant (climate) policy in transportation" (p. 198). One of these 'taboos' is the unequal contribution of different sectors of the population to transport externalities.

As Gössling and Cohen argue, "a minor share of highly mobile travellers, mostly from higher income classes, are responsible for a significant share of the overall distances travelled, as well as emissions associated with this transport" (2014, p. 199). A growing number of academic studies has highlighted the very skewed distribution of transport GHG emissions (e.g. Aamaas et al., 2013; Brand and Preston, 2010; Brand et al., 2013; Büchs and Schnepf, 2013; Gough et al., 2011; Preston et al., 2013). On this basis, researchers have argued that, for reasons of fairness and efficiency, 'gross polluters' should be targeted by tailored policy measures (Brand and Boardman, 2008; Chatterton et al., 2015; Mattioli, 2016). However, policy makers have so far steered clear of targeting high mobility patterns with specific policy measures (Gössling and Cohen, 2014). So, while the skewed distribution of transport GHG emissions could be construed as an opportunity to take advantage of, it is currently remarkably absent from the transport policy agenda. This in turn is a barrier to the achievement of sustainable transport.

While the research evidence on the skewed distribution of transport emissions is robust and conclusive, most studies so far have focused on overall travel, with only limited analysis disaggregated by travel purpose. This is in contrast with a shift in transport and energy research towards studies that focus on specific activities or practices. In transport research, the case has been made for activity-based approaches to travel analysis (Pinjari and Bhat, 2011) and for the close investigation of travel purposes other than commuting (e.g. shopping, leisure, etc.), which account for large travel distances (Anable, 2002, 2005; Schlich et al., 2004). Similarly, in the broader energy research field, there is increasing attention for the end uses of energy (Day et al., 2016; Knoeri et al., 2015; Shove and Walker, 2014). So far, however, such studies have not given much attention to patterns of energy consumption at the higher end of the spectrum of carbon emissions.

In this article, we fill this gap by focusing on a specific activity responsible for a substantial amount of car travel (food shopping) and, at the same time, on the 20% of households responsible for most of it. Based on travel survey data for Great Britain (NTS

* Corresponding author at: Room 113, Institute for Transport Studies, University of Leeds, 1-3 Lifton Place, LS2 9JT Leeds, UK.
E-mail addresses: g.mattioli@leeds.ac.uk, giulio.mattioli@gmail.com (G. Mattioli).

http://dx.doi.org/10.1016/j.tbs.2016.04.002
2214-367X/

2002-2010 dataset), we investigate patterns of weekly food shopping travel among these households, describing them in terms of frequency, concentration, distance and use of alternative modes. The underlying research question is: which patterns of food shopping travel by car are responsible for most of resulting carbon emissions?

The article is structured as follows. In Section 2, previous studies on transport emissions distribution are reviewed, along with activity- and practice-based approaches in transport and energy research. The case for focusing on food shopping is also made, and previous research findings in this area are summarised. Section 3 introduces the approach, data and methods used. The findings in Section 4 are discussed in Section 5, and implications for transport policy are drawn (Section 6).

2. Background

2.1. Transport emissions distribution

There is now substantial evidence on the social variation of GHG emissions both in general (Baiocchi et al., 2010; Büchs and Schnepf, 2013; Druckman and Jackson, 2008; Girod and de Haan, 2009; Gough et al., 2011; Preston et al., 2013) and specifically for transport (Aamaas et al., 2013; Brand and Boardman, 2008; Brand and Preston, 2010; Brand et al., 2013), from which the following conclusions can be drawn.

First, the distribution is highly unequal, with gross polluters responsible for a disproportionate share of total emissions, and this is even more pronounced for transport emissions. Brand and Preston (2010), based on a study of transport emissions in Oxfordshire (UK), find a '60-20 rule', "surprisingly similar across units and scales of analysis" (p. 9), whereby 60% of emissions are produced by 20% of the population. Second, car and air travel account for an overwhelming share of passenger transport emissions, while local public transport is insignificant overall.

Third, while income is the dominant explanatory factor of varying levels of overall emissions (and the association is even stronger for transport), other factors are significantly related with transport emissions. The most recent and comprehensive study for Britain (Büchs and Schnepf, 2013) finds that household size is positively associated with household transport emissions but negatively correlated with *per capita* emissions, indicating economies of scale. Households with children and male headed households also have higher emissions. Age has a curvilinear relationship with emissions, with highest values in the working age band, and indeed emissions increase with employment. Other studies have found a positive association with car ownership, while the association with urbanisation is negative (for daily travel). Given the strong link between travel distances and emissions, the relationships mirror those with travel distances (Holz-Rau et al., 2014).

Finally, despite these associations, the investigated determinants typically account for only a relatively small share of the observed variation, i.e. there is high variation within socio-demographic groups, and notably within high emission and high income groups. Conversely, there are pockets of high emissions among low income groups. Therefore, Brand and Boardman have highlighted the need for "alternative or complementary segmentation methods" (2008, p. 236).

Studies in this area are driven by concerns for the distributional implications of carbon reduction policies, typically concluding that a carbon tax would be regressive, although less so for transport emissions (given the steeper income gradient). Therefore, Brand and Boardman (2008) argue for a "taming of the few" approach whereby "(transport) policy needs to target the gross polluters (...) to seek out these differences, identify the causes and target these causes directly" (p. 234).

One shortcoming of this literature is that it generally focuses on total transport emissions, with little insight for the activities that are travelled to. To the best of our knowledge, the only exception is the study by Brand et al. (2013), which estimates CO_2 emissions from motorised passenger travel for different travel purposes, based on a non-representative survey in the UK. Relevant to this study, the authors find that "travel for shopping or personal business" produces an important share of emissions (19%), but these are more equally distributed among the population than other travel purposes, and harder to predict based on socio-demographic and built environment variables. Overall, then, there is only limited evidence on the activity patterns underlying high levels of transport emissions. This is in contrast with an increasing importance of activity- and practice-based approaches in transport and energy research.

2.2. Activity and practice-based approaches

While traditionally transport research has studied travel behaviour with little regard to the activities it is embedded in, some approaches acknowledge that travel is a derived demand, i.e. that in order to understand travel, it is necessary to understand individual and household activity participation. Activity-based approaches to travel analysis and modelling (Bhat and Koppelman, 1999; Buliung and Kanaroglou, 2007; Kitamura, 1988; Malayath and Verma, 2013; McNally and Rindt, 2008; Pendyala and Goulias, 2002; Pinjari and Bhat, 2011) attempt to "better understand the behavioural basis for individual decisions regarding participation in activities in certain places at given times", aiming to include "all the factors that influence the how, where and why of performed activities" (Bhat and Koppelman, 1999, p.119). To date, several studies into travel for shopping have adopted an activity-based approach (e.g. Bhat et al., 2004; Jiao et al., 2011; Krizek, 2003; Schmöcker et al., 2008).

In the energy research field, acknowledgement that technological innovation alone is insufficient (Anable et al., 2012) and dissatisfaction with cognitivist approaches to behaviour change (Shove, 2010) have led to increasing interest for detailed accounts of 'what people do'. Shove and Walker (2014) make a compelling case for "reinstating fundamental questions about what energy is for in research and policy" (p. 16), by considering energy as an ingredient in the reproduction of *social practices*. Shove et al. (2012) define practices as "routinized types of behaviour" (Reckwitz, 2002, p. 249) consisting of three kinds of elements – materials, competences and meanings – that are integrated when practices are performed. At the same time, practices shape each other and might connect to form 'complexes' of practices that "depend upon each other (...) in terms of sequence, synchronisation, proximity or necessary coexistence" (Shove et al., 2012, p. 87). For example, the evolution of eating practices is strongly linked to the dynamics of tv watching, food preservation and freezing (p. 87–94) and arguably food shopping. Also, practices compete with each other for the finite resource of time (p. 127), and there is indeed some evidence that energy-intensive but time-saving practices (such as pre-prepared meals) are increasingly common in contemporary 'time-squeezed' societies (Jalas, 2005; Shove, 2003; Warde et al., 2007). Indeed, sustainable practices scholars have recently proposed a research agenda focused on temporality, bringing to the fore questions of rhythm and frequency of energy-consuming practices (Walker, 2014).

While there have been calls to introduce a social practice approach in transport research (Cairns et al., 2014; Mattioli et al., in press; Watson, 2012), most studies so far have focused on driving, cycling and car sharing as practices per se (Kent and Dowling, 2013; Shove et al., 2012; Watson, 2012). However, transport is a derived demand, i.e. a certain amount of mobility is integral to