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Carbon reduction and travel behaviour: discourses, disputes and contradictions in governance

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Abstract
Prospects for mitigating climate change require decarbonisation of the energy sector over relatively short time periods, coupled with significant changes to the way we consume energy. This is particularly true in the transport sector given the current levels of transport related greenhouse gas emissions, the heavy dependence on fossil fuels, and the uncertainty surrounding transition pathways to ultra-low carbon vehicles. There are policy responses aiming to reduce carbon emissions by changing travel behaviour, but prominent approaches share a common theme of seeking to change behaviour by focusing on the individual and their choices. These are the object of critics who maintain that effective change requires collective action at social, economic and cultural levels.

This paper questions whether decision-makers are relying on these choice-based approaches to change travel behaviour and, if so, how effective they expect them to be. We address this through analysis of over 50 interviews with policy stakeholders in England and Scotland. We find dominant policy approaches do focus on individual choices, but significantly it is not because decision–makers have faith in their effectiveness. These approaches persist in policy on carbon reduction for two reasons. One is appeal to a politically powerful, but incoherent, discourse of individualism. The second is that decision-makers do not want significant behavioural change. There is an imperative of economic growth and a firm belief that a strong economy is linked to higher traffic levels, and that to reduce the demand for travel is to risk economic damage. We argue that these beliefs about the relation between travel demand and prosperity are narrowly defined and contestable for empirical and normative reasons. If there is to be a significant change in the approach to intervening in travel demand there is an urgency to engage in the politics of behaviour change – a meta-level behaviour change challenge.

Keywords: Carbon; economy; philosophy; behaviour change; choice

1. Introduction

There is political recognition of the scale of carbon reduction necessary to mitigate dangerous climate change. The International Energy Agency estimate that transport is responsible for over 22% of global CO_2 emissions (IEA 2013, p. 71). The picture is similar in the UK with road transport creating 25% of CO_2 emissions in each of the years 2007, 2008 and 2009 (DECC 2011b, Table 4). In developed countries the transport sector has to contribute significantly to carbon reduction if the ambitious future targets are to be met. The scale of the challenge requires a 'sophisticated mix' of technological and behavioural adaptation (see IEA 2012; Rajan

2006; Schwanen et al. 2012). Despite agreement on this broad principle, the practical implications of such statements remain elusive. In particular, underlying approaches, responsibility, timing, and intensiveness of behavioural adaptation are all open to debate. The predominant approach in the UK, as with most developing countries, is on a shift of the vehicle fleet to electric or hydrogen fuelled vehicles where the energy is provided by renewables (DECC 2011a; EC 2011; see also Barbour and Deakin, 2012; Deakin, 2011). Yet there remain substantial uncertainties surrounding the development and adoption of viable low carbon technologies (Lyons, 2011; Geels 2012; Schwanen et al. 2012). Beyond these uncertainties, technological developments alone appear insufficient for the scale of carbon reduction required, and there is recognition that behaviour change will also be required. For instance the UK Government's technical advisory committee on climate change suggests a need for a 5% reduction in car travel by 2020 even if all anticipated technological advances are delivered (CCC, 2012, p. 185).

While carbon reduction through travel behaviour change is a feature in transport policy and debate, there is doubt about the effectiveness of some of the prominent measures adopted to prompt behaviour change (for instance, Bonsall, 2009). Some policy measures based on social psychology have been challenged for focusing on individual choices since it is claimed that effective change requires action at more fundamental social, economic and cultural levels (see Shove, 2010). Since they also focus on choice, this charge can also be levelled at other measures which draw on classical and behavioural economics. The focus on individual choice is by no means a universal approach within measures on behaviour change. A range of alternatives, both theoretical and applied, have aimed to change aspects of the fundamental economic, social or cultural conditions which frame individuals' travel possibilities and practices. This can be seen in some of the approaches using urban planning to reduce the need for travel by motor vehicle. An example of this is California's measures to reduce carbon which aim to implement smart planning, seeking among other things, to plan housing developments which avoid sprawl (Barbour and Deakin, 2012; Deakin, 2011). To be effective, such planning approaches need to reconsider the social and economic arrangements which influence planning and development, and consequently frame the conditions in which people act.

This paper addresses two broad questions raised by debate and criticism of measures which focus on choice-based approaches. First is the question of whether there are jurisdictions within which such measures dominate attempts to reduce carbon by travel behaviour change. Second, if these measures are dominant, then what are the decision-makers' reasons for this? It might be supposed that such reasons would fall into one of two categories. One category involves confidence that choice-based measures are effective. This could be because decision-makers are unaware of arguments to the contrary, or because they find reasons to reject those arguments - for instance, by appealing to cases such as the Sustainable Travel Towns Initiative in England, where, as we discus below, choice-based approaches enjoyed a degree of success (Sloman et al., 2010,). The other category involves doubt about effectiveness of measures, but would involve ideas that choice-based measures are desirable for other reasons, which could be normative ideas about what constitutes legitimate attempts to influence behaviour, or might be reasons of political expediency, or might be some other reason. The value of understanding decision-makers' rationales lies in its contribution to knowledge of factors relevant in determining what policy approaches are used. It is important to understand the way in which policies and policy change is framed in order to be able to develop alternative policy formulations with a chance of challenging the current framing (Tennøy, 2010).

In Section 2 we set out the theoretical groundwork for our argument. We first describe prominent approaches to behaviour change drawn from classical economics and some aspects of social psychology, and more recently from behavioural economics (see Avineri, 2012; Brekke and Johansson-Stenman, 2008; Gowdy, 2008; Metcalfe and Dolan, 2012). We show how these

approaches share a common focus on seeking change at the level of individual choice. We go on to describe a contrary set of arguments which maintain effective behaviour change requires focus on social practices and their causes rather than at the level of individual decisions (for instance Geels, 2012; Schwanen et al., 2012; Shove, 2010). In Section 3 we introduce the data on which the analysis is built. This involved documentary analysis and in-depth interviews with fifty nine practitioners, policy-makers (including some councillors and politicians), advisors and campaigners concerned with carbon reduction and transport at European, UK, English and Scottish national and local level. The interview findings, presented in Section 4, show a range of measures aimed at promoting behaviour change which will lower transport emissions. However these measures do share a common feature of a focus on individual choice. To this extent our findings reflect much of the wider theoretical analysis of policy on behaviour change. However, our study moves beyond existing critical arguments by revealing how actors are aware that their low expectations are a result of the choice-based approaches adopted. We find that despite this awareness they appear unable or unwilling to adopt a more effective strategy. This inability might result in part from a politically attractive but arguably incoherent 'choice' discourse. However, it is clear the greater barrier to effective action on carbon reduction results from prevalent beliefs about the relationship between travel demand and economic development. In Section 5 we use our analysis first to identify an inconsistent rhetoric of choice underpinning measures on travel behaviour, and second to argue that the dominant economic imperative and underlying mindset lead to the rejection of anything other than marginal changes in behaviour and this dominates the governance of measures to promote behaviour change.

2. Conceptualising approaches to travel behaviour change

Measures and policies aimed at promoting behaviour change draw on a range of theoretical conceptions drawn from economics, psychology, political theory and moral philosophy. The following discussion sets out the significant distinction that can be made between approaches which focus on change at the level of individual choice, and those which maintain that effective change requires a focus on wider social and structural context and practices.

2.1 Influencing choice

Measures drawing on economics and aspects of social psychology emphasise bringing about change by influencing individuals' choices. However as the following discussion shows, the disciplines, and measures derived from them, adopt quite different assumptions about effective means of achieving this influence.

Classical economic theory maintains that price incentives will tend to make certain choices more attractive. As Avineri (2012) explains, applied to transport, classical economics treats individuals as rational and self-interested and that this has been interpreted as the view that, if their interest lies in making a journey, then it is assumed they will decide how to travel according to the cost and time involved in different options.[1] Further, if their interest is in travelling this will be because of 'the value of the activity at the destination' rather than 'activity that people wish to undertake for its own sake' (Banister 2008, p. 73). Consequently, it is assumed that a policy aim of changing people's travel can be achieved by changing the timing, cost and quality of options available such that there is an incentive to shift to those options

[1] While this interpretation remains widely used in transport modeling, it is increasingly contested (see for instance Vij et al., 2013).

favoured by the policy. In other words, this approach attempts to influence people's choices. It is worth noting that there are long established, and sometimes contested concerns that economic dis/incentives sufficient to prompt substantial behaviour change would be politically or publicly unacceptable (Altshuler, 1969). Further, there are increasingly challenges to ideas that transport behaviour is adequately explained by these ideas drawn from classical economics. As we show in what follows, challenges are brought by explanations appealing to aspects of disciplines including behavioural economics, social psychology, practice theory, and pragmatic philosophy.

Behavioural economics - popularly described as 'nudge' (Thaler and Sunstein; 2008), uses assertions based on empirical studies to challenge the framing of self-interested, rational actors in classical economics (e.g. Avineri, 2012; Brekke and Johansson-Stenman,2008; Gowdy, 2008; Oliver, 2012). Behavioural economics suggests people's preferences and choices can be influenced by identification with a social norm (Avineri 2012; Brekke and Johansson-Stenman 2008; Metcalfe and Dolan 2012; Oliver 2010). This suggests appeals to social and environmental benefits of low carbon transport might be a means of promoting change. Further some behavioural economists point to evidence that 'monetary incentives can be a deterrent to cooperative behavior' (Gowdy, 2008, p. 635) raising questions of whether there are circumstances in which it would be counter-productive to use price to encourage low carbon travel. A further potentially relevant finding is that people are loss averse so 'perceive losses to loom larger than gains' (Oliver, 2012, p. 652). Finally, the impact of measures designed to facilitate behaviour change could be affected by behavioural economists' claims that people are influenced by what is called a 'framing effect' so behaviour can vary 'according to how a particular choice is presented' (Gowdy, 2008, p. 635). What is significant here is that while compared to ideas based in classical economics, those drawn from behavioural economics appeal to some quite different influences on choices, behavioural economics still conceives behaviour change as an issue of changing individuals' choices.

Methods drawn from aspects of social psychology are held to underpin many measures intended to change travel behaviour (Avineri, 2012; Geels, 2012; Schwanen et al., 2012; Shove, 2010). Shove argues that despite some variance, theories in social psychology share characteristics that:

> 'social change is thought to depend upon values and attitudes…, which are believed to drive the kinds of behaviour…that individuals choose… to adopt' (2010, p. 1274).

Social psychology differs from classical economics by maintaining that preferences and subsequent behaviour, rather than being a function of self-interested and (a particular sort of rational) decision-making, are shaped by beliefs or values and attitudes (Anable, 2005; Avineri, 2012 p. 513; Shove, 2010). Shove adds that for some conceptions, the conditions in which choices are made also carry an explanatory force (2010). Interventions designed to prompt change may focus not just on changing attitudes or values but also on altering the range of options available and the ease with which different options can be adopted. To the extent that an approach to behaviour change does involve this focus on conditions, it moves away from the emphasis on choice under discussion here, and instead falls more into the approaches under discussion in the next subsection. However for those approaches which primarily focus on appealing to, or attempting to alter, beliefs or attitudes to prompt behaviour change, then again the focus of the approach is at the level of individual choice.

2.2 The relevance of society and social practice: criticisms of policy focusing on choice

Despite their differences, approaches based in classical and behavioural economics, along with some based in social psychology, share an overarching approach of explaining and seeking to influence behaviour by focusing on the level of individual decision-making and choice. This focus on choice is a target of a body of contemporary criticism which emphasises how humans and their decisions are grounded in, and influenced by, the social context in which they live, and which has roots in a philosophical tradition dating at least from Aristotle (Nicomachean Ethics, 1999). Among contemporary criticisms is Shove's argument for the need to change social practices rather than individual actions, and to give attention to how institutions are 'involved in structuring possible courses of action an in making some very much more likely than others' (2010, p. 1280). For Shove, attempting to encourage people to change the way that they travel by focusing on each individual's choices is likely to be ineffective as it does not challenge the systems and processes giving rise to social practices of (perhaps increasingly) unsustainable travel. Socio-technical transition theory also identifies the importance of 'multidimensional interactions between industry, technology, markets, policy, culture and civil society' in creating sustainable or unsustainable ways of living (Geels 2012, p. 471). Schwanen et al. (2012) draw on the work of Félix Ravaisson and the pragmatist philosopher John Dewey to develop objections to the emphasis on promoting sustainable travel behaviour by seeking to directly influence individual choice. Schwanen et al. argue that rather than adopt one or other method of appealing directly to people's deliberate decisions in order to change behaviour, measures should instead seek to attempt to influence people's habits. One rationale for this is based in Dewey's argument that a person's 'habits are ontologically primordial to reflective thought and emotions' (Schwanen et al. 2012, p. 526), and that habit is 'the basis for morality and ethics' (2012, p. 527). Further they describe how for Dewey, a person's habits 'are more-than-individual and emerge from the relations between person and environment' and are influenced - although not determined - by 'customs or institutions – collective habits held by wider social groups' (2012, p. 526), and that 'conflicts between habits [are] a key source of social change' (*ibid*). As with arguments by Geels and Shove, Schwanen et al. maintain that their account of habit supports a shift in approaches to change which include:

> 'changes to the material infrastructures for alternative means of transport and to the built environment and separation of origins and destinations but much more is to be done. For one, the cultural meanings and affective atmospheres associated with cars need to be reconfigured, and popular connotations of cars with freedom, power, control need to be challenged.' (Schwanen et al. 2012, p. 528)

Were critics of choice-based policy to claim that choice or individual rational decision-making are redundant or illusory concepts then they might be making a large target of their arguments. So it is worth clarifying that such arguments in this tradition tend not to involve such claims, instead treating choice and decision-making as something which is influenced, but not fully determined, by context and circumstance. Arguments in this tradition maintain that there is justification in interventions which change the conditions influencing individual choices. However they need not deny any role for individual decision-making.

Our purpose in making these distinctions is not to suggest that these propositions or world views cannot co-exist to some degree. However, they put a very significant and material distinction on what is necessary to facilitate effective and non-marginal change, as the policy analysis suggests is necessary.

3. Methodology and Data

This paper emerges from a broader study of the governance of carbon emissions from transport in Great Britain (Marsden et al., 2013; Marsden et al. 2014). The wider study aims to understand relationships between approaches to carbon reduction from transport taken by different actors and the underlying governance structures in different parts of the UK. The UK is an interesting setting for such a study as it has adopted a Climate Change Act 2008 (and a separate Climate Change (Scotland) Act 2009) which requires that 'the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline' (s1). In pursuing this target the Act requires that a series of five year carbon budgets are set by government taking account of advice from the independent advisory body, the Committee on Climate Change. The wider study has been structured through the use of multi-level governance as an analytic framework for identifying key state and non-state actors operating with different remits at different spatial scales (Bache and Flinders, 2004).

Fifty one semi structured interviews, involving fifty nine practitioners, policy-makers (including some councillors and politicians), advisors and campaigners working at EU and national levels in England and Scotland and in four city regions across the two countries (Leeds, Manchester, Edinburgh and Glasgow). Table 1 provides a description of the spatial governance scale and nature of the interviewees. The interviews were conducted in 2011 and 2012.

Table 1: Interviewee description

	Description of interviewees
European level	Two environment officers; one politician; one environmental NGO
UK	One advisory body; one transport infrastructure organisation; two private sector transport providers; five with NGO actors
England	Two national government officers, one transport infrastructure organisation
Scotland	Two current/former governmental actors - one a politician and one a civil servant; one local authority; three with governmental agencies for transport and business; two private sector transport providers; one industry networking body; one NGO.
Edinburgh City Region	Regional Transport officer; Edinburgh City Council; one private sector transport provider; one NGO.
Glasgow City Region	Regional Transport officer; Glasgow City Council; sustainability partnership; Chamber of Commerce.
Leeds City Region	Passenger Transport Executive; Leeds City Council officers, one NGO.
Manchester City Region	Transport for Greater Manchester; Manchester City Council, Stockport Council; Chamber of Commerce; private sector transport provider; an NGO.

The interviews sought to explore how the transport system was making progress towards the targets and within this therefore there were opportunities to understand the extent to which behaviour change was foregrounded relative to other instruments and how it was described. The interview analysis has been guided by the following questions:

(1) What types of measures are being used to change transport behaviour in order to reduce emissions?

(2) What expectations do those implementing them have for these measures?

(3) How are measures on carbon reduction from transport influenced by other factors, including other policies, priorities and political contexts?

(4) What are the practitioners' rationales and justifications for these measures?

4. Results: description and analysis of approaches to carbon reduction in transport

The data indicates adoption of a range of approaches to reducing carbon in transport. In this section we begin with a descriptive account of these approaches, grouped according to (non-mutually exclusive) themes of low carbon technologies, and encouraging behavioural shifts to more sustainable travel, and economic incentives. We follow this with an analysis drawing on the theoretical approaches discussed in Section 2.

4.1 Description of approaches to behaviour change

4.1.1. Low carbon technology and behaviour

National government plans express confidence that the major source of carbon reduction from transport will come from development and uptake of low carbon technologies and resources. This includes plans for more widespread use of biofuels, and implementation of existing technology such as electrification of rail (e.g. DECC, 2011a). It also involves ambitions for future technological development of low carbon vehicles, and policy moves ostensibly intended to support such development. So the Carbon Plan 2011 (DECC 2011a) describes how government will seek to support markets for low carbon technologies and their development, and Low Carbon Scotland (Scottish Government 2011) describes the ambition for 2020 of a 'mature market for low carbon cars' and 'an electric vehicle charging infrastructure in place in Scottish cities' (s 6.3). This optimism is so significant that national government anticipates zero emissions from all cars and vans to occur just prior to 2041 (DECC, 2011a, Chart 16). As might be expected, local and regional transport plans are more focussed on how to support the uptake of low carbon vehicles through local infrastructure (for instance GMCA and TfGM 2011; WYLTP, 2011). Adoption of low carbon technologies is also prominent among public and private sector organisations responsible for infrastructure and transport provision. In a reflection of other literature in this area (e.g. Lyons, 2011) it became apparent that a significant motivation for looking to technological development and its adoption was the idea that in this way carbon reduction can be achieved with minimal interference to the range of choices available to people and without upsetting current practices of mobility[2]. This view was explicit in comments by national actors. For other national and local policy makers, a similar view was expressed in ideas that technology, and especially low emission vehicles, offer prospects of a straightforward or relatively painless form of behaviour change. This view at local and regional level echoes that expressed by national government. Yet curiously it sits alongside an acute awareness, articulated by actors from all backgrounds, of uncertainty on the effectiveness of technological developments, on the direction that development will take, and the prospects for providing infrastructure capable of supporting low carbon vehicles.

4.1.2 Economic incentives

Several interviewees described how economic incentives historically have encouraged, and continue to encourage, increasing travel demand and especially use of private cars. Curiously,

[2] We note that what amounts to a major systemic technological change has a surprisingly silent behaviour change narrative around it.

while increasing cost of driving was widely believed to be effective in encouraging some shift away from private vehicle use, it is not necessarily assumed that this is because people make judgements which directly follow relative costs of driving. Notably there was a view that while driving remained relatively inexpensive compared to use of public transport, this was not widely understood by drivers. In a reflection of debate in literature (cf. Altshuler, 1969), actors discussed, in an apparently speculative or conversational way, stringent price incentives as an effective mechanism for substantially reducing use of polluting vehicles, at the same time noting their unacceptability. This can be seen in comments by a transport authority officer:

> 'we looked at is the impact of increased parking charges in the city centre, again there was a lot of wariness there about what the public reaction would be to that sort of thing, so then you do the modelling you look at the impacts you establish you can reduce emissions, but then in discussion and looking at the political facts it's decided well maybe we shouldn't go down that particular road'

4.1.3 Encouraging sustainable transport

Across public, private and third sector organisations there is advocacy and implementation of measures to increase public transport use, walking and cycling, and behaviour such as eco-driving and car sharing. Local and regional transport planning gives weight to measures intended to increase capacity and viability of public transport including plans for major public transport projects (such as Manchester tram extensions (GMCA and TfGM, 2011)) and for interventions within existing regulatory frameworks, designed to tackle some of the apparent barriers to public transport use, such as tackling high fares or lack of services serving certain areas (e.g. GMCA and TfGM, 2011; Scottish Government, 2011; WYITA, 2012). While these measures are consistent with, and expected to support, carbon reduction, many are also central to plans to use transport to support economic growth, and especially employment growth, by improving capacity of the transport network and the ease by which people can travel to work (DECC 2011a; GMCA and TfGM, 2011; WYLTP, 2011). As we discuss below, there is a sense in which carbon benefits arising from this investment are secondary.

Plans for supporting shifts to active travel include large interventions, such as relocation of a station to improve pedestrian accessibility, road improvements to support cyclists' safety and perceptions of safety, and also cycle training, or car sharing. Although infrastructure measures are included in this mix, it is measures designed to promote 'smarter choices' which feature most. There is recognition that concerted actions can have significant impact. A notable example is the Sustainable Travel Towns' initiative which 'aimed to show what effect could be achieved from a sustained package of smarter choice measures, complemented by improvements to infrastructure' and provided individuals a range of measures, including workplace, school and personal travel planning, with information and marketing about public transport and walking, information and training for cycling, travel awareness and car clubs (Sloman et al. 2010, pp. 5-7). This had been a project in a few small towns, and there was some discussion of prospects for scaling the initiative up. Significantly actors expressed doubts about the viability of the initiative for larger cities, partly because these schemes take relatively large volumes of staff time which is especially problematic in the current context of a reduced overall financial envelope for cities.

There was some confidence that adopted measures produce some change, but crucially an absence of consideration of whether the measures would contribute to the degree needed to meet required carbon reduction. Some targets and indicators exist, for instance the Scottish Government Report on Policies and Proposals 2011 had proposals (but not firm plans) for 10% of journeys to be made by bicycle, and for 'personalised travel planning advice provided to all households' by 2020 (s 6.3), and the WYLTP (2011) includes targets 'to keep the total number of car trips at current (2011) levels,' and to increase the proportion of trips made by sustainable

modes from 36% to 42%' (pp. 98-99). Yet, as one interviewee explained, the problem is that while ambitious targets exist, the means of achieving them do not. For some actors, the difficulty, cost, and uncertainty surrounding measurement of carbon reduction was offered as a reason for explaining modest action on change.

Moreover interviewees indicated that the measures they have adopted on sustainable transport are unlikely to be sufficiently effective. This reticence was expressed in a variety of ways, from unwillingness to directly consider the question among a minority of interviewees, to overt doubt among a greater number from across the sectors involved. In addition to expressing doubt, actors identified obstacles to more effective change. One reason is the perceived difficulty in scaling up intensive targeted programmes noted above. The further, and major reason, is a clear priority for economic development, especially for employment growth. This was cited as a reason for a shift away from attention on carbon, and further as an explanation of why there was not even an expectation that measures to reduce carbon would be sufficiently effective. The clear understanding is of an expectation in local and national government that measures on reducing carbon, have to be consistent with policies that support economic growth. This is illustrated by comments made in relation to an English funding stream 'Local Sustainable Transport Fund', for which, according to one NGO actor, it is 'the economy aspect that tend[s] to predominate in Ministerial decisions.' There are measures considered to compliment carbon reduction and economic development (e.g. new public transport infrastructure discussed above). Yet there is little indication that planning such measures involves consideration of whether they will bring substantial carbon reduction, and carbon again is secondary to economic considerations.

Measures which might increase sustainable travel are overshadowed by the further and more overt manifestation of the tension between economic and carbon considerations. With the increasing priority of economic growth over carbon reduction there is a trend away from measures on modal shift for carbon reduction, and towards measures liable to sustain or even increase private vehicular use. The Westminster Government is identified as encouraging this trend, with planning reforms considered likely to increase carbon emissions from transport. The Scottish Government too have relegated much of their former ambition for encouraging mode shift, emphasising instead hopes for development of low carbon vehicles and (Compare Scottish Government, 2011 and 2013; also CCC, 2013). Within England there is tacit acknowledgement that infrastructure spending at a local level will not necessarily be consistent with the current carbon reduction goals. For instance, the West Yorkshire Local Transport Plan (WYLTP, 2011) targets on carbon and mode shift sit at best uneasily with the objectives of the West Yorkshire Transport Fund (the strategic infrastructure delivery plan) which has a 'primary objective is to maximise an increase in employment and productivity growth' and intends only to 'deliver an overall net reduction in transport CO_2 emissions' (WYITA 2011, sec. 2.7).

4.2 Analysis

Among policy-makers and advisors, and public and private sector actors, it is unsurprising that the study found a focus on ambitions to reduce carbon through technological developments. As we have seen, this reflects the emphasis found in policy debate. Nevertheless many interviewees accepted either a need to change travel behaviour to adequately reduce emissions, or that it is important to change behaviour. Yet in many cases this acceptance dissipated, when considering the idea of significantly changing travel behaviour through demand management.

Measures designed to support or promote behavioural adaptation as a means of reducing carbon tend to have an aim of persuading people to make some different choices (smarter choices), by providing information and publicity about benefits and about how to use different

forms of transport, or by changing some travel conditions (e.g. adding cycle lanes, improving public transport), or by small economic incentives (e.g. discounted parking charges for low emission vehicles). Some of these measures, most notably those involving cost, are consistent with classical economic theory. There is more ambiguity about the theoretical basis, if any, of other measures. Measures involving provision of information and publicity may be intended to influence people's attitudes and beliefs about the viability and benefits of changing travel practices (especially when information is coupled with improvements in service or infrastructure) in line with aspects of social psychology. There is less indication that ideas from behavioural economics are reflected in these measures. While the term 'nudge' is applied, it is used loosely - for instance in relation to planned improvements to public transport and walking and cycling infrastructure creating conditions intended to 'nudge' people to change travel choices (GMCA and TfGM 2011, p. 59). As such it does not obviously denote measures designed to take account of the framing of reasoning and decision-making ascribed to people by behavioural economics.

A more pronounced consistency with the theoretical conceptions appears in the way that the measures designed to create changes in travel behaviour focus on individual decision-making and choice. That is, the adopted measures have in common an appeal to people to switch from travelling by relatively polluting modes to using less polluting ones or even to forgoing certain journeys and replacing them with other arrangements (e.g. online meetings, working at home). So in each case the measures aim to encourage people to make fairly straightforward replacements for journeys, rather than measures aiming to tackle, broader patterns of high travel demand or the reasons for these patterns.

Two primary reasons were given to explain the limited acceptability of measures expected to encourage more significant shifts to sustainable travel behaviour. To see this consider first, as outlined above, that where influencing choice would be effective (e.g. stringent price mechanisms to prompt reduction in use of polluting vehicles) it is held to be politically difficult and economically unacceptable. Second, the acceptable measures are ones which expand, or make 'smarter' but do not inhibit individual 'choice' – with the hope that, given broader choices, individuals will choose those that are more sustainable. This is most visible in relation to development of low carbon vehicles, whether as private vehicles or public transport, which is favoured for its perceived potential to reduce carbon without reducing people's travel. Yet it is also apparent in attempts to encourage or persuade people to make different 'smarter' choices, in particular by replacing less sustainable modes with more sustainable modes or alternatives to a given journey. This was described by an actor from a non-governmental transport organisation as an aim of providing:

> 'an environment where people have the choice to make the best choice of transport.'

Again the obstacle to more effective change was said to be concern that this would be at odds with the priority for economic growth:

> 'looking at it purely from a climate change point of view ideally everyone should live close by where they work and walk there or at worst cycle. But that's not realistic. And in fact for a lot of types of economic activity over the last ten years and looking into the future people are travelling longer distances than they ever did.' (member of City Region Transport Authority)

This is coupled with the recent moves seen in the devolved transport funding in England, to emphasise schemes which might be anticipated to increase traffic growth on the basis that these schemes will support economic development. The picture, therefore, is one in which decision-makers believe that shaping conditions and circumstances which form the possibilities available

to people and so influence their behaviours. Far from placing faith in choice-based approaches to travel behaviour change, decision-makers tacitly accept the counter-argument that the focus on choice will have limited impact on behaviour. It is just that the behaviours that decision-makers would like to promote tend towards increased travel as this is believed to have a causal connection with economic development. This is illustrated by two comments from the actors:

> Local decision-makers are 'very keen to see transport interventions, as, as a key to economic growth in the area. Again, that's very focused on economic growth, rather than a reduction in carbon (member of City Region Transport Authority)
>
> 'I'm not saying every time you build a road our investment flows, but it usually does. It usually does.' (former politician)

5. Discussion

We have suggested that in this English and Scottish case study decision-makers accept the argument that choice-based approaches will lack effectiveness in reducing carbon, and that substantial change requires changing the conditions and circumstance which shape possible behaviours. The question is whether the low expectations for choice-based approaches give support to a recommendation that policy attention should shift from 'choice-based approaches' to measures designed to influence the contexts in which people make decisions?

One factor determining the answer to this concerns the defensibility of a shift from choice-based approaches. Advocates of choice-based approaches might attempt to appeal to well established normative positions. Some utilitarians maintain that greatest overall good will be achieved if people are able to express their preferences through their individual choices (e.g. Singer, 1993). However, the justification for these arguments depends on their producing the greatest good (i.e. justification depends on consequences). So it would count against such arguments *if* they fail to produce a satisfactory outcome because they are unable to prompt required changes. If maximising overall good requires effectively reducing carbon emissions (to mitigate the worst effects of climate change), and focus on individual travel choice is an ineffective way of achieving this, then utilitarians should seek a different focus. A different type of normative justification for 'choice' is that this is a means of respecting autonomy, and so it should be preserved even if it prevents beneficial change (what Berlin called 'negative liberty' (1969)). Yet while this might motivate some decision-makers, it cannot be consistently adopted. In transport, as perhaps in other areas, the claim that 'choice' should be protected and expanded is difficult to sustain as a coherent rather than a rhetorical argument, since some types of choices (physically) constrain those available to others (and so arguably prevent even 'negative liberty'). Policy choices that promote a more car dependent culture produce conditions which restrict or remove the possibility of choosing other travel modes, and can affect other choices, such as choice over land use and maintaining good health (for instance, Appleyard 1981; Mullen, 2012; Pooley et al., 2013; Schwanen et al., 2012, p. 523). If the reason for limited action on carbon reduction is an aim to protect 'choice' then it is only in the sense that one set of choices is being privileged. Arguably any transport system restricts some choices, but that is a case against a choice-based approach per se rather than a justification for an arbitrary application of that approach. Consequently the normative force of autonomy does not provide a plausible justification for the favoured approaches to behavioural change. This does not mean, of course, that decision-makers might not, perhaps unconvincingly, claim this justification.

However we can see from the discussion above that our data also indicates a further and quite different rationale for the protection of one set of choices over others. This argument stems:

(i) From the political priority given to economic development and perceptions of the relationship between travel demand and growth. The policy logic is simple: over a long period, as the economy has grown so has travel demand, ergo, measures that reduce travel demand may also constrain economic growth.

(ii) The recognition that effective change requires moving beyond a focus on choice, and conversely that, focusing on 'choice' is a safe way of creating only marginal change where that is what is desired. So measures on sustainability are introduced that shift journeys from one mode to another do not stymie activity and therefore can be seen to be consistent with growth theory, particularly where they free up congested roads. At the margins, measures such as trip chaining and working from home reduce demand but these are currently small enough to be 'noise in the data', offset for example by population growth. Simultaneously there is a pressure to change the context in which individuals make travel choices by creating conditions likely to increase travel demand.

However, moving beyond this to a substantial change in sustainable behaviour and reduction in trips made would require a new conceptualisation of the role of transport in supporting economic growth. Even if, for the sake of argument, we accept the priority of economic development as it is currently measured and understood (through Gross Domestic Product or Gross Value Added), it remains the case that evidence on the connection between transport and economic development is uncertain (Banister, 2012). Further we can note that the Stern review of the economics of climate change maintained that the cost of action would indeed have a dampening effect on economic growth (Stern, 2007). The cost of inaction is anticipated to be higher. However Stern's argument was not apparently guiding perceptions or motivating actions of decision-makers. Moreover the priority of the dominant approach to economic development is widely contested in arguments which maintain this approach poorly represents social, environmental and distributional factors vital to human well-being (for instance, Jackson 2009; Victor 2008; Wilkinson and Pickett, 2010). While these arguments still have limited traction in policy, they nevertheless present further challenges to the idea that attempts to reduce carbon from transport should be constrained in the pursuit of a narrow conception of economic development.

6. Concluding Comments

This study confirms previous, more theoretically driven arguments that the policy emphasis on behaviour change tends to focus on promoting 'smarter' choice through promoting action largely at the level of the individual. Our aim has not been to quantify the changes which might be delivered through such policies. Rather we have aimed to identify decision-makers own expectations and rationales, and in this we have found that they are sceptical about the ability of current approaches to behaviour change to deliver real reductions in emissions rather than slowing the rate at which things get worse. So it is not that decision-makers do not recognise the limitations of the individual choice approach or deny the potential of an approach which focuses on changes to broader governance structures, materials, infrastructures and practices. Indeed, promoting new infrastructure to change conditions is a well accepted approach but not one which will typically reduce the need or demand to travel. Recent events have reinforced, through macro-economic policies, the perceived importance of stimulus spending on the capital asset base to support growth. More infrastructure is expected to generate more travel which is seen as a sign of a strong economy and a stimulant to job creation. Set against such a policy narrative, measures which might effectively reduce carbon emissions because they reduce absolute levels of travel demand are, in many circumstances, believed to risk slowing economic growth. In such formulations the importance of economic externalities seem to evaporate and

the reasons why demand reduction policies would be damaging are largely absent. It is difficult to see this narrative changing until there is an evidence base developed which shows the merits of a truly integrated approach to reworking the travel practices in our cities.

To date, there has been a strong tradition of debate about the technical tools that can be brought to bear on behaviour change. It is inevitable that these will remain contested given the different theoretical traditions they emerge from. Whilst it seems apparent that an integrated approach is necessary to deliver behaviour change which encompasses contextual and operational interventions in land-use, prices, incentives, legislation and the meanings surrounding travel, this remains elusive in reality. Contextual conditions are rarely changed significantly and the individual choice narrative dominates. This paper has shown that actually, the limitations of choice-based approaches are already understood by decision-makers. If there is to be a significant change in the approach to intervening in travel demand there is an urgency to engage in the politics of behaviour change. This is critical, to what is and is not allowed to make the list of options that are available for consideration. The challenge of 'behaviour change' extends therefore beyond the design of interventions to the policy logics, structures and incentives of decision-makers – a meta-level behaviour change challenge.

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