

Freedom of movement and fairness

Transforming transport planning for social and environmental justice

A think-piece for Friends of the Earth's Big Ideas Project by Dr Caroline Mullen, DEMAND Centre and Institute for Transport Studies, University of Leeds

Overview

Mobility and movement of resources is life sustaining and enhancing. Yet transport and mobility systems in countries across the world present a complex tangle of freedoms, benefits, health problems, physical dangers and restrictions. This think-piece argues that we should reframe thinking about transport so that equality - recognition that each and every person matters - becomes the starting point. Transport planning would then aim to ensure that each person can obtain the benefits of mobility, and to minimise social and health inequalities caused by transport. These premises would help us reconcile what can seem to be conflicting social and environmental goals. Practically this would mean treating transport as a matter of social and environmental justice, and thus making it a priority to ensure that people can move freely on foot, bicycle, and wheelchair, coupled with comprehensive, accessible public transport operated as a public good. This approach contrasts starkly with existing mobility systems that prioritise motor traffic and aviation. These existing systems create huge problems for human wellbeing, ironically restricting freedom for many people to move around safely and to participate in society, while damaging economic welfare, and causing serious harm to other species and the natural environment. Reframing transport as a justice issue also challenges existing political discourses and assessment tools, which have tended to encourage systems with heavy reliance on motorised transport and aviation, and which act as a barrier to a just transport system. The think-piece explores how a move to a just mobility system can draw broad political and public support by promoting multiple social, economic and individual interests. It outlines new methods of assessment and public participation in decision-making which could support a transition toward a more just transport system.

For more than 40 years we've seen that the wellbeing of people and planet go hand in hand – and it's been the inspiration for our campaigns. Together with thousands of people like you we've secured safer food and water, defended wildlife and natural habitats, championed the move to clean energy and acted to keep our climate stable. Be a Friend of the Earth – see things differently.

Introduction

Why should we move to thinking about mobility and transport decisions as matters of justice? We can usefully begin to explain by reflecting on the real implications for lives - ranging from capacity for basic survival, to personal development and participation in social, economic, political, and cultural practices and activities – that arise from abilities and freedoms for people and resources to move around, and across countries. This reflection sets a context for considering problems associated with transport as it tells us something about why people and society might tolerate the many challenges associated with transport, from social, economic and political problems to physical issues of collisions, pollution, energy and land take. It also hints at how different transport and mobility systems facilitate and sometimes prevent different types of activity and participation.

Values of transport and mobility

Mobility is integrated so closely into everyday life that we can forget much of the scale of its value. At its basic level, transport is needed for securing, distributing and providing essential goods and services. Yet it is also apparent that there is no fixed relationship here: societies can seek to provide and distribute basic resources in different ways and so it is not surprising that there is no single simple way to identify exactly what transport would be needed for raw survival. The nature and complexity of the transport needed depends in part on social, geographical and economic organisation. One simple example is the freight logistics involved in providing cities and towns with food, clothing, building materials and other goods. We can compare societal arrangements involving more local production of goods with those that are less localised, and think about how there would be different volumes and travel distances associated with each. Relatedly, transport is a necessary condition for participating in most, if not all, education and employment. Even people who do not travel to and within their work, will in almost every case rely for their work on transport bringing them goods and services (from raw materials to computers). Travel to, and for work, is often considered at a societal and political level with planners focusing, and frequently disagreeing, on how the transport system can manage commuting and business travel in a way that best supports economic development and growth (Bannister 2012; Mullen and Marsden 2015). From the perspective of workers and students, opportunity, welfare, and quality of life can rely on availability and affordability of travel. This might be summarised from commuters' perspectives as: being able to get from homes we can afford, in places we want to live, to and from jobs or education, and doing that without taking so long that there is little time left for family and personal lives.

Social and family lives can be profoundly affected by the infrastructure, vehicles, regulations, costs and cultures that constitute the transport and mobility system. It is easy to identify roles of mobility in social activities and family life, especially where people are dispersed or where family life involves complex journeys frequently combining several tasks into one trip (Pooley et al. 2013). In this sense what matters to users is the availability of transport modes which get people, and any luggage, relatively conveniently to where they need to be (Mattioli et al. 2016). As a final note in this outline of values of mobility, we can reflect that there will be an open-ended list of reasons that people have to travel, and values that they find in different forms of travel. For instance, even with a rise in use of social media, effective political and community participation in multiple forms involves gatherings, meeting and travel. As

another example, travel for tourism and migration can bring economic benefit and innovation, but also increase inter-cultural solidarity, knowledge, understanding and empathy.¹

Transport and its problems

In many ways, the discussion above sang the praises of mobility and a strong transport system. Yet even within this list of possible values, there were hints of downsides. One of the more straightforward concerns is that mobility is a part of practices and activities that are directly or indirectly damaging. Examples of indirect harm are seen in the fairly well known dilemma that while international travel can broaden the mind and increase understanding it can also help disease spread, and creates substantial pollution. Cases of direct harms are perhaps inevitable, since humans are capable of acting for good or bad - transport is necessary for war as much as in supporting lives and society.

At a broader level there is a well-established, and increasing, body of evidence on the ways in which the reconfiguration of transport and land use planning can be a barrier to participation and activities. 'Car dependency,' for example, is a consequence of urban developments which make robust provision for cars, and which implicitly or explicitly assume travel is something done predominantly by car (e.g. Mattioli and Colleoni 2016). As the term suggests, the consequence is that it can be difficult for people in such places to manage their lives without a car. This creates social exclusion for some without access to a vehicle (e.g. Lucas 2016; Mullen and Marsden forthcoming; SEU 2003), and further financial hardships for people on limited incomes who nevertheless find they need to devote much of what they do have to running a car (Mattioli and Colleoni 2016). The problem can be a lack of available, affordable or accessible public transport, or land use creating a need to travel over distances which are too great for walking or cycling (see for instance, SEU 2003; Lucas 2006, 2012; White 2008). These problems extend far beyond inconvenience, and can have far reaching implications for people's lives. Travel problems can lead to lost opportunities in career progression and education, and create difficulties in relation and providing support for family and friends (Mullen and Marsden forthcoming). There are however numerous other, more subtle difficulties for people traveling without cars, and ironically these difficulties are often created by traffic and provision for traffic. Pedestrians and cyclists in many countries and regions face high rates of death and serious injury in collisions with motor vehicles (Mullen et al. 2014; WHO 2013), and fears of traffic and collision are, for many, an effective barrier to walking and cycling (see e.g. Pooley et al. 2013). These risks and fears are, in some although not all countries, exacerbated by social and legal norms which tend to blame pedestrians and cyclists if they are injured in a collision with a vehicle (see Fedtke 2003). Further, roads and traffic can become a physical barrier to other forms of movement. Major roads can bisect communities and prevent or seriously inhibit non-motorised travel even over short distances. This problem – called severance – can be aggravated by inadequate or non-existent provision for pedestrian crossings (see for instance CIHT 2010). A famous study published by the University of California in 1981 showed that as traffic along residential roads increased, so the social interaction between residents decreased

¹ For an extended discussion of the value of empathy and other ways to promote it, see Roman Krznaric's thinkpiece for Big Ideas at <https://www.foe.co.uk/sites/default/files/downloads/empathy-effect-roman-krznaric-76075.pdf>

(Appleyard, 1981). This study begins to reveal how transport itself can be a barrier to some forms of mobility and so to social and other activities.

Beyond these concerns about its impacts on some activities and participation, transport as it currently exists across the globe presents major threats to human and non-human life and welfare. While it is well-known that threats, and physical harms, stem from collisions and transport related pollution, their scale and distribution are often overlooked. There are well over a million people killed on the roads worldwide each year. In their Global Status Report on Road Safety report in 2015, the World Health Organisation reported 1.25 million deaths on the roads in 2013, noting that this number had remained almost constant since 2007 (p.2). Risks from collision are very uneven distributed between countries. 16% of deaths on roads occur in low-income countries, despite these countries having only 1% of registered motorised vehicles (p.3), and the risks of death on roads per 100,000 people is 24.1 for low-income countries and 18.4 for middle-income countries compared to 9.2 for high-income countries. Within countries there are further inequalities in risks from road traffic collisions. A large Canadian study found a correlation between areas with lower socio-economic status and road traffic collisions “involving pedestrians, injury collisions, fatal crashes, and speed related fatal crashes” (Brubacher et al. 2016, p.7). Further, road users can be exposed to very different levels of risk and harm depending on what mode of transport they use. Pedestrians, cyclists and moped riders are at particular risk in a collision with a motor vehicle as “the collision energy is mainly absorbed by the lighter 'object'” (European Commission 2015b). In Great Britain in 2014, there were 39 pedestrians and 35 cyclists killed per billion vehicle miles travelled compared to just 3 car occupants killed for each per billion vehicle miles travelled (Department for Transport 2015b). We also see inequalities in risks of fatalities for different modes if we use number of journeys made rather than distance as a measure (Mullen et al 2014).²

Surface transport still predominantly uses fossil fuels and this makes it a major, and in many countries the overwhelming, source of urban outdoor air pollution (including particulates, nitrogen oxides carbon monoxide and sulphur). This pollution is associated with cardiovascular problems, and pollution from diesel is now also understood to cause lung cancer (Vermeulen et al. 2014). As well as causing early deaths, this pollution can exacerbate health problems including asthma (Guarnieri and Balme 2014). Worldwide, this pollution is understood to be responsible for 1.3 million early deaths annually (WHO³). The WHO has found that:

² Walking and cycling also bring health benefits of physical activity (WHO 2013). We might argue this offset risks from traffic when walking and cycling (see de Hartog et al. 2010). For an individual deciding how to travel, this could be a convincing argument. Empirical evidence indicates though that fear of traffic is enough to prevent many people from cycling in traffic – see Pooley et al. 2013. People may (and often do) decide to go (often by car) to safe off-road places in order to gain the benefits of physical activity from walking or cycling. From a societal perspective then, there are two reasons to be cautious about a policy of treating activity benefits of walking or cycling as offsetting risks of collision in traffic. First, is that acts to discourage walking or cycling as transport, and can in fact induce travel by motor vehicle (to safe places for walking and cycling). In doing so, it does less than it could to tackle the many other problems caused by high levels of motor traffic. Second, it raises a concern about health inequalities. People who can afford to travel to safe places for walking and cycling can enjoy safe physical activity, whereas people who walk or cycle because it is what they can afford, still face the risks from traffic.

³ http://www.who.int/phe/health_topics/outdoorair/databases/health_impacts/en/index1.html

“98% of cities in low- and middle income countries with more than 100 000 inhabitants do not meet WHO air quality guidelines. However, in high-income countries, that percentage decreases to 56%.” (WHO 2016)

Differences in environmental regulatory standards between countries enable export of second hand, often more polluting vehicles, from developed to developing countries (de Jong, 2016; Sulemana 2012). Further some commodity trading companies have been accused of creating low quality, and more polluting, fuel for export to African countries (de Jong 2016; Guéniat et al. 2016). Even in developed countries mortality and morbidity associated with poor outdoor air quality is extremely high. In the UK the estimate is that outdoor air pollution is responsible for 40,000 deaths each year (RCP 2016). However the distribution is far from even for a number of reasons. First, people will face greater risks from similar exposure to pollution because of their underlying health status. Second, people’s exposure to this pollution depends on where they live and spend their time. British studies have identified correlations between levels of transport pollution and neighbourhoods with higher proportions of households in financial hardship (Barnes and Chatterton 2016; Mitchell and Dorling, 2003). Further, a study of Britain and the Netherlands found correlations between exposure to pollution and age and ‘neighbourhoods with high proportions of ethnic minorities’ diversity of neighbourhoods (Fecht et al. 2015, p. 209). In addition to the harmful health impacts of urban outdoor pollution, there is substantial evidence that exposure to transport noise, especially noise from aviation, can have severe effects on physical and mental health (for instance, Beutel et al. 2016; Kaltenbach et al. 2016). Further, transport is currently one of the major emitters of greenhouse gases, accounting for 23% of worldwide carbon emissions from fuel combustion emissions (IEA 2015). So transport is implicated in the multiple and unequal threats to health and welfare which climate change is expected to bring (see IPCC 2014, p. 6).

Sustainable transport?

Understanding the harms, and the values of transport is a work in progress. Attention to and investigation of transport and social exclusion has become more established since the millennium, but there are still many questions and gaps in knowledge. Likewise scientific research into transport problems is ongoing. For instance, it was only in 2012 that the World Health Organisation confirmed that diesel pollution causes lung cancer. Still, many of the broad issues have been recognised for decades, with continuing debate about broad approaches that might tackle transport’s problems while retaining its values. Attention to major problems caused by transport became prominent in the 1990s and 2000s with a combination of activists, practitioners and academics criticising transport’s environmental, health and social damage. In this time there was increasing awareness of the scale of deaths on roads, especially in developing countries (see [Azetsop 2010](#); WHO 2015), and of the problem of transport pollution. In the 1990’s there was protest and opposition in developed countries to a dominant policy approach which predicted more cars and provided more roads for them (see for instance Curran 2007; Docherty and Shaw 2011; Sheller and Urry 2003). This policy was tied up with the belief that even in developed countries, more roads meant more economic growth (see for instance Fernald 1999).⁴

⁴ Recall the much protested against ‘Roads for Prosperity’ programme in Britain in the 1980s-1990s

In the context of this recognition of transport's problems, there was a shift in thinking and policy on transport towards an idea of sustainable transport. As with other sectors concerned with sustainability, sustainable transport is conceptually framed as developing transport policies and systems that simultaneously meet environmental, economic and societal (and equity) objectives. Practically this tended to involve emphasis on encouraging and supporting walking, cycling, public transport and land use planning that reduces car dependency (Newman and Kenworthy 1999). There are many examples of progressive, more sustainable transport policies and practices in the last couple of decades, and in some ways, in some places, there has been progress on road deaths (such as Britain, although as noted there remain significant inequalities in risk even here), nitrogen oxides and particulates have reduced (although remain a major problem) in European countries (EEA 2015), and Britain has seen a small decrease in carbon emissions from transport since 2003 (Committee on Climate Change no date). However, as noted above, deaths on the roads have remained at a level of around 1.2 million per year worldwide for several years. Levels of nitrogen oxide have sharply increased in some areas (especially East Asia – see Geddes et al 2016). Carbon emissions from transport have increased substantially, with road traffic emissions going up by 68% between 1990 and 2013 (IEA 2015).

Transport problems remain vast, and the impacts of the idea of sustainable transport are in many ways, disappointing. The idea of sustainability in transport may be one that is lacking in some way, or does not work effectively as a framing idea. Or it could be that it has not really been implemented. Or both. Sustainable transport, as a policy approach, has an uphill fight against a constant pull back to ideas of predict and provide, car culture and the political idea of not upsetting the choice to drive⁵ (see Doherty and Shaw 2010). Yet part of its problem may be that it – perhaps deliberately - has always been loosely defined and this reduces its effectiveness. The advantage of this type of definition is that people can agree on the idea - citing the value of trying to meet environmental, economic and societal objectives is motherhood and apple pie (cf. Jordan 2008). But since it is such a broad definition, relative weight given to environment, economy and society can slip around with the result that much transport policy can - with more or less plausibility – stake a claim to be sustainable even if it is expected to support traffic and aviation growth (Marsden et al. 2014). Further it gives little guidance when tricky questions and decisions arise – such as decisions on reducing capacity for motor traffic, or decisions on pricing which might reduce demand for driving but create hardship for some people on low incomes. It can be difficult to find a basis or reasoning for debating and making transparent decisions on such difficult questions without a more robust conceptual framework than sustainability offers.

The remainder of this piece presents and develops a more robust framework for transport and mobility rooted in an idea of justice centred recognition that each person matters equally, and that this basic equality should inform decisions on economy, environment, and society. As discussed in the next section, this equality involves treating transport as matters of social and environmental justice (see also arguments for just sustainabilities proposed by Agyeman 2003; Agyeman and Evans 2004). The argument in what follows is that framing transport and mobility as matters of justice will involve a radical rethink of approaches to transport policy and practice. This framing also provides a firm basis for transparent debate

⁵ Even if that means upsetting the choice to walk, cycle.

on difficult questions about on how to tackle transport's problems and protect and develop its capacity to improve lives.

2. How is transport a matter of social and environmental justice?

If we accept the very simple and fundamental principle of justice that people matter, and that their lives and quality of lives matter, then it is not difficult to make the case that transport and mobility are important issues of justice. We have reflected on some of the ways in which mobility and a functioning transport system matters to people as something necessary for living and flourishing. We have also outlined how transport, as it is currently used, creates numerous and serious threats to social and economic welfare, health and to lives. Further, as we discussed in the previous sections, transport has unequal impacts on different people both in respect of its potential value, and in terms of its problems.

The idea of treating transport and mobility systems as issues of justice is not entirely new, but it is still an idea in its early stages (see Root et al, 1996; Beyazit 2011; Lucas 2006; Martens 2016; Mattioli 2016; Mullen et al 2014; Mullen and Marsden 2016a; van Wee 2011). There is a slightly longer tradition of concern with questions of environmental justice (e.g. Čapek, 1993) and of social justice and welfare (e.g. Beauchamp 1976). These have many parallels and overlaps with mobility justice, although as we shall see, transport brings its own complexities and questions. Before discussing what transport or mobility justice might involve, it is worth saying a little about what it is and is not. Most people will be familiar with ways in which criminal law touches on transport, and in this respect transport and justice are long established. Transport and mobility justice is a much broader idea concerned more with ideas of equality, and with social and environmental justice. Transport or mobility justice may intersect with law - and we may come to argue that law should change to reflect this justice – but we can think about mobility justice without necessarily thinking about law.

Ideas of justice

If transport and mobility are issues of justice then how can we assess their current state, and how can we think about what a more just transport and mobility system might look like? As with any issue of justice, questions of what should be done, or what situation would be more or less just, are not always evident from simply looking at things as they are. We also need a transparent and plausible basis for making value judgements and thereby getting from understanding how things are, to assessing how things should be. An example may help to illustrate this point. We might question whether all inequalities in exposure to risks of potentially lethal harm, such as exposure to traffic pollution or risks of road collisions, are necessarily unjust. For instance, would exposure to a relatively high level of risk be unjust if someone chose to live in an especially polluted area (cf. questions explored by Shrader-Frechette 2002; Walker 2009). Are the individuals involved not responsible for the consequences of these choices? But then, what if someone chooses to live in a polluted area because homes are affordable to them only there? The question that jumps out here is about the extent to which individuals are exercising choice when their decisions are greatly constrained. There is also, however, a prior question about the extent to which people should be held responsible for their choices. We cannot answer such questions without bringing in value judgements.

One way to make these value judgements would be to find an appealing theory of justice and to try to apply it to the dilemmas that mobility and the transport system presents us with. There is after all, no shortage of theories to choose from.⁶ There are two shortcomings with this approach. First we would need to justify why we have adopted one rather than another theory, and this might need to be done in the face of objections from people who quite reasonably prefer different theories. The second reason is the risk that what seems a plausible theory in abstract can look much less plausible once it is applied. The way that the world works can mean that a theory does not work, or does not work well. A simple example of this could be a theory which maintains we should avoid all actions that will harm other people. That would imply that we should simply stop using any motor transport at all since to do so creates harmful pollution. Yet to do this would – almost certainly – itself create huge harms, perhaps beginning with a breakdown of existing systems of distributing food and other basic supplies (this reflects an argument made by Railton 1985). It might be worth clarifying that none of this means that all transport pollution should be tolerated or that there need not be an aim of preventing it altogether over time. What the example does try to illustrate is the difficulties that can face appealing theories when they are applied to the complexities of real life.

Instead of looking for a theory, we can go back a step and begin with two very basic ideas of justice (Mullen and Marsden 2016a). The intention is that these are broad enough to be widely accepted while having sufficient substance to allow them to be applied to transport. So these principles of justice are ones which underpin a broad range of approaches and theories of justice (see for instance, Anscombe 1958; Dworkin 2000; Glover 1977; Harris 1988; Nussbaum 2003). These principles are:

- i. Equality: that each person matters, and each matters as much as any other.

This is not simply an abstract idea, but one that gives us as individuals and as society, a reason for showing concern for each life, and for each to be able to live well.

- ii. Responsibility for each other: as individuals and society we have responsibilities to try to make sure that, as far as is possible, our actions and our social, economic and other arrangements enable each person to live well.

This does two important things:

- a. It involves a positive responsibility to each other, as society and as individuals. This can be contrasted with ideas that we have some responsibilities not to cause harm, but not responsibilities to constructively support each other. This positive responsibility is not necessarily more onerous than ideas that we need only avoid causing harm, since as we discussed above, avoiding all actions that cause harm can itself be dangerous and damaging. We might add that while the idea of a positive responsibility sometimes sounds difficult, it is in fact something that most people live by (most of the time). One example of this is collectively paying for a healthcare

⁶ The Stanford Encyclopaedia of Philosophy is an excellent and freely available source of peer-reviewed articles on all aspects of philosophy including theories of justice – see <http://plato.stanford.edu/entries/justice-distributive/>

system that is free to people at the point of need. Another is respecting customs that are reasonably fair.

- b. It helps to frame or guide thinking about what are or are not defensible methods of seeking to bring about just ends. Coupled with the principle of equality, this idea puts a check on measures that would benefit some but at a cost to others so great that they are not being treated as equal. In other words there is a limit to the level of restriction or cost that would be reasonable – or just.

Transport and mobility justice

So we have a basis for thinking about mobility justice and an outline of the numerous ways in which transport and mobility affect people, and affect different people in different ways. From this we can see what sorts of issues mobility and transport systems raise for equality and social and environmental justice. To recall very briefly, there are ways in which transport has value in sustaining lives, welfare and enabling activities. It can do this directly by providing mobility (e.g. buses, walkable surfaces, bicycles) or by being designed in a way that does not damage welfare and prevent activities (e.g. by not dissecting communities with busy roads). Then there are ways in which transport causes often fatal harms to health and damage to welfare and activities. If people matter, then all of these values and harms also matter. If each person matters then we need to think about how each person fares in the context of the values and harms of transport. Specifically, we need to think about how to enable each person to benefit from transport and reduce inequalities in those benefits, *and* to tackle overall harms and inequalities in exposure to the harms of transport (cf. Mullen et al. 2014).

Significantly, these issues are diverse. Given this complexity it can be tempting to divide up the issues and think about how to tackle each one separately. In fact such an approach is often found in policy moves to address major transport problems. However, this could be problematic since moves to tackle one aspect of justice considered in isolation can create further injustices elsewhere. Resolving this tension means thinking about the many aspects of mobility justice together, and there are promising - if not easy - ways of achieving this. To illustrate the risks of treating different aspects of mobility justice in isolation, we can look to the prominent matter of transport pollution, both as carbon emissions and as localised poor air quality. Both types of pollution have received policy attention even if the relative attention given to each has varied. One well known example of the tensions which can occur when there are attempts to tackle problems in isolation is found in the approach of using tax incentives to favour diesel over petrol as the former has lower carbon emissions.⁷ This has been brought in to sharp question given the high levels of particulates from diesel (e.g. Schiermeier 2015).

However there is a further, and significant case of this type of problem which is based in - what in some countries, is the dominant policy approach - of using electric, or other ultra-low emission vehicles to tackle both carbons emission and localised transport pollution.⁸ There are plenty of questions and concerns about this type of approach. For a start, there is

⁷ See HM Government (no date) Vehicle tax rate tables <https://www.gov.uk/vehicle-tax-rate-tables/rates-for-cars-registered-on-or-after-1-march-2001>

⁸ Britain is an example of this – see for instance, Committee on Climate Change (2015)

uncertainty on whether the technology will develop in the way that it needs to for electric vehicles to become viable as widespread transport (for instance, there are currently still problems of limited range), and about whether or when its costs will make it attractive and accessible to a broad range of consumers (Anable 2015; Committee on Climate Change 2015; Hill et al. 2012; Lyons 2011). There are also some concerns about the pollution associated with electric vehicles, especially in the absence of full decarbonisation of electricity supply (for instance, Timmers and Achten 2016). So there are doubts about how well a policy that focuses primarily on moving to electric vehicles would work, even on its own terms.

Yet even if we are optimistic that technological developments will enable electric vehicles to do what is hoped for them, this approach leaves open, and risks exacerbating, other forms of transport and mobility injustice. Recall the discussion of the roles of mobility and transport system across social, economic, political and personal lives. That outlined how some people can be restricted in their mobility and so excluded from activities because transport is unaffordable, or unavailable, or because of inaccessibility. Policy focused on electric vehicles would not obviously contribute to tackling any of these restrictions or forms of social exclusion. Still, it could be argued that electric vehicle policy is not intended to do this - if it does its intended job of tackling transport pollution then we are much better off in relation to a major cause of environmental injustice, and no worse off in relation to other forms of social and environmental injustice. This could be a plausible argument, but only if there was some confidence that electric vehicle policy would not be expected to have damaging implications for other forms of mobility justice. If that were the case then perhaps those other forms of injustice could be tackled separately. The problem is that it is difficult to have confidence that other injustices would not be made worse. The root of the concern is, as reported earlier, that so many aspects of transport injustice are associated with having transport systems which, to a large extent, rely on private motor vehicles. It is this which often makes travel without a motor vehicle difficult or dangerous, and which as a consequence means that some people without vehicles can face social exclusion, and that some with vehicles feel they need to keep that vehicle despite financial difficulties and even hardship in doing so.

In this context, one concern for electric vehicle policy is that it will increase affordability problems for people on low incomes who rely on owning a motor vehicle. Electric vehicles tend to be far more expensive to purchase than conventional vehicles, and this is not expected to change for decades (Anable 2015). The hope for advocates of electric vehicles, is that the running costs - which are much lower than for conventional vehicles - will offset the expense of the vehicle itself. That might work for people who are reasonably affluent and can either borrow or just pay large upfront costs, but could be more difficult for people on lower incomes (see Mullen and Marsden 2016b). While there is some possibility that this could be mitigated by car clubs, or leasing, models of sharing would need to extend to people on low incomes who may not have good credit ratings.⁹

The second, and larger concern, is that assuming or relying on electric (or other low emission) vehicles to deal with pollution, distracts from pressure to reduce traffic. Yet as discussed above, it is traffic and planning which accommodates high levels of motor traffic,

⁹ For a longer discussion of the potential of sharing (particularly in cities) see Julian Agyeman and colleagues' think-piece for big ideas at https://www.foe.co.uk/sites/default/files/downloads/agyeman_sharing_cities.pdf

which can create hardship, inaccessibility and physical risks. High volumes of traffic squeeze out pedestrians and cyclists, diminish social interaction and reproduce built environments which make life difficult for those without vehicles. If a policy focused on electric vehicles reduces momentum to tackle these problems then these injustices will remain. Further, they may actually get worse where traffic forecasts (such as official forecasts in Britain¹⁰) assume traffic growth, and governments continue to try to accommodate that expected growth rather than prevent it. In this case the worry is not just that traffic levels and the associated problems of exclusion and hardship will persist in the short term, but that they may actually get worse over the longer term if governments seek to accommodate expected traffic growth (Mullen and Marsden 2016b).

Reconciling social and environmental aspects of mobility justice

Electric, or other lower emission, vehicles are not the only way to tackle pollution. They might be part of the story, but walking, cycling, shared transport, public transport and just reducing travel are all potential contributors to reducing pollution. Further, between them they also have the potential to contribute to traffic reduction and support social inclusion by making it easier to go about everyday activities without owning or leasing a vehicle. In other words, this looks like it might be a basis for a coherent response to different aspects of mobility justice. This is well recognised and established in the idea of sustainable transport, and in efforts made to promote social inclusion (see for instance, Docherty and Shaw 2011; SEU 2003). As noted earlier however, despite this recognition, transport remains disappointingly untransformed. Many places with high levels of walking and cycling and shared or public transport use are also relatively poor, and there is a tendency for private motor car ownership and use to increase as GDP increases (see for instance, Orvañanos Murguía 2015). While wealthier countries take steps to encourage walking, cycling, and public and shared transport, these are for the most part relatively small when considered against levels of motor traffic. Even those European countries, Germany, Denmark and Netherlands, which famously have high levels of cycling also have very high levels of car ownership and use (European Commission 2015a; EEA 2014a;b;c). This should not overshadow some very innovative transformations which have brought substantial change in some cities across the world: and the possibilities that these reveal for future changes is discussed further in Section 4 below. Yet there remains a background of substantial reliance on motorised transport with its associated injustices.

So it is not enough simply to point to what we might call sustainable modes of transport. We need to think much harder about how walking, cycling, public and shared transport might work in a comprehensive way within a just transport system. We also need to think about why it appears so difficult to develop transport systems around these modes, and how barriers to such development could be overcome (see also Mullen and Marsden 2016a). In what follows we explore these questions. First we will identify some of the major sticking points and barriers for these forms of sustainable transport. Then we investigate how the idea of mobility justice can be used in framing a response to these barriers, and in developing democratic forms of planning capable of reconciling the diverse aspects of social and environmental justice involved in transport and mobility.

¹⁰ See Department for Transport 2015a

3. Challenging assumptions about transport and travel behaviour

Three major reasons, often in conjunction with one another, act as barriers to attempting a substantial shift to walking, cycling, shared and public transport. In each case, questioning and challenging the factors that create these barriers could be an important step in moving towards a more just transport system.

Aids to decision-making

A significant barrier is found in some of the dominant tools, methods and processes intended to help make and evaluate decisions about transport (benefit-cost (or cost-benefit) analysis being the most well-known, but there are many others such as multi-criteria analysis). One issue here is that at present there is a significant gap between what available tools can assess and evaluate and what planners want to consider. For example, there is increasing interest in improving the quality of the environment in towns and cities by reducing motor traffic and encouraging pedestrianisation. As planners are aware (often to their frustration) there is an absence of decision-making tools suitable for helping with this sort of planning (see for instance, Mullen and Marsden 2015). This might be tackled by development of new tools capable of this kind of assessment and evaluation (and such work is ongoing – one example is Gori et al. 2014).

However the limitations of existing tools or methods for settling transport planning decisions and disputes go deeper than a simple absence of the right tool for the right job. The more fundamental point is that while tools are often believed to be neutral or objective, they are in fact neither. They are open to question in two major respects. The first is the assumptions they incorporate about the workings of transport, mobility and behaviour. If we want to know how transport might change, we need first to have an idea of what activities, behaviours, policies and processes create the transport and mobility systems that we now have. These are questions that do, and probably will continue, to keep researchers, policymakers and activists busy. That does not mean that we have no sense of how things might change, just that we need to remain open to new knowledge and understanding (and a little more is said on this below).

The second is the assumptions that tools or methods make about what is, and is not valuable or detrimental, and how values and dis-benefits should be measured and compared. This is crucial for sustainable transport and especially for planning for non-motorised transport. There has been longstanding recognition that models and appraisal tools dominant in transport planning contain assumptions that favour those transport modes that have higher speeds and cover longer distances (see Banister 2008; Whitelegg 1997; also Plowden and Hillman 1996). A similar problem occurs when benefit-cost analysis is used in transport. The issue stems from:

- (i) assumptions about the value of travel time;
- (ii) assumptions about how travel time values can be aggregated across a population (so if each person saves a few minutes that becomes a very large value);

- (iii) assumptions that these aggregated values of time are compared directly against other costs and benefits, often including safety and pollution, so that time savings expected (for instance from a road expansion) are considered to outweigh serious health and social impacts of traffic.

The first of these, that is the value of travel time, has historically involved an assumption that travel is a 'derived demand' which means it does not have value for its own sake, but only as a means of doing whatever it is that you are travelling to do – in other words, that travel time is otherwise 'wasted time' (Banister 2008). In measuring the cost of time, adjustments are frequently made for a number of reasons, including comfort of travel and uncertainty for the traveller about the time that a journey will take, and travellers' willingness to pay for time savings, effectively meaning that wealthier people's time is valued more highly (VTPI 2009). It is not surprising that there is criticism of the injustice of valuing time more highly for the wealthier (see Gössling 2016). There is also more general criticism that the assumption of travel time as wasted is erroneous since much leisure travel and some travel modes (such as cycling) are intrinsically enjoyed and valued,¹¹ and because mobile technology means that people can work or get on with other activities while traveling (Banister 2008; Gössling 2016; Lyons and Urry 2005). So attention to problems of how travel time is valued is important in thinking about justice both because it can involve inequalities in the weight given to different people's preferences, and because it can create a misleading impression of what does and does not matter.

Yet this is far from the only concern with the way that time has been measured in making transport decisions. Even all objections of this type were addressed, it would not tackle what is perhaps a greater problem, arising from the second and third assumptions listed above. These assumptions are a form of utilitarianism, which aims at the greatest benefit, possibly - but not necessarily - for the greatest number (cf. Harris 1988).¹² To recall, these assumptions mean that where there is an expectation that a transport measure will bring small travel time savings for many people, this can (and often does) outweigh concerns about serious harms (including deaths) expected from that measure. Such concerns are one of the reasons that some advocate alternative models and appraisal tools such as multi-criteria analysis (e.g. Guhnemann 2016). The question then is what form of multi-criteria analysis would be beneficial and what weight should it be given against the dominant modelling and appraisal tools. A justice framing allows this assessment to be made. It exposes how assumptions (ii) and (iii) conflict with the basic ideas of equality (and as discussed in later sections, the framing can then be used to inform the design of a multi-criteria analysis which reflects equality). The concern from justice is a fundamental one about how these costs and benefits are compared. The basic idea: that each person matters, and their life and welfare matters; means that small benefits for many cannot outweigh large dis-benefits to a few. Put another way, it is not just to sacrifice welfare of a few people for even large benefits. This analysis is significant as it is sometimes argued that

¹¹ Time spent walking and cycling can also have a value for health. There is a tool for measuring this – the Health Economic Assessment Tool (HEAT) available at World Health Organisation Europe – see <http://www.heatwalkingcycling.org/index.php?pg=acknowledgements>

¹² As Harris (1988) points out, this type of utilitarianism is only instrumentally concerned with distribution. The aim is to achieve the greatest benefit however that is distributed. See also Mullen 2012.

concerns about models or cost-benefit analysis can be addressed if the calculations take account of a wider set of social and environmental benefits (for instance, Bateman et al. 1993). Yet even if these wider factors are added to the cost-benefit calculation (and even if they are given substantial weight) the problem remains that they can be outweighed by a large number of small gains.

This type of model and benefit-cost analysis, may be dominant, but as we have indicated, these are not the only tools or methods that could help decision-making. For instance, decisions on moving to a more just transport system might be supported by analysis of social and distributional impacts and methods such as multi-criteria analysis which enable planning “by reference to an explicit set of objectives... for which [the decision-maker] has established measurable criteria” (CLG 2009, para. 4.3). For such tools and methods to have a useful impact however, there would need to be a will to prioritise them over tools tending to favour faster transport. There also needs to be an understanding of what objectives would be implied by a socially and environmentally just transport system. We return to this question below.

Choice

The idea of choice is important in political, commercial and cultural contexts, and it is especially important in transport. It tends to pervade thinking about how people decide to travel in the ways that they do, and thinking about how more sustainable transport can be legitimately be supported. Broadly this means that measures to move towards more sustainability typically rely on appealing to people to choose to change their travel modes, and that relatively less attention is given to the context in which people make those choices. This view persists even when planners consider that it will not be effective in meeting objectives such as carbon or traffic reduction (see Marsden et al. 2014). The notion of choice is often a target for those who argue that people’s actions are framed (although not necessarily determined) by the context in which they live (for instance Shove 2010; Widdows 2013). Choice - as a political ideal – is also criticised by people concerned about individualism, consumerism and sustainability (see for instance Vincent 2012). Transport however, provides a particularly good example of a further, and quite fundamental objection to this idea of choice. This is simply that the idea is not coherent when applied to transport. The way that the transport system is organised and functions means that some choices are privileged over others. More widely, as discussed in section 1, some transport systems are such that life for many becomes very difficult without access to a private car, and it is the privilege given to the ‘choice’ of using private cars that creates one of the most significant restrictions of the ‘choice’ to travel without a car. We could imagine different transport systems in which private cars, while not banned, had restricted access, but where it is very easy to conduct everyday activities by foot or public transport. In other words, the issue in transport is not between choice and constraint, but rather about which choices to facilitate. If we are concerned with justice, then the choices facilitated should be ones that do not exacerbate inequalities. Recognition that choice is not a coherent basis for thinking about transport does not necessarily mean that more sustainable or just transport planning would be automatically promoted. What it would do is remove a cause of relatively ineffective planning which in many cases perpetuates a car-reliant system. By doing this it would force people to think about what sort of transport system is wanted.

Influencing transport and transport's influences

Sometimes when people think about changing transport, there is a focus on how specific journeys are made, and what conditions are like for people making journeys by different modes. This is undoubtedly important. For instance, there is evidence that fear of traffic and poor conditions on roads act to inhibit cycling, especially for people who are not already confident cyclists (Pooley et al. 2013). Yet there are also very good reasons to suggest that effectively changing transport is not something that can be done simply by focusing on transport (or even by extending the focus to planning too, so as to influence where journeys begin and end). The key issue is why people use the transport that they do. Transport is frequently described as a 'derived' demand, which means that, for the most part, people do not travel just for the sake of traveling (of course there are exceptions) but instead they travel as a means to getting on with some other activity. However even this is not the whole story, and changes in mobility and transport can also shape our activities, creating causal loops and feedback between transport and other aspects of society. Organisation and norms in other parts of society - education, business, health, and so on – critically influence, and are influenced by, mobility and the transport system.¹³

It is worth outlining a couple of examples to illustrate this type of relationship. One example is online shopping.¹⁴ The internet is held up as having substantial possibilities for reducing travel since it means that many activities which would previously mean travelling can now happen virtually. However the relationship is not straightforward. An ongoing project is identifying ways in which online shopping may induce more travel, such as through emergence of a practice where people buy multiple goods with the intention of returning most via the same courier that delivered them, or where people travel to shops for 'window shopping', and then buy online.

A second example is air travel. It is widely recognised that drastic reductions in the price that travellers pay to fly and the huge expansion in availability of flights has changed the way that many people think about international travel. In some countries, and for some people, travel for holidays becomes expected, and people may even live part time in several countries. This might be understood in terms of the influence of a new affordable (to some) form of transport on expectations and activities. The possibilities presented by air travel have also enabled the development of specific norms in some employment sectors. One case of this is the expectation that academics will travel to conferences across the world, and that to fail to do so is harmful to careers (Strengers 2014). The issue is less about whether individual employees want to travel, and more about what they come to be expected to do by the norms of the sector that they work in.

The aim in this section is to flag up the inter-relations between transport and other sectors and parts of society. The next section will look at how this matters for a shift to a more just mobility and transport system. Before that it is important to emphasise the care needed in making decisions that aim to take account of relationships between transport and other

¹³ Disruption Project (Six UK Universities, and funded by Engineering and Physical Sciences Research Council (EPSRC)) - <http://www.disruptionproject.net/>

¹⁴ Demand Centre Project - 'Infrastructures for online shopping: integrating supply and demand' (this project is based at Leeds University and part of wider Demand Centre - see <http://www.demand.ac.uk/>)

sectors. To illustrate this we can reflect on one area where strong beliefs about the influences of transport are poorly supported by evidence. This belief is that high traffic levels are causally linked to economic growth, and that dampening traffic growth will be economically damaging. In some cases this could be right – for instance in parts of developing countries where there is little established transport infrastructure. Yet as a general rule, which persists in areas of developed transport infrastructure, the evidence is uncertain (Banister 2012), and becomes more doubtful in the face of the potential economic impacts of transport pollution and harms.

4. Planning for socially and environmentally just mobility and transport

A more socially and environmentally just transport system, which recognises that each person matters, is likely to place little reliance on aviation, motorised traffic and especially on private motor transport; and put strong emphasis on walking, cycling, public and shared transport. Such modes are more promising for enabling each person to benefit from the values of transport while also tackling overall levels of harm and inequalities in exposure the harms of transport. Suggesting that is the easy bit. Much more difficult is understanding what such a transport system might look like in practice, what dilemmas and problems might be faced, and how any sort of transition towards that system could - legitimately and effectively – be planned. We cannot meaningfully just say 'let's have more walking, cycling, shared and public transport.' There are questions of the where, when and how of changing transport. Related to these are questions about what effects changing transport will have on people's lives and their ability to participate in the activities that matter to them. Tied in with this we need to think about implications of changing transport for other sectors such as education, health and business. Put another way, some possibilities will inevitably be closed down by a transport system that ceases to prioritise private vehicles and aviation.

The sections above have described how some of the barriers to transport or mobility justice can be tackled. These indicate the case from justice for rethinking models and tools (such as benefit-cost analysis) used to assess transport decisions. This matters because the assumptions underpinning dominant tools currently used tend to promote motor traffic. Justice also provides a basis for challenging the particular, and incoherent, idea of 'choice' which acts as a barrier to effective change in transport policy. Finally, it indicates how we need to think beyond transport, and to wider social and economic organisation and norms, if we want to effectively change transport.

The next step is to look more at how a just transport system might work, and how the ideas of equality can guide transport and mobility planning. Since circumstance, conditions, and our knowledge of both present and future are all things that change and develop, it would be a mistake to try to give a definitive description of a just transport system. There are however two substantial ways in which we can think about what a just transport system would be like. First is to illustrate some of the changes that might be expected, and second is to explore what a commitment to justice would mean for decision-making in transport.

Imagining mobility justice

One way of imagining a just transport system is to think about how people could live well in a society that has little reliance on motor cars and aviation. It would have to be possible to walk and cycle, efficiently and safely, within and between, towns, villages, cities and so on. That is not to say that motor traffic has no role – public transport especially will be important

not least because few, if any, people can manage entirely on foot or by bicycle. Walking and cycling fundamentally support equality. They enable people to move around freely and make independent journeys. People are not constrained by infrequent services, and can get door to door (or anywhere to anywhere). If conditions for walking and cycling are good that also facilitates free movement for people with disabilities, for carers of small children, and for older children. Walking and cycling can both be very cheap (if not quite free) and while there are such great wealth inequalities this affordability can be vital for inclusion. Walking and cycling are also responsible for few of transport's harms. They are largely pollution free and so largely avoid contributing to climate change and the huge mortality and ill-health associated with petrol and diesel emissions. Pedestrians and cyclists are also less likely than drivers of motor vehicles to injure others in a collision.

The sorts of conditions for walking and cycling implied by a just transport system would be very different to those that exist anywhere now. There are excellent examples of provision for walking and cycling, such as those found in Denmark and the Netherlands. There are also some innovative and radical examples of taking space from motor traffic and giving that to pedestrians and cyclists. Hamburg's Tunnel Park project plans to reduce road severance between districts of Hamburg by sending traffic through a tunnel, and turning the surface into a linear park.¹⁵ Seoul demolished a major elevated highway, opening up paths by the river for pedestrians and invested in public transport (Kodukula 2011). A just transport system would involve not only continuity of provision for walking and cycling across and between urban areas, but also substantial and widespread traffic reduction measures. This contrasts quite sharply with projects that basically divert traffic (such as the Hamburg project), and involves a major scaling up of projects (such as the one in Seoul) which aim to reduce traffic, to cover whole settlements and even countries rather than just parts of a city.

To begin, the priority would need to be to ensure accessibility for as many people as possible (that is, for anyone who can walk at all, or move around using a wheelchair). 'Priority' should be seen in strong contrast to practices which see policy support for these measures but which fail to sufficiently implement them in the face of pressure to meet demands for motor traffic and parking. That means priority for things like dropped kerbs, effective prohibition of pavement parking and any other obstacles, maintaining and gritting pavements. Likewise, it would mean prioritising removal of anything that severs walking or cycling routes. So the priority would be to ensure there are sufficiently broad and continuous footways and safe cycle routes, and this would apply even when it creates tension for providing space for motor traffic. It would also involve removing unsafe crossings (such as underpasses which frighten people) and, where there is traffic, making sure there are sufficient safe crossings. Meeting this equality requirement would mean focusing first on conditions for walking and cycling where these are currently poorest.

If space is completely or partially shared between motor and non-motor traffic, a just transport system would require at least transitional measures to protect pedestrians and cyclists from high levels of risk. Risks of collision can be reduced if people just avoid, or are prevented from, walking and cycling – and in practice, this is often how risks are avoided. This approach is the opposite of what is wanted for a just transport system. Instead, a just system would consider reducing speed limits and shifting rights of way between motor traffic

¹⁵ See <http://www.tunnelvisions.eu/projects/nieuwe-pagina-2/>

and pedestrians and cyclists, along with changes in the way responsibility for collisions is understood. A problem identified in some places, including England, is a de facto assumption by drivers (and perhaps from self-preservation) by many pedestrians and cyclists, that drivers have right of way in shared spaces and where pedestrians cross roads (see Moody and Melia 2014). One approach to mitigating this is by changing to a system of strict liability such that in a collision drivers have civil liability without reference to fault. The idea here is that strict liability will encourage better driving (Fedtke 2003).

Along with comprehensive walking and cycling routes, a just mobility system would also focus on creating physically accessible (i.e. by wheelchair users and others who are not physically fit, strong adults¹⁶) short and long distance public transport run as a public good, for the benefit of all members of society, rather than being primarily profit-led businesses with some subsidies to offset the worst risks of exclusion for people who live on unprofitable routes. This might involve implementing evening and early morning services where these are currently absent, and improving currently poor services in rural areas and housing estates where poor public transport puts people can be at risk of isolation and exclusion (SEU 2003; Lucas et al. 2016). It may also require attention to designing public transport capable of easily carrying prams, pushchairs and bicycles (something which is successfully managed in some countries such as Denmark and less so in others including Britain (Macleod 2013). Cycle carriage means that people can make long journeys, extending well beyond the range of public transport services. Sufficient pushchair and pram carriage means that carers of children do not face the physical difficulties of trying to fold and lift pushchairs while carrying children and luggage. The resource cost of space taken by bicycles or pushchairs is likely to be far outweighed by the justice benefits of enabling people to live without access to private motor vehicles, and without suffering social exclusion because of this.

Taxis and car sharing may be an important part of this public transport service– if the service is comprehensive and affordable. However there can be a temptation to think of taxis or other shared car services as an elixir, whereas there are significant questions about their role in a just transport system. One factor is the extent to which they are comprehensive in providing services to everyone who needs them. That is, do they operate sufficiently, as affordable services, in relatively isolated areas, and in deprived areas (the latter may be especially relevant to services like car clubs)? The answer to this is likely to be influenced by business models and any subsidies, and these could be expected to change with overarching commitment to a just transport system. A related question, currently gaining attention, is employment conditions for drivers providing these services (Rogers 2015). Again, if there is a commitment to justice based on ideas that each person matters, then conditions should reflect this. This applies to employment conditions as much as to service provision and safety.

Alongside a focus on public transport within countries, a just mobility system would include expansion of accessible and affordable public transport across countries. At present many international travel practices are environmentally damaging (both in terms of pollution and land use) and tend to exclude people with lower incomes in developed and developing

¹⁶ All public transport users are likely to have experienced some of the physical difficulties that can be involved in some services –from having to run to change platforms, to hauling luggage, standing for long journeys where seats are unavailable, and so on. Making public transport accessible to everyone would require attention to removing these physical demands. See Chatterton et al. 2015.

countries. Cost, income and border controls are the most obvious reason for exclusion. However there are further factors including digital exclusion or limited flexibility over working times which can mean that people cannot access cheaper fares (Baum 2006). A just mobility system may involve decisions about the levels and forms of international travel which can be provided without creating intolerable environmental harm or associated health and welfare inequalities, coupled with systems of fares and access which mean that each person, regardless of physical or financial capacity, has some opportunity to travel internationally. Contrary to many assumptions, overseas holidays would not become a thing of the past in a just mobility system.

A just transport system is likely also to involve intervention to reduce or influence transport demands which stem from other sectors, especially those that add little to our wellbeing. Section 3 looked briefly at how other sectors influence transport, especially car travel and flying. There are well-established approaches in transport planning that can contribute to reducing the pressure that other sectors place on transport. Land use planning is perhaps the most familiar of these – for instance this can involve attempting to plan developments in places accessible by public transport or non-motorised transport, or reducing car parking provision in new developments. There are also a range of economic tools such as tax incentives, parking levies, public transport subsidies. However the extent to which planning successfully reduces car reliance and use, and the extent to which these economic tools are adopted has been variable. In this context, the idea of a just transport system would serve to tackle some of the barriers that currently hamper effective implementation. If justice means reducing car reliance then that would take priority. The questions would no longer revolve around how to encourage a little less car use within a car-based system, and instead would be ones of how to make the sectors work given a transport system not based around cars.

Any just transport system will also need to tackle inequalities in exposure to pollution from surface transport and aviation. Much of the problem of traffic pollution should be tackled by shift to walking and cycling, coupled with measures to improve public transport and reduce motor travel involved in business and public sectors. The intention is to drastically reduce the need to travel by car, and also to prioritise other activities over car travel. So prioritising safe, efficient and continuous walking and cycling routes will take space from private motor traffic. Further in developed countries there would rarely be a case for increasing road capacity since doing so would be unlikely to improve pollution or inclusion. Nevertheless, motor traffic is unlikely to disappear entirely through these measures alone and this, possibly along with some public transport, may still cause inequalities in exposure to particulates, nitrogen oxides and noise, as well as contributing to carbon emissions and the (unequally distributed) threats associated with climate change. The situation is similar for aviation. If justice as equality underpins transport, then these inequalities need to be tackled. It is possible, depending on circumstance, that some of the inequalities could be genuinely offset – meaning that those facing the inequalities are provided directly with adequate compensation. This is very different to ideas that benefits to some outweigh losses to others (i.e. the sort of calculation that cost-benefit analysis would allow), and in practice it may be unfeasible (how do you compensate for worsening asthma, or for flooding which is probably associated with a changing climate?). So in practice, justice might require further restricting and diverting traffic and aviation to avoid such inequalities.

One immediate response to this sort of account of how mobility justice could work is a claim that it would be expensive and economically damaging. This sort of argument is relevant to justice, but only if the economic damage can plausibly be held to bring greater inequalities (cf. Mullen et al. 2014). As discussed above, the relation between transport and economy is not as straightforward as sometimes believed. There are several ways in which this account of mobility justice could be expected to bring economic benefits. First is that it would support, rather than exacerbate, social inclusion and so mean that people are more able to be economically and socially active. Secondly, it would contribute to reducing direct and indirect costs of injury from road collisions, ill health from pollution and costs associated with climate change. Nevertheless, we should anticipate difficult decisions involved in this approach to transport, and these are discussed shortly.

Decision-making and mobility justice

The discussion so far gives a broad suggestion of the sorts of transport system that could realise justice as equality with respect to the values of transport and avoiding its harms. If this idea of justice is adopted, there remain questions about how to make specific transport decisions in different contexts, places and times, and how to engage with tensions, uncertainties and dilemmas.

At one level, it should be feasible to adapt existing tools in order to help think through consequences of transport decisions and so aid decision-making. For instance multi-criteria analysis may be designed to assess the range of social equalities and health equalities expected by a given transport measure. The trick would be to avoid focusing on one or other factor in isolation – for instance, it would need to look across pollution, and physical activity, and risks of collision, and at accessibility and affordability. Likewise, it would be important to consider the impact of a measure within the wider context of the transport system. For instance, a cycle route might bring small benefits when considered in isolation (especially in early stages of moving away from car reliance), but it might be a necessary component of a wider system enabling free movement by bicycle. It would also need to prioritise distribution of impacts before maximising benefits and costs. This would reverse the cost-benefit approach with its focus on maximising.

Within a system adopting mobility justice, some decisions could be straightforward. However many would not be. The difficulties involved in decision-making themselves make a case for a central role for transport planning to become much more open to experimentation and deliberative public participation. Even if society accepted an overarching approach based on ideas of equality, there would remain questions which should be put to democratic debate, and decision-making capable of drawing on knowledge which is distributed across society rather than vested in professionals and politicians.

While we know something about the impacts and implications of decisions about transport, there is plenty we don't know.¹⁷ Levels of uncertainty might vary depending on available evidence (and the quality and applicability of evidence¹⁸), and the scale of intervention, but it

¹⁷ This echoes a more general point on uncertainty made for instance by Rip 1997.

¹⁸ As discussed in Section 2, methods and tools used to assess transport measures and plans all incorporate assumptions about travel behaviour and effects of transport (this would also be the case for methods developed to support more just transport). These assumptions can be derived in part

will be there for pretty much any transport intervention. In the face of uncertainty, one possible approach is to experiment with measures – for instance applying them over a small scale, or for a limited period (see Chatterton et al. 2015). An interesting benefit of this idea is that in addition to offering a way of checking at least short-term impacts, it can address – with the evidence of practice - fears about changes. The Stockholm congestion charge is a good example of this, where (in contrast with British cities outside London) the decision was taken to implement the charge for a trial period and then to hold a referendum on whether to retain the charge. Having seen the charge work, and bring benefits to the city, there was public support for keeping it (Borjesson et al. 2012). Another example is Ghent's experimentation with different forms of pedestrianisation, including school streets, and play streets, and in some cases informal car free areas which occur as a consequence of adjacent streets being pedestrianised.¹⁹

Beyond experimentation, tackling uncertainty in transport planning needs public participation. Since transport is so integrated across most aspects of people's lives, impacts of changes can be diverse, complicated and very different for different people and in different places. No one person or decision-making body will have a monopoly on this understanding, and the best experts on particular impacts are likely to be those affected. If people from across society can be brought into thinking about transport, then there is a possibility of improving understanding and prospects of making decisions which contribute to supporting lives (see also Bohman 1999).

In addition to its knowledge based role, public deliberation can have an important democratic function in transport decision-making. One, fairly stark, example of a question that may need to be settled through democratic debate concerns health. Much of the focus of debate on transport and health is around the risks of collision, harms of pollution (and we could add lost opportunities for physical activity if walking and cycling is difficult). But transport is also vital to a well-functioning health system. Getting to a hospital quickly can be a matter of life or death. Further, centralised and specialised hospitals can provide life-saving treatment which would be unlikely to be possible in more dispersed smaller hospitals. Yet this sort of healthcare system relies on substantial, probably motorised, transport and an infrastructure to support it – this is not just about getting people to hospitals (although that is a major part of it), but is also about supplies. In other words there could be a tension between reducing some of the life-threatening harms caused directly by transport and providing life-saving treatment, even if hospitals can be returned to central locations in a just transport system (rather than forced into car-dependent suburban sites).

Ideas of justice can contribute to thinking through this tension and exploring which approaches would reduce inequalities and overall harm. But this sort of inquiry may reach a point where there are not definitive answers, or if there are, we may not know what they are. In that case, the tension would be something that can only reasonably be resolved through democratic debate about which sort of life-sustaining system would reduce health inequalities, and if there is no clear answer to that, then there is a need for debate about which is preferred. Further, it may be found that dilemmas about justice and transport might not be limited to these stark examples about sustaining lives. Justice involves concern for

from empirical evidence, but there is no guarantee that a measure applied in one place and time would have the same effects as when applied in another place and time.

¹⁹ Conversation with transport planner from Ghent.

quality of life and people's ability to engage in activities which matter to them, and if different configurations of transport support - and inhibit - different activities then we might expect multiple dilemmas about the sorts of activities which society should prioritise and protect (for instance, think of dilemmas about giving valued land over to public transport). Again, tackling such questions is something that should be dealt with through democratic processes.

As democracy, and as a way of improving knowledge, there is a compelling case for public participation in decision-making to take the form of a deliberative process in which public are involved in framing, discussing, challenging decisions at each stage of planning (see Dryzek 2001, Fiorino 1990; Mullen et al. 2011.)²⁰ The case is that otherwise, people simply express a view on options (or worse one option) which is set out for them, and in which they have no real prospect of contributing to developing plans and decisions which take account of, and respond to, their knowledge and opinions. There are many difficulties for public participation, and a need for constant guard against difficulties. There are too many practices that do little more than inform publics of a fait accompli while using the phrase 'participation' to give a veneer of legitimacy (see Arnstein 1969). Where more significant involvement is available, there can still be concerns about power imbalances between professional experts and lay publics, or among social groups, and further concerns that people's lay expertise knowledge is not taken seriously (see Fiorino 1990; Martin 2008; Ottinger 2013). The further and far more intractable difficulty stems from the tension between numbers of people who can (even if they have time) be involved and the depth of involvement possible (Dryzek 2001). The difficulties this raises are slightly different for the democratic function than for the knowledge function (see Fiorino 1990). In relation to knowledge, there is some prospect that decisions will be better (that is, take better account of implications) if they are made in light of as many relevant factors as possible. So if people from across different groups, areas and so on are involved, then that has potential to improve decisions. For the democratic function, things are more tricky. It is not legitimate to claim that decisions are democratic simply in virtue of having direct involvement of a sub-section of society. Put another way, decisions are not democratic just because someone like you (e.g. same gender, age, ethnicity, location etc.) has spoken for you (Mullen et al. 2011). If decision-making involves people from diverse groups then there might be a better chance that the decisions made would have broad public acceptability, but that cannot be assumed. Given this, participation in transport planning should be seen as contributing to wider democratic processes, rather than as democratic in itself. That is not to belittle its value in this contribution.

Overlapping interests and broad appeal of mobility justice

Transport planning based on a fundamental principle that each and every life matters would require broad democratic support if it is to work. This type of support would both inform and benefit from the sorts of public participation just discussed. Experience of attempting to move to more sustainable transport indicates the challenges involved in moving to a vision of transport which shifts away from reliance on private cars and highly polluting transport. The sections above have discussed aids to decision-making and political assumptions about transport which act as barriers to change, but which can also be challenged on grounds of incoherence and inconsistency (some of the 'choice' rhetoric about transport), lack of

²⁰ For more discussion of citizen participation and ways to enable and support it, see Eurig Scandrett's thinkpiece for Big Ideas at https://www.foe.co.uk/sites/default/files/downloads/citizen_participation_and.pdf

evidence (on economic development and transport), or simply because they do not intend to reflect the principle of equality (some assessment tools). In an open-minded debate, it could be hoped that these arguments and assumptions could be tested, challenged and reformed. There are though, further significant influences the attractiveness of one or other approach to transport. First are influences stemming from created images and representations of transport, especially car culture. Secondly, and arguably more importantly, are considerations about how different interests and concerns would be affected (or met) by a more just mobility system.

Perhaps the most significant constructed image is of driving and vehicle ownership as desirable and aspirational. This presentation is recreated and replicated by many vehicle manufacturers advertising promises of worlds of open roads, admiration for drivers and vehicles, sometimes with 'ideal' nuclear families (usually with heterosexual parents) being 'ideal' in their comfortable car, sometimes with male drivers with the charm and confidence but none of the flaws of Captain Poldark, and still in some cases, a level of sexism which is much discussed and parodied (google 'sexism and car adverts'). Coupled with this has been what would too generously be called sharp practices by some manufactures in reporting environmental, efficiency and performance standards, and which have helped obscure the real costs of, and environmental damage from, vehicles. Moreover, these representations can be challenged not only for their gender stereotypes, but also for the extent to which they diverge from what is the reality of congestion, stress of finding a parking place, expense, vehicle breakdowns, pollution within as well as outside the vehicle (see Weijers 2014), and so on.

More than this, car culture can be challenged by emphasising the far reaching benefits, attraction and interests served by transport planning beginning from a principle of equality. At one level, changing mobility practices opens new opportunities for industry. This is recognised by some vehicle manufacturers, who anticipate a trend away from private car ownership and are thinking about models of shared transport. As we have discussed, high volumes of traffic and planning predicted on car use, can themselves be a barrier to mobility by physically restricting movement on foot or bicycle, by reducing viability of public transport and by supporting built environments with large distances between homes, services, and workplaces. So moving away from car reliance offers possibilities for improved mobility (over short and longer distances using public transport) with benefits for the economy by supporting individuals' access to employment and education, and by reducing costs of ill health from pollution and collisions on roads (and potentially from physical inactivity) (see for example, McLaren 2010). There is also increasing opinion that less traffic can help create towns and cities which are attractive for knowledge based and creative industries (see Mullen and Marsden 2015 for discussion of evidence). Far from levelling down, a mobility system less reliant on private vehicles can contribute to creating safer, cleaner more walkable neighbourhoods allowing increased social interaction. There is evidence of house price increases for areas where motor (and aviation) traffic is reduced (e.g. Tang 2016) and where there is proximity to public transport and cycle routes (Welch et al. 2016). Where relatively few neighbourhoods benefit from low traffic levels then it tends to be the wealthier who can benefit (as indicated by increasing housing prices). Reducing reliance on motor traffic across society offers prospects for people, regardless of wealth, to live in desirable neighbourhoods.

Conclusion

Framing mobility and transport as issues of justice should be uncontroversial when we reflect on their value across our lives, on the serious physical threats and harms that some transport presents, and on how different configurations of transport enable, or inhibit participation in important social, personal, and political lives. Justice beginning from the principle that each and every person matters provides a robust framework for addressing transport across its impacts on our lives rather than focusing separately on specific social or environmental aspects of transport. This holistic approach is crucial if we are to avoid risks of tackling one problem only to exacerbate others. Moving to a more just transport system will require radical change to the transport system, so that it begins with the aim of ensuring that each person can move freely, effectively and safely and without creating inequalities in health or opportunity for others. Practically this is likely to mean a major reconfiguration of physical transport networks so that people are able (if they wish) to move freely without motor transport, and so that short and long distance public transport is available, accessible and affordable to serve public needs rather than profit. The framing of mobility justice challenges many of the political discourses, decision-making methods and tools which appear to lock societies into transport systems reliant on cars and with high levels of aviation. So gaining broad political and public support for this approach will be challenging. It may be possible though by emphasising the appeal of living with less traffic, and the multiple economic, social, business and individual interests which can benefit from a just mobility system which moves away from reliance on private vehicles and very polluting travel. Beyond this, mobility justice based on equality needs to inform development of new assessment tools, drawing on existing methods such as multi-criteria analysis but taking account of the impacts on equality of the diverse social, economic and environmental impacts of transport. Assessment tools need to work in conjunction with decision-making that takes account of uncertainty through willingness to experiment, and by embedding meaningful public participation capable of improving understanding of transport's impacts across society and contributing to democratic governance of transport.

November 2016

References

- Anable, J. and Element Energy Limited (2013) Pathways to high penetration of electric vehicles for The Committee on Climate Change.
- Anscombe, G.E.M. (1958) Modern Moral Philosophy. *Philosophy*, 33, pp 1-19
- Appleyard, D. (1981) *Liveable Streets*. University of California Press: Los Angeles.
- Agyeman, J. and Evans, B. (2004), 'Just sustainability': the emerging discourse of environmental justice in Britain? *Geographical Journal*, 170, 155–164
- Agyeman, J., (2003) Toward Just Sustainability in Urban Communities: Building Equity Rights with Sustainable Solutions, *The Annals of the American Academy of Political and Social Science*, 590, 1, **35-53**
- Arnstein, S.R. (1969) A Ladder of Citizen Participation, *Journal of the American Institute of Planners*, 35, 4, 216-224

- [Azetsop, J.](#) (2010) Social Justice Approach to Road Safety in Kenya: Addressing the Uneven Distribution of Road Traffic Injuries and Deaths across Population Groups, *Public Health Ethics*, 3, 2, 115-127.
- Banister, D. (2008) The sustainable mobility paradigm, *Transport Policy*, 15, 73–80.
- Banister, D. (2012) Transport and economic development: reviewing the evidence, *Transport Reviews*, 32, 1, 1-2.
- Barnes, J. and Chatterton, T. (2016) [An environmental justice analysis of exposure to traffic-related pollutants in England and Wales](#). In: *Air Pollution XXIV, Proceedings of the 24th International Conference on Modelling, Monitoring and Management of Air Pollution, Greece, 20-22 June 2016*, Crete, Greece, 20-22 June 2016. Southampton, UK: Wessex Institute of Technology Press
- Bateman, I., Turner R.K. and Bateman, S. (1993). Extending cost benefit analysis of UK highway proposals: environmental evaluation and equity, *WP PA 93-05*. Centre for Social and Economic Research on the Global Environment, University of East Anglia.
- Baum, T. (2006) Low-cost Air Travel: Social Inclusion or Social Exclusion? *Tourism Culture & Communication*, 7, 1, 49-56
- Beauchamp, D. (1976) Public Health as Social Justice, *Inquiry*, 13, 1, 3-14
- Beyazit, E. (2011) Evaluating Social Justice in Transport: Lessons to be Learned from the Capability Approach, *Transport Reviews*, 31, 1, 117-134.
- Beutel, M.E., Jünger, C., Klein, E.M., Wild, P., Lackner, K., Blettner, M. Binder, H., Michal, M., Wiltink, J., Brähler, E., and Münzel, T. (2016) Noise Annoyance Is Associated with Depression and Anxiety in the General Population- The Contribution of Aircraft Noise. *PLoS ONE* 11(5): e0155357. doi:10.1371/journal.pone.0155357
- Bohman, J. (1999) Democracy as Inquiry, Inquiry as Democratic: Pragmatism, Social Science, and the Cognitive Division of Labor Author, *American Journal of Political Science*, 43, 2, 590-607
- Borjesson M., Eliasson J., Hugosson M.B. and Brundell-Freij K. (2012) The Stockholm congestion charges—5 years on. Effects, acceptability and lessons learnt, *Transport Policy* 20, 1–12
- Brubacher J.R., Chan H., Erdelyi S., Schuurman N. and Amram O. (2016) The Association between Regional Environmental Factors and Road Trauma Rates: A Geospatial Analysis of 10 Years of Road Traffic Crashes in British Columbia, Canada. *PLoS ONE* 11(4): e0153742. doi:10.1371/journal.pone.0153742
- Čapek, S.M. (1993) The “Environmental Justice” Frame: A Conceptual Discussion and an Application, *Social Problems* 40, 1, 5-24
- Chartered Institution of Highway & Transportation (CIHT), 2010. *Manual for Streets 2: Wider Application of the Principles*. CIHT.
- Chatterton, T., Williams, D., Marsden, G., Mullen, C., Anable, J., Docherty, I., Faulconbridge, J., Cass, N., Roby, H. and Doughty, K. (2015) Flexi-mobility: Helping local authorities unlock low carbon travel? In: *University Transport Studies Group (UTSG) 47th Annual Conference*, London, 5-7 January 2015

Committee for Climate Change (no date) **Total emissions versus indicator (2003-2027)** Online at: <https://www.theccc.org.uk/charts-data/ukemissions-by-sector/transport/>

Committee on Climate Change (2015) *Committee Sectoral scenarios for the Fifth Carbon Budget Technical report* Nov 2015, online at: <https://documents.theccc.org.uk/wp-content/uploads/2015/11/Sectoral-scenarios-for-the-fifth-carbon-budget-Committee-on-Climate-Change.pdf>

Communities and Local Government (CLG) (2009) *Multi-criteria analysis: a manual*. London, CLG

Curran, G. (2007) *21st Century Dissent: Anarchism, Anti-Globalization and Environmentalism*, Palgrave Macmillan UK

de Hartog, J. J., Boogaard, H., Nijland, H., and Hoek, G. (2010) Do the Health Benefits of Cycling Outweigh the Risks? *Environmental Health Perspectives*, 118, 8, 1109–1116.

Department for Transport (2015a) Road Traffic Forecasts 2015 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/411471/road-traffic-forecasts-2015.pdf

Department for Transport statistics (2015b) Key Outcome Indicators - Strategic Framework for Road Safety: Great Britain, Table RAS41001

de Jong, R., (2016) *Exporting Pollution: Dumping Dirty Fuels and Vehicles in Africa*, United Nations Environment Programme

Docherty, I., and Shaw, J. (2011) The transformation of transport policy in Great Britain? 'New Realism' and New Labour's decade of displacement activity. *Environment and Planning A*, 43(1), pp. 224-251. (doi:"10.1068/a43184)

Dryzek, J.S. (2001) Legitimacy and economy in deliberative democracy, *Political Theory* 29, 5, 651–669

Dworkin, R. (2000) *Sovereign Virtue: the Theory and Practice of Equality*. Harvard University Press: Massachusetts.

European Commission (2015a) Mobility and Transport Statistical pocketbook 2015 http://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2015_en.htm

European Commission (2015b) Pedestrians and cyclists unprotected road users http://ec.europa.eu/transport/road_safety/specialist/knowledge/pedestrians/pedestrians_and_cyclists_unprotected_road_users/no_speed_no_mass_and_no_protection_en.htm

European Environment Agency (EEA) (2014a) Air pollution fact sheet, Denmark <http://www.eea.europa.eu/themes/air/air-pollution-country-fact-sheets-2014>

European Environment Agency (2014b) Air pollution fact sheet, Germany <http://www.eea.europa.eu/themes/air/air-pollution-country-fact-sheets-2014>

European Environment Agency (2014c) Air pollution fact sheet, Netherlands <http://www.eea.europa.eu/themes/air/air-pollution-country-fact-sheets-2014> (Accessed 15/11/2015)

European Environment Agency (2015) Emissions of the main air pollutants in Europe, <http://www.eea.europa.eu/data-and-maps/indicators/main-anthropogenic-air-pollutant-emissions/assessment-1>

Fecht D., Fischer P., Fortunato L., Hoek G., de Hoogh K., Marra M., Kruize H., Vienneau D., Beelen R. and Hansell A. (2015) Associations between air pollution and socioeconomic characteristics, ethnicity and age profile of neighbourhoods in England and the Netherlands, *Environmental Pollution* 198, 201 – 210

Fedtke, J. (2003) Strict Liability for Car Drivers in Accidents Involving "Bicycle Guerrillas"? Some Comments on the Proposed Fifth Motor Directive of the European Commission. *The American Journal of Comparative Law*, 51, 4, 941-95.

Fernald, J.G. (1999) Roads to Prosperity? Assessing the Link between Public Capital and Productivity, *The American Economic Review*, 89, 3, 619-638

Fiorino, D., (1990) Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms, *Science, Technology and Human Values*, 15, 2, **226-243**

Geddes, J.A., Martin, R.V., Boys, B.L., and van Donkelaar, A. (2016). Long-Term Trends Worldwide in Ambient NO₂ Concentrations Inferred from Satellite Observations, *Environmental Health Perspectives*, 124, 3, 281–289. <http://doi.org/10.1289/ehp.1409567>

Gori, S., Nigro, M., and Petrelli, M. (2014) Walkability Indicators for Pedestrian-Friendly Design *Transportation Research Record: Journal of the Transportation Research Board*, No. 2464, Transportation Research Board of the National Academies, Washington, D.C., 2014, 38–45.

Gössling, S. (2016) Urban mobility justice, *Journal of Transport Geography*, 54, 1–9

Guarnieri, M. and Balmes, J. R. (2014) Outdoor air pollution and asthma, *The Lancet*, 383, 9928, 1581 - 1592

Guéniat, M., Harjono, M., Missbach, A., and Viredaz, G., (2016) *Dirty Diesel. How Swiss Traders Flood Africa with Toxic Fuels*, Public Eye

Guhnemann A. (2016) CH4ALLENGE Monitoring and Evaluation Manual: Assessing the impact of measures and evaluating mobility planning processes, European Platform on Sustainable Urban Mobility Plans. Online at: http://www.eltis.org/sites/eltis/files/trainingmaterials/manual_monitoring-evaluation_en.pdf

Harris, J. (1988) 'More and Better Justice' in Bell, J. M. and Mendus, S. *Philosophy and Medical Welfare*. 1st ed. Cambridge University Press: Cambridge, 75-96

Hill, N., Varma, A., Harries, J., Norris, J. and Kay, D. (2012) *A review of the efficiency and cost assumptions for road transport vehicles to 2050*: Report for the Committee on Climate Change, AEA

International Energy Agency (IEA 2015), *CO₂ Emissions from Fuel Combustion – Highlights*, 2015 ed. International Energy Agency, Paris

IPCC (2014) *Summary for policymakers*. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth

Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, et al (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1-32.

Jordan, A. (2008) The governance of sustainable development: taking stock and looking forwards, *Environment and Planning C: Government and Policy*, 26, 17 - 33

Kaltenbach M., Maschke C., Heß F., Niemann H. and Führ M. (2016) Health Impairments, Annoyance and Learning Disorders Caused by Aircraft Noise Synopsis of the State of Current Noise Research, *International Journal of Environmental Protection*, 6, 1, 15-46

Kodukula, S. (2011) *Reviving the Soul in Seoul: Seoul's experience in demolishing road infrastructure and improving public transport*, Federal Ministry for Economic Cooperation and Development

Lucas, K. (2006) Providing for social inclusion within a framework for environmental justice in the UK, *Transportation Research Part A: Policy and Practice*, 40, 10, 801–809

Lucas, K. (2012) Transport and social exclusion: Where are we now? *Transport Policy*, 20, 105–113

Lucas, K., Bates, J., Moore, J. and Carrasco, J.A. (2016) Modelling the relationship between travel behaviours and social disadvantage, *Transportation Research Part A: Policy and Practice*, **85**, pp.157-173.

Lyons, G., (2011) Technology fix versus behaviour change. In: Grieco, M. and Urry, J. (Eds.), *Mobilities: New Perspectives on Transport and Society*. Ashgate, Surrey, UK.

Lyons, G., and Urry, J., (2005) Travel time use in the information age. *Transportation Research Part A: Policy and Practice*, 39, 257–276.

Macleod, A. (2013) The Viability of Bike-Rail Integration as a Commuter Mode in Leeds, Yorkshire (UK) Masters Dissertation, Institute for Transport Studies, University of Leeds

Marsden, G., **Mullen, C.A.**, Bache, I., Bartle, I., and Flinders, M. (2014) Carbon reduction and travel behaviour: Discourses, disputes and contradictions in governance, *Transport Policy*, **35**, pp.71-78. doi: 10.1016/j.tranpol.2014.05.012

Martens, K. (2016) *Transport justice: Designing fair transportation systems*, Routledge: New York

Martin, G.P. (2008) 'Ordinary people only': Knowledge, representativeness, and the publics of public participation in healthcare. *Sociology of Health & Illness* 30, 1, 35–54

Mattioli, G. (2016) Transport needs in a climate-constrained world. A novel framework to reconcile social and environmental sustainability in transport, *Energy Research and Social Science*, doi: [10.1016/j.erss.2016.03.025](https://doi.org/10.1016/j.erss.2016.03.025)

Mattioli G., Anable J. and Vrotsou K. (2016) Car dependent practices: Findings from a sequence pattern mining study of UK time use data, *Transportation Research Part A: Policy and Practice*, **89**, pp.56-72. doi: [10.1016/j.tra.2016.04.010](https://doi.org/10.1016/j.tra.2016.04.010)

Mattioli, G. and Colleoni, M. (2016). Transport disadvantage, Car Dependence and Urban Form. In: Pucci P., Colleoni, M. (eds.), *Understanding Mobilities for Designing Contemporary Cities*. Berlin: Springer.

McLaren, D. (2010) *42% Better: the feasibility and added value in meeting Scotland's climate change targets for 2020*. Friends of the Earth Scotland. Available online at: http://www.foe-scotland.org.uk/sites/www.foe-scotland.org.uk/files/42PercentBetter_0.pdf

Mitchell, G. and Dorling, D. (2003) An environmental justice analysis of British air quality, *Environment and Planning A*, 35, 5, 909-929.

Moody, S. and Melia, S. (2014) Shared space: Research, policy and problems, *Proceedings of the Institution of Civil Engineers - Transport*, 167, 6, 384-392.

Mullen, C.A. (2012) "Mobility (transport)." In *Encyclopedia of Applied Ethics Second Edition volume 3* edited by R. Chadwick, 137-144, Academic Press: San Diego

Mullen, C.A., Hughes, D. and Vincent-Jones, P. (2011) The Democratic Potential of Public Participation: Healthcare Governance in England, *Social & Legal Studies*, 20, pp.21-38. [doi: 10.1177/0964663910391349](https://doi.org/10.1177/0964663910391349)

Mullen, C.A. and Marsden, G. (2015) Transport, economic competitiveness and competition: A city perspective, *Journal of Transport Geography*, 49, pp.1-8. [doi: 10.1016/j.jtrangeo.2015.09.009](https://doi.org/10.1016/j.jtrangeo.2015.09.009)

Mullen, C.A. and Marsden, G. (2016a) Mobility justice in low carbon energy transitions, *Energy Research & Social Science*, Open Access: <http://www.sciencedirect.com/science/article/pii/S2214629616300615>

Mullen, C.A. and Marsden, G. (2016b) Unconsidered futures: Limits of economic assumptions in forecasts for electric vehicles, DEMAND Centre Conference, Lancaster, 13-15 April 2016

Mullen, C.A. and Marsden, G. (forthcoming) The car as a safety-net: narrative accounts of the role of energy intensive transport in conditions of housing and employment uncertainty, in Hui, A., Day, R., and Walker, G., (eds) *Demanding Energy: Spaces, Temporalities and Change*, Palgrave: Basingstoke

Mullen, C.A., Tight, M., Whiteing, A. and Jopson, A. (2014) Knowing their place on the roads: What would equality mean for walking and cycling?, *Transportation Research Part A: Policy and Practice*, 61, pp.238-248. [doi: 10.1016/j.tra.2014.01.009](https://doi.org/10.1016/j.tra.2014.01.009)

Newman, P. and Kenworthy, J. (1999) *Sustainability and Cities: Overcoming automobile dependence*. Island Press: Washington

Nussbaum, N. (2003) Capabilities as Fundamental Entitlements and Social justice, *Feminist Economics*, 2-3, 33-59

Plowden, S. and Hillman, M. (1996) *Speed Control and Transport Policy*, Policy Studies Institute. London

Pooley, C.G., Horton, D., Scheldeman, G., **Mullen, C.A.**, Jones, T., Tight, M., Jopson, A. and Chisholm, A. (2013) Policies for promoting walking and cycling in England: A view from the street, *Transport Policy*, 27, 66-72. [doi: 10.1016/j.tranpol.2013.01.003](https://doi.org/10.1016/j.tranpol.2013.01.003)

Railton, P. (1985) 'Locke, Stock, and Peril: Natural Property Rights, Pollution, and Risk' in Gibson, M. (ed.) *To Breathe Freely; Risk, Consent and Air*. pp. 89-123, Rowman and Allanheld: New Jersey

Rip, A. (1997) A cognitive approach to relevance of science, *Social Science Information*, 36, 615-640.

Rogers, B. (2015) The Social Costs of Uber, *University of Chicago Law Review Dialogue* 85, 82-102.

Root, A., Boardman, B., Fielding, W., (1996) The Costs of Rural Travel, Final Report of Sustainable Mobility and Accessibility in Rural Transport, Energy and Environment Programme Environmental Change Unit, University of Oxford

Royal College of Physicians (RCP) (2016) *Every breath we take: the lifelong impact of air pollution*. Report of a working party, London: RCP.

Orvañanos Murguía R., (2015) *Share the Road: Design Guidelines for non-motorised transport in Africa*. UNEP and FIA Foundation

Ottinger, G. (2013) Changing Knowledge, Local Knowledge, and Knowledge Gaps: STS Insights into Procedural Justice Science, *Technology, & Human Values* 38, 2, 250-270

Schiermeier, Q. (2015) The science behind the Volkswagen emissions scandal, *Nature*, <http://www.nature.com/news/the-science-behind-the-volkswagen-emissions-scandal-1.18426>
doi:10.1038/nature.2015.18426

Sheller, M. and Urry, J. (2003) Mobile Transformations of 'Public' and 'Private' Life, *Theory, Culture & Society*, 20, 3, 107-125

Shove, E. (2010) Beyond the ABC: climate change policy and theories of social change, *Environment and Planning A*, 42, 1273–1285

Shrader-Frechette, K. (2002) *Environmental Justice: Creating Equality, Reclaiming Democracy*, Oxford University Press

Social Exclusion Unit (SEU) (2003) *Making the Connections. Final Report on Transport and Social Exclusion*. Office of the Deputy Prime Minister/ SEU

Strengers, Y. (2014) Fly or die: air travel and the internationalisation of academic careers, Demand Centre, online article at: <http://www.demand.ac.uk/04/06/2014/fly-or-die-air-travel-and-the-internationalisation-of-academic-careers>

Sulemana, I., (2012) Assessing Over-aged Car Legislation as an Environmental Policy Law in Ghana, *International Journal of Business and Social Science*, 3, 20

Tang, C. K. (2016) Traffic Externalities and Housing Prices: Evidence from the London Congestion Charge, *Spatial Economics Research Centre Discussion Paper*, 205, <http://www.spatial-economics.ac.uk/textonly/SERC/publications/download/sercdp0205.pdf>

Timmers, V.R.J.H. and Achten, P.A.J. (2016) Non-exhaust PM emissions from electric vehicles, *Atmospheric Environment*, 134, 10-17

van Wee, B. (2011) *Transport And Ethics: Ethics and the Evaluation of Transport Policies and Projects*, Edward Elgar, Cheltenham

Vermeulen, R., Silverman, D.T., Garshick, E., Vlaanderen, J., Portengen, L., and Steenland, K. (2014) Exposure-Response Estimates for Diesel Engine Exhaust and Lung Cancer Mortality Based on Data from Three Occupational Cohorts, *Environmental Health Perspectives*, 122, 2, 172-177

Victoria Transport Policy Institute (VTPI) (2009) *Transportation Cost and Benefit Analysis II - Travel Time Costs*, Victoria Transport Policy Institute, www.vtpi.org

Vincent D (2012) Low carbon energy technology diffusion: A UK Practitioners Perspective. In Ockwell, D.G. and Mallett, A. (eds.) *Low-carbon Technology Transfer: From Rhetoric to Reality*, Routledge, Oxon

Walker, G. (2009) Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice, *Antipode*, 41, 4, 614–636

Weijers, E. (2014) And what about the air inside a vehicle? Another risk when driving a car ... presented at Tackling Tomorrow's Air Pollution Today, Leicester, 22 June 2014, [http://joaquin.eu/03/MyDocuments/7_Weijers_Exposure_to_NOx_and_particulate_matter_while_driving\(1\).pdf](http://joaquin.eu/03/MyDocuments/7_Weijers_Exposure_to_NOx_and_particulate_matter_while_driving(1).pdf)

Welch, T., Gehrke, S., Wang, F. (2016) Long-term impact of network access to bike facilities and public transit stations on housing sales prices in Portland, Oregon, *Journal of Transport Geography*, 54, 264–272

White, P. (2008) *Factors affecting the decline of bus use in the metropolitan areas*, commissioned by PTEG, University of Westminster

Whitelegg, J. (1997) *Critical mass: transport environment and equity in the twenty-first Century*, Pluto Press: London and Illinois.

Widdows, H. (2013) *The Connected Self: The Ethics and Governance of the Genetic Individual*, Cambridge University Press; Cambridge

World Health Organisation (no date) *Public health, environmental and social determinants of health* http://www.who.int/phe/health_topics/outdoorair/databases/health_impacts/en/index1.html

World Health Organisation (WHO) (2013) *Development of the health economic assessment tools (HEAT) for walking and cycling*, http://www.euro.who.int/_data/assets/pdf_file/0005/248900/Development-of-the-health-economic-assessment-tools-HEAT-for-walking-and-cycling.pdf?ua=1

World Health Organisation (WHO) (2015) *Global Status Report on Road Safety*. WHO, Geneva

World Health Organisation (WHO) (2016) Air pollution levels rising in many of the world's poorest cities; News release, Geneva.