e-Supplement

Understanding how transport choices are affected by the environment and health: Views expressed in a study on the use of carbon calculators

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SUMMARY

Objectives: To examine the influence that the provision of environmental information might be able to make on personal travel behaviour through analysis of the views of members of the public expressed in a study for the UK Department for Transport on attitudes towards carbon calculator tools.

Study design: A three-stage qualitative survey taking an ideographic approach to analysing public attitudes to the use of carbon calculator tools in relation to making transport decisions.

Methods: Interviews and discussion groups with stakeholders, non-users and users providing extensive data that were analysed using the British Market Research Bureau's matrix mapping methodology.

Results: Despite considerable awareness of climate change as an issue, personal carbon emissions were not found to have much influence on personal transport choice, which could be seen as being dominated by issues of cost (both in time and money), comfort and convenience.

Conclusions: The spatial and temporal dislocation of the cause and effects of climate change make it difficult to link the impacts of personal travel behaviour with specific activities. If environmental- and health-based information is to be provided as a lever to change travel behaviour, it may be necessary to provide information on issues such as local air pollution and personal health impacts in order to link wider benefits with a travel user's self-interest.

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Introduction

Climate change has become the 'sustainability issue' of the current decade. Tony Blair described it as 'the world's greatest environmental challenge' and 'so far reaching in its impact and irreversible in its destructive power, that it alters radically human existence'.[1] Sir David King, the UK Government's former Chief Scientific Adviser, sees it as 'the most severe problem that we are facing today – more serious even than the threat of terrorism',[2] and the National Health Service Sustainable Development Unit claims it is 'probably the most serious threat to our health and well-being'.[3]

To many, the term 'sustainable development' has become synonymous with efforts to combat climate change, and 'carbon reduction' in particular. Despite little in the way of firm obligations and clear responsibilities to act, compared with other environmental threats, it is a subject that currently receives a higher political and media profile than almost any other environmental or health issue. It certainly has a high 'recognition' value with the public; by 2002, only 1% of the English public had not heard of either 'climate change', 'global warming' or the 'greenhouse effect',[4] an awareness that was still as strong in 2007.[5] There is growing awareness amongst the public of the negative contribution of both air traffic and road transport on the environment.[6] However, public understanding of the science underlying these issues is somewhat limited, and people are largely unable to link these general environmental terms to their own personal behaviour and carbon emissions.[6] Hence, despite recognition that many transport modes have negative environmental effects and that people claim to want to live greener lifestyles,[7] people are quite reluctant to change their travel behaviour in line with this.[8]

Given that there is such a strong attitude–behaviour gap surrounding environmental concern and travel behaviour, perhaps a more personal message is pertinent. Personal messages, especially interactive messages, have been shown to have a greater impact on attitude and behaviour change.[9] One way that has been used to try and engage people more directly with climate change and the issue of personal carbon emissions is through the provision and use of 'carbon calculators'.

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Carbon calculators are tools that allow people to assess how their personal behaviour does, or could, impact on the environment. People input information in response to specific questions, and an estimate of emissions of carbon dioxide resulting from the activities (or carbon equivalence) is produced at the end. As such, carbon calculators have the quality of being personalized and interactive, and therefore may have significant potential for changing attitudes and behaviour. Whilst these tools for estimating the impacts of personal behaviour are becoming increasingly common in relation to climate change, they rarely consider non-carbon impacts of behaviour, such as local environmental pollution, or beneficial and non-beneficial impacts on health.

This paper is based on a research project carried out for the UK Department for Transport (DfT) by the British Market Research Bureau and the Air Quality Management Resource Centre and Centre for Transport and Society at the University of the West of England, Bristol. The study was commissioned to improve the understanding of how the public engages with environmental terminology and personal carbon emissions, including making recommendations for good practice in the design of carbon calculator tools for raising awareness of personal contributions to climate change and encouraging behaviour change. The full report is available on the DfT website,[10] but this paper will examine the views expressed by participants in the study and use them as the basis for discussing some key issues raised:

- What are the key factors deciding an individual's transport choices?
- How do environment- and health-related factors rate in these decisions?
- Might the perception of climate change be a less significant driver for behaviour change than health and other local environmental issues?
- Do potential actions to reduce climate change need to have clearer benefits to people's daily lives?

Methods

An idiographic approach was taken, involving intensive studying of individuals and small groups in great detail. This lends itself to a predominantly qualitative methodology using a series of direct discussions and interactions with a range of people with different experiences of carbon calculators. The aim of qualitative research is to define and describe the range of emergent issues and explore linkages, rather than to measure their extent.[11] The method adopted consisted of three stages of research, each with a distinct group of respondents.

Stage 1: stakeholder meetings

Separate meetings were held with eight key stakeholders, each of whom had either direct experience of setting up and managing an online carbon calculator, or other experience of communicating environmental information. The meetings explored the views of these stakeholders in relation to good practice for communicating environmental information and the lessons learnt from existing carbon calculators, with regard to their usage and perceptions of attitudes towards them.

Stage 2: user interviews

Twenty in-depth interviews were held with people who had previously used carbon calculators, looking at their motivation to use the tool, and their thoughts about accessibility and usability, understanding of terminology, information needs, improvements and suggestions, as well as their expectations and responses to the final score. Respondents were identified by e-mail through an online carbon offset provider, who contacted a proportion of their customers in relation to the research.

Stage 3: reconvened non-user group discussions

These discussions formed the main body of the research, incorporating 15 reconvened focus groups (each meeting twice in total) around England, Scotland and Wales. The groups were made up of eight to 10 people who had never used a carbon calculator. The first session (Wave 1) explored people's spontaneous views and understanding of environmental issues, with particular focus on terminology and quantifying carbon emissions. The second session (Wave 2) involved a practical hands-on exploration of existing carbon calculators, with respondents sharing their reactions to different aspects, such as content, layout and terminology. Participants were recruited using free-find methods and, in order to reflect a broad spread of the general public, quotas were incorporated, including age, gender, ethnicity, social class, urban/suburban classification and family status. Most importantly, groups were segmented using a simplified version of the Anable segmentation,[12] which classifies people according to their attitude towards car usage and the environment; this ensured that a wide range of attitudes towards the environment and transport mode would be present.

Data analysis

Data were analysed using the British Market Research Bureau's matrix mapping method, details of which can be found in the report on the project.[10]

Results

Understanding of the terminology

There has been recent growth in public awareness about climate change, but this has not necessarily led to greater understanding of the science behind climate change or people's ability to relate such issues to individual behaviour, as would concur with previous research.[6] Common terminology, such as 'climate change' and 'global warming', were recognized and felt to convey a broad message about environmental problems, yet a lack of understanding combined with often contradictory media coverage provoked confusion and cynicism. Emissions-related terminology was less well recognized and was felt to be confusing. However, once explained, people were able to relate such terms to their personal behaviour. People were generally unaware of how carbon emissions are quantified and measured. Abstract quantities were felt to be meaningless unless related to something more tangible, such as social norms, target emissions or environmental impact.

Use of carbon calculators

Despite initial pessimism about the impact that using a carbon calculator might have on people's understanding of emissions, following the practical session, participants who had not used carbon calculators previously, expressed an increased appreciation of carbon emissions information. This was in contrast with those who had used them before, who felt that it was sufficient prior understanding of the issue that had motivated them to use a calculator in the first place. There was increased interest in reducing carbon emissions amongst participants using carbon calculators for the first time, but as explained below, this was largely outside of a transport context.

Travel behaviour as a special case

Despite increased understanding and increased interest in reducing carbon emissions, very few people felt able to change their travel behaviour. Analysis suggests that people have unique attitudes and behaviour with regard to transport to begin with, which constrain likely behaviour change, and they also have to face additional barriers if they actually get as far as trying to change their behaviour. For example, on the whole, the participants in this study felt able to make changes around their home on the basis of environmental considerations, but were much less willing to make changes to their own travel behaviour, especially with regard to changing transport mode from their own private motor vehicle to another mode of travel such as public transport, cycling or walking. These findings also reinforce those of previous work.[6,8] Analysis of the qualitative data suggested a number of reasons for this, and these are set out below.

Discussion

One of the key findings that significantly affects how environmental information can be used to change behaviour is regarding the perception of travel behaviour as being distinct from domestic behaviour, and less within an individual's power to control and determine. Further examination of this issue has identified five aspects of travel behaviour that contribute to this perceived powerlessness.

Travel behaviour change was perceived as difficult and substantial compared with other lifestyle changes

Changes in household behaviour were seen as small changes that were likely to save money and not cause significant inconvenience. On the other hand, changing to public transport was perceived as more expensive, and choosing other alternative modes of transport was perceived as being a lifestyle shift. Sometimes, carbon calculator sites reinforced such an idea by presenting strategies that required a perceived large change such as buying a smaller car or giving up a certain journey altogether. This is compared with suggestions for small-scale changes put forward for household emissions, such as boiling the kettle with less water (rather than giving up tea altogether or drinking cold tea!). Although smaller changes were sometimes suggested in relation to travel behaviour, such as smarter driving techniques and planning to avoid congestion, these were largely overlooked by respondents, who focussed instead on larger-scale suggestions, perhaps indicating their desire for a justification to maintain their current behaviour. In addition, household changes are likely to intuitively save the individual money, such as not leaving appliances on standby (a small-scale inconvenience which helps the environment and saves money) and changing to energy-saving light bulbs (a small extra outlay of money that helps the environment and saves money in the longer term by increasing the length of life of the bulb and reducing the amount of electricity used). Increasing self-interest alone helps encourage pro-environmental behaviour. Transport changes from car to bus or other public transport could often (but not always) incur extra costs for those who already own a car. Although per passenger mile, the costs of bus and train journeys can be less than for private motor vehicles when all annual running costs are taken into account[a], where an individual already owns a vehicle, the standing costs of tax and insurance can actually encourage car use in order to make the most of money that has

already been spent. Thus, as many people already own or have access to a car, using public transport usually incurs an additional cost which is often considerably more expensive than the simple fuel cost for using a car on the same journey. In addition, walking and using a bike for journeys often incurs readily identifiable increases in the expenditure of time and effort compared with changes in the household. If alternative modes of transport can be made to seem financially advantageous in comparison with car travel, it may be that this would provide the greatest lever of all on travel behaviour.

Car travel was seen as essential and necessary

This view often related to both the journey itself and to the mode of travel. Even when there was likely to have been another way of reaching a chosen destination, or reaching an equivalent alternative destination by another mode, perceived alternatives were rarely considered plausible and hardly ever sought, with the car remaining the default option. This view was particularly evident amongst participants from rural settings, especially in relation to travel for work or shopping. Even where public transport may have been possible, the restrictions in terms of 'when' and 'where' public transport went, particularly where there was a need for connections between routes, meant that this option was regarded as so inconvenient as to be unreasonable, particularly when adding fears to personal safety associated with late night travel.

Car travel has emerged as dominant due to socio-affective reasons

The dominance of the car in society has not just arisen out of necessity but has been crafted through careful social engineering by car manufacturers, making vehicles appealing, wanted and desired. As such, the use of the private motor vehicle is associated with feelings of status, wealth, wellbeing and normality.[13–16] In fact, for some, the freedom that a car achieves is viewed as a basic human right.[17] Any attempt, however subtle, at breaking the status and freedom aspects of driving a motor vehicle is likely to be resisted. Although people often identify with wanting to be seen as having concern for the environment, they also like to identify with the positive social signals displayed by owning and driving a vehicle.

Travel modes were often habitual

People get into the routine of using the car for certain journeys and never even consider other modes.[18] The longer this continues, the more difficult it becomes to break a habit, as the behaviour becomes more autonomous and less conscious, and car drivers will not be seeking to compare the impacts of their mode of travel. Tools such as carbon calculators do have the ability to make individuals reflect on their travel behaviour in terms of the environment, and can raise awareness of the impacts of habitual behaviour and lead to reconsidering alternative transport, but first they have to be made aware of the issue. As such, information on comparative journeys should be made on website tools used by 'die-hard drivers', so that comparative information on impacts of journeys, such as that provided by the Transport Direct site,[19] are automatically made available to them without having to first break their habit in order to seek the information.

No comparable disincentives for car travel

The car, undeniably, has many apparent attributes that make it a desirable form of transport. It is seen as being able to provide sheltered door-to-door travel and is generally marketed in terms of the freedom of the road rather than the congested rush-hour street. Whilst this may not be the reality of daily car travel, it is often held

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[a] Rail is 17 p/passenger mile, bus is 22 p/passenger mile and car is 24 p/passenger mile (6 p/mile of which is fuel). Source: Focus on Personal Travel, DfT, 2005. http://www.dft.gov.uk/pgr/statistics/datatablespublications/personal/focuspt/2005/ (last accessed 3 September 2008).

as the perception against which alternative modes, which may expose the traveller to both the weather and other members of the public, are judged. Whilst there may be significant personal benefits to be had from a modal shift away from motor vehicles, such as fitness gains from increased physical activity (even when using public transport), and social benefits from interaction with people in the local community, the way these are presented in wider society rarely has the same weighting as the messages conveyed by car advertising or the media representation of potential threats to personal safety (e.g. 'knife crime').

It is likely that significant work would need to be done to counter each of the cultural issues outlined above before carbon calculators are able to significantly influence decisions on transport mode by themselves. Most of these barriers are also likely to be applicable when seeking to encourage travel behaviour change for other environmental and health reasons.

Although travel behaviour (the main focus of this work) appeared to be particularly resistant to the influence of environmental information, discussions with participants indicated several areas where environmental factors may be more pertinent, and acknowledged that carbon calculators can play a key role in underpinning a slow evolution towards more environmentally conscious behaviour. However, further issues arise with the equating of environmental damage solely with carbon emissions, as this may fail to convey the full impacts of behaviour choices. Whilst the impacts of climate change are dislocated both spatially and temporally from the source of the emissions, other impacts such as environmental and social impacts, e.g. air pollution, noise, congestion and safety, are all immediate impacts that occur at or near the point of transport use. This is particularly true for key transport problems such as the 'school run', where these non-climate impacts may (when properly explained) be a significantly greater driver for behaviour change than climate change. The complexity of these multiple impacts was clearly identified by the Royal Commission for Environmental Pollution in their 2006 report on the urban environment[20].

The complexity of needing to explain climate change itself, and then how it has to be assessed in relation to other environmental, social and personal considerations has to be handled very carefully. Confusion arising from participants' limited understanding of environmental issues (i.e. beyond simple awareness of the terminology) was found to provoke feelings of cynicism and disinterest, particularly among non-users. When participants felt that they were not able to understand the issues easily, this helped to fuel other areas of cynicism, regarding issues such as whether human activity was the cause of climate change and whether there were political or economic motives behind the pressure on people to change their behaviour, such as restricting the development of other countries, increasing tax domestically, or profiting from the sale of 'green' products such as low-energy light bulbs.

It was demonstrated that carbon calculators can play a useful role in closing the gap between public understanding of broad environmental issues and how this relates to personal actions. Whilst the research highlighted some important limitations of these tools, particularly among previous users and a section of obstinate non-users who failed to be engaged by them, another section of the non-user group did emerge as more receptive to the personalized carbon emissions information. Interestingly, although they were not clearly divided by segmentation, this group appeared to be distinguishable from the other group due to their previous lack of engagement with environmental issues. However, even within this receptive group, any subsequent behaviour change was limited by perceptions of the practicalities of changing behaviour, and the relative insignificance of individual action in comparison with national, international and commercial emissions.

Participants showed a great degree of concern regarding the potential impacts of climate change and, by the end of the study, a significant realization of the potential impact of personal carbon emissions. However, there was little expression from participants about how the effects of climate change would impact on them and, as pro-environmental behaviour is more likely to occur when it is coupled with self-interest, this dislocation of cause and effect of climate change weakens it as a lever to engender behaviour change.

In order to identify existing users of carbon calculators, the project team had to rely on carbon offsetting companies to help recruit participants. Whilst this had some impact on the views expressed within parts of the study, it also raised further issues regarding climate change as a special case in terms of its impacts. The concept of 'offsetting' is not applicable to most other impacts of transport choices, and this may limit the potential for using this type of tool in other areas of environment and health. However, the introduction of carbon emissions into Transport Direct[21] and the incorporation of pollution exposure into the walking planning website, 'walkit.com',[22] does indicate a strong potential for embedding many types of information within transport planning tools. Travelfootprint.org,[23] a new website produced by the London Borough of Camden and ClearZones, also makes an effort to evaluate and balance both the climate change and local air quality impacts of travel modes.

Conclusions

Whilst carbon calculators are important to help people understand their impact on the environment, it appears that they have a number of key limitations. These include:

- they only represent one aspect of environmental damage (climate change). As such, they are unable to give an indication of health and environmental consequences of transport choices that are likely to be of more immediate relevance to the transport user in terms of their own self-interest;
- the aim of changing travel behaviour through the provision of information on carbon emissions, or other health and environmental impacts, through these tools relies upon there being a real and perceived alternative choice on offer. If there is not, increasing an individual's knowledge of the impact of their (unavoidable) choices may lead to increased feelings of guilt, fatalism and powerlessness, potentially reducing their inclination to seek out beneficial lifestyle choices that are more readily achievable; and
- where realistic choice does actually exist in transport modes, there was very little sign that health or environmental issues were likely to outweigh what can be summarized as the 'three Cs' – cost (in time and money), comfort and convenience. Whilst the comfort and convenience of other modes may rarely be able to compete with car travel, there may need to be significant savings in cost elements before public transport or non-motorized forms of transport are used.

While climate change has a very significant profile as an environmental issue, it may not be very powerful as a lever for encouraging individuals to change their travel behaviour, due to both the remote nature of the effects and the magnitude of individual emissions, and the real and perceived constrictions placed on travel choice by external constraints such as cost and availability. Carbon calculators may play a limited role in helping individuals to understand part of the environmental impact of their travel behaviour, but there are significant problems associated with getting this information to transport users, especially those who are likely to have the greatest carbon emissions. In particular, as habit

has been shown to play such a significant role in determining transport choices, it is also questionable whether micromanagement of individual journeys on the basis of environmental factors is as likely to achieve environmental goals as developing strategies that focus on encouraging overall behaviour change towards public and non-motorized transport. Where predominantly beneficial behaviour can be brought about across the whole of an individual's lifestyle, the benefits may well be much greater, even though there is a risk that every individual journey may not produce the minimal impact on the environment.

Acknowledgements

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