

# **Review of public attitudes to climate change and transport: Summary report**

## **Contents**

<b>Report Summary .....</b>	<b>2</b>
<b>1. The public understanding of climate change .....</b>	<b>4</b>
<b>2. Attitudes to transport and climate change.....</b>	<b>6</b>
<b>3. The attitude-behaviour gap .....</b>	<b>9</b>
<b>4. Barriers to changing travel behaviour .....</b>	<b>12</b>
<b>5. Segmentation.....</b>	<b>14</b>
<b>6. Interventions to change attitudes and behaviour .....</b>	<b>17</b>
<b>7. Research methodology .....</b>	<b>23</b>
<b>8. Research recommendations.....</b>	<b>25</b>
R1: Understanding how to engage with the public. ....	25
R2: Understanding the demand for air travel.....	25
R3: Media.....	27
R4: Barriers to changing travel behaviour .....	27
R5: Identity .....	28
R6: Segmentation.....	29
R7: Testing community based social marketing .....	29
R8: Trade-offs and policy acceptance.....	31
R9: Lifestyle.....	31

# Review of public attitudes to climate change and transport: Summary report

by

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## Report Summary

In September 2005, Dr Jillian Anable<sup>1</sup> together with Dr Ben Lane<sup>2</sup> and Dr Tanika Kelay<sup>3</sup> were commissioned by the UK Department for Transport to undertake an *Evidence base review of public attitudes to climate change and travel behaviour*. The overall objectives were to improve the evidence base for policy decisions concerning:

1. How climate change knowledge and awareness relates to transport decision-making, attitudes and behaviours amongst the public;
2. The nature and impact of interventions aimed at altering attitudes and behaviours in relation to climate change issues;
3. The identification of research methods (including measures and data sources) pertinent to these issues.
4. The identification of evidence gaps worthy of further research.

A main conclusion concerning the state of the art is that the three strands of this review (i) attitudes (ii) climate change and (iii) travel behaviour have not been comprehensively examined in any consistent, robust and integrated way to warrant a comprehensive analysis of the links between them. Consequently, the review drew upon literature from environmental psychology, public understanding of science, travel behaviour research, marketing and sociology to achieve its aims.

The review used a search strategy designed to capture all aspects of travel behaviour including the choice of all transport modes, car purchasing, the frequency and amount of travel and support for transport policies. Only a small amount of literature emerged in relation to attitudes to air travel and climate change. Consequently, understanding attitudes to and the demand for air travel comprises a strong recommendation for further research. Self evidently, the conclusions in this summary pertain almost exclusively to private surface passenger transport.

The main findings for each of the three objectives were as follows:

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## Review of public attitudes to climate change and transport: Summary report

1. There is only a weak link between knowledge and awareness of climate change on the one hand and travel behaviour at the individual level on the other. Raising public awareness of this link is necessary, particularly to galvanise support for carbon abatement policy, but it is not sufficient to change behaviour on its own. In order to effect change, many other factors need to be addressed - at the objective and subjective and at the individual and collective levels. These factors will be different for different travel behaviours and for different people.
2. Transport policies can set out to change attitudes directly as a route to behaviour change, or they can be indirect in that they aim to change behaviour *first* without *necessarily* changing attitudes. This review concludes that a combination of each of these types of measures is desirable. In addition, any travel behaviour change strategy will be more effective if it targets change at the community level. Community Based Social Marketing offers a strategic framework to transform markets and behaviours.
3. There is a need to engage the public in issues of transport and climate change using deliberative methodologies to deviate from traditional 'top down' methods of information provision. New forms of research and communication need to be two-way, explore formats for learning on all sides of the issue, have an iterative and deliberative component and not necessarily strive to reach consensus.
4. Nine areas for further research were identified (R1 - R9).

This summary will now present the main findings from each of the eight chapters in turn.

## 1. The public understanding of climate change

*(Please note, all findings and references are listed in the main report)*

Public understanding of climate change extends over a vast range of 'levels of knowledge', from the most basic level of recognising phrases such as 'global warming', to understanding simple causal relationships, personal contribution to climate change, timescales and the detailed inter-relationships of natural processes. Overall, the current evidence suggests that recognition of the concept of climate change among the UK population has almost reached saturation point. In contrast, surveys in the few years leading to 2006 show the public's awareness or acknowledgement of the seriousness, scale and urgency to have been much lower.

It is appropriate for an evidence base review to begin by commenting on the quality of the evidence. A main weakness of the body of research in relation to attitudes to climate change more generally and to transport issues in particular, is that data collection has been largely reliant on quantitative techniques using closed-question formats. These take the form of both relatively basic opinion polls and more substantive questionnaire surveys.

Whilst these surveys are undoubtedly useful, especially as a comparative tool (over space and time), reservations (semantic and methodological) are required regarding the meaningfulness of their findings. For example, it is generally assumed that questionnaire surveys overstate respondent concern and that some topics generate 'socially desirable' responses or 'overclaiming'. Environmental concern is a particular candidate for the exhibition of these problems. Indeed, research suggests that the structure of most surveys on climate change itself serves to reinforce the perception that the environment is a serious issue and demands concern from any 'respectable citizen'.

Another major weakness is that many surveys seldom put environmental concerns in the comparative context of other social and personal problems. Where comparisons are made, such as in the British Social Attitudes Survey, while the majority indicate a concern for climate change, other issues frequently take precedence when juxtaposed against it.

Caution is therefore required in drawing lessons from these crude survey instruments as they lack depth and the ability to elicit a true understanding of what people really know and are motivated by with respect to climate change. The evidence review notes that qualitative research is a much more appropriate tool for exploring the ways in which something is understood (and presents examples in Appendix 3 of mixed methodological approaches that aim to capture the diversity of views on climate change). Overall, qualitative data sources included in this review suggest either that the environment or climate change do not surface spontaneously as an issue for concern, or when they do, people's understanding is mixed and full of uncertainty or qualified by feelings of a lack of personal control or efficacy.

Nevertheless, quantitative survey data can offer a useful barometer of awareness and opinion. Overall, the evidence indicates that public awareness of climate change is particularly high, whilst a more sophisticated understanding is variable and inconsistent between surveys. In particular, we have very little true understanding of how people deal with the complexities of the science of climate change, or how they might deal with it under different information environments. The main findings suggest:

- The vast majority of the public claim to believe, at least in the abstract, that climate change is happening, and around two-thirds of the population are convinced it is linked to human activity. They are, however, unclear about the detail.

- Many people are well informed about some of the causes of climate change and there is evidence to suggest that knowledge may be improving. Indeed, some research finds that most people possess quite detailed, although often inconsistent, knowledge of the issue. For instance, the majority of people are able to identify the destruction of forests and the burning of fossil fuels as contributors, but at the same time, only just over half the population tend to recognise emissions from power stations and only a quarter identify the use of gas and electricity in homes. In addition, the prevalence of common misconceptions (such as the belief that the hole in the ozone layer is a cause) points to varying degrees of uncertainty about the causes of climate change.
- Overall, it is not possible to conclude that people generally believe climate change is caused by large scale actors only, but there does appear to be a disconnection between the recognition of primary contributors (e.g. fossil fuels) and the use of these fuels (e.g. in power stations or in the home). It is notable that several of the behaviours that people are less likely to identify as linked to climate change are those that the public are also least prepared to address in their own lifestyles. Whether or not this variability reflects inconsistencies in knowledge or, as some commentators suggest, a tendency for respondents to align their answers on surveys with their behaviour in order not to reflect themselves in a bad light, is unclear from the evidence so far.
- In general terms at least it may be easier for people to make the link between climate change and transport's use of fossil fuels than with the use of fuel in the home. Around two thirds of the population identify transport as a cause of climate change compared to a fifth identifying the use of gas and electricity in the home.
- Research shows that public concern regarding climate change is high (at around 80%). However, it is unclear whether concern for climate change is currently rising or falling due to the way the data has been collected.
- Although climate change generates concern it is not a 'front-burner' issue. Public concern for climate change appears to be tempered by uncertainty about where and when climate change will occur, the extent of change and by competition from other issues of individual concern.
- The majority of the public do not regard climate change as an immediate threat to themselves, but as a threat to future generations and 'far away places'. This is termed 'psychological distancing'. This is important as evidence suggests that awareness of environmental impact of cars and feelings of personal obligation may be insufficient without concerns for the future. Nevertheless, increasing numbers of people believe the threat is more immediate and indeed may already be materialising.
- Although there are encouraging indications that people are acknowledging their own contribution and responsibility towards climate change mitigation, they generally place the onus for action on national (and global) institutions. Even the majority of those already making changes believe their own efforts are making little difference.
- When asked a direct question about 'level of knowledge' people believe themselves to be only a little informed about climate change. Nevertheless, there is an apparent keenness to be provided with more information, particularly more advice on what to do as opposed to information on environmental threats and problems. Once again, it is difficult to know whether this request for information reflects a genuine desire for information or a tendency to answer in a socially desirable way.

In conclusion, there is a solid foundation of knowledge on climate change being created among the population but significant areas of confusion, ambivalence and potential 'denial' are still worryingly prominent. Other than this evidence, little information exists on lay belief and understanding of the subject and what the challenges and consequences of providing the information with scientifically sophisticated material in a deliberative and participatory way might be. Due to the weaknesses in the ways in which data has primarily been collected so far, we have only a superficial understanding of the way in which people do or could engage with the issues.

## 2. Attitudes to transport and climate change

Data from questionnaires and opinion polls show around half the population acknowledges car use as a cause of climate change (Table 2.1)<sup>4</sup>. The contribution attributed to car use is not a long way below recognition of the other main causes (destruction of forests and carbon dioxide emissions). When it comes to flying, however, the evidence suggests an even lower awareness of this mode's contribution (around a third of respondents). Importantly, both are seen to be a significant source of 'pollution'.

Table 2.1 Percentage agreeing car travel/ air travel is a contributor to climate change

Source	Date	Sample size	Road Transport	Air Travel
Scottish Executive: Public attitudes to the environment in Scotland	2002	4,119 (Scotland)	52%	30%
Bibbings/ WCC: Climate Concern: Attitudes to climate change and wind farms in Wales	2004	988 (Wales)	55%	35%
			<b>Transport in general</b>	
DEFRA Survey of public attitudes to QoL and the environment	2001*	3,736 (England)	65%	
BBC News Online/ ICM: Climate Change Poll	2004	1,007 (UK)	67%	

\*published in 2002

Recent evidence reported in a study for the DfT (2006) reveals that the public's perceptions of the relative contributions of different transport modes to climate change are reasonably accurate. They consider cars and vans to be the largest transport contributors to UK climate change overall, but view flying as the most harmful for specific journeys. It should be noted, however, that other evidence shows that any more detailed knowledge of the comparative impact of different modes may be quite limited. For instance, the evidence suggests the relationship between fuel and emissions is only very generally, if at all, understood by most drivers. In particular, fuel efficiency seems to fall into a conceptual blind spot with regard to minimising the environmental impact of car use. It also appears to be the case that 'carbon emissions' are often interpreted by the public as referring to carbon monoxide rather than carbon dioxide emissions - again highlighting the low level of understanding of carbon dioxide's role in climate change.

Although the public are generally aware that car use results in serious environmental impacts, these are predominantly understood as attributable to visible elements of the exhaust (e.g. fumes, smoke, particulates). This finding is confirmed by a number of studies and shows that environmental impacts are usually viewed in local terms (e.g. pollution in the high street, combustion products settling on washing, asthma in children) rather than global effects (such as climate change). This is also consistent with the higher public concern given to air quality issues than climate change. This

<sup>4</sup> Please see main report for list of references.

'pollution model' is not entirely inaccurate as applied to global warming and may be valuable in the sense that it generates concern and support for environmental issues in general. However, other evidence points to a general 'fatigue' among the public in response to the term 'environment' and whether these issues and errors have any real implication for environmental policy decisions is unclear.

Despite the public concerns regarding the environment, these issues play little part in car-purchasing process (pre-, during and post-purchase) and are among the least important considerations for new car buyers. Although fuel economy is reported to be important during the early stages of the car purchasing process, these concerns tend not to get translated into action. For instance, many motorists use fuel consumption as a first order proxy for environmental and economic impacts but the importance attached to it drops off nearer to the purchasing decision. It would appear that the process of cognitive dissonance<sup>5</sup> is activated to relegate fuel economy in importance in order to legitimise higher order preferences such as costs, performance, image, reliability and safety. One reason for this may be that motorists have little understanding of the relationship between fuel use and emissions and experience cognitive difficulty in calculating fuel costs when presented with fuel price and fuel economy information. There is also some evidence that the issue gains more importance after the purchase has been made in that motorists can express dissatisfaction once they own a vehicle if it does not live up to expectations on fuel economy. Although the situation may improve with the introduction of the new car energy label (which includes 'mpg' information), the literature suggests that non-environmental factors will continue to dominate the car purchase process.

Whereas some studies show that motorists are well aware of the range of cleaner fuels and vehicles being commercially developed, more open-ended surveys suggest a less realistic view of alternative fuel/technology types. The evidence also reveals a very low detailed understanding of the potential benefits of cleaner fuels and of how cleaner vehicle technologies actually work. Furthermore, there are strong indications that misconceptions regarding new fuel and technology options are present at all levels - some examples include: *hybrid vehicles have a limited range, do not provide significant environmental benefits and require a special recharge point; and liquefied petroleum gas is not widely available and can be very dangerous.*

This low level of public understanding is relevant to policy design in two ways. First, as most misconceptions regarding cleaner vehicles involve negative attributes, there is an opportunity here for these to be removed through education. The lesson from misconceptions research is that misconceptions are usually stable, predictable and are similar across different populations. Understanding what the pertinent misconceptions are for cleaner vehicles can therefore increase the effectiveness of information campaigns designed to increase their appeal. Second, accepting the limitations in public understanding of cleaner vehicle technologies and fuels suggests that (once basic misconceptions have been dispelled) non-technical issues are more likely to engage the 'green' car consumer.

This review concludes that further research is required to identify level of knowledge and extent of misconceptions in key areas (cleaner vehicle technologies, environmental impacts of road transport, costs of car ownership and non-car modes) and to understand the type of information that people want and need to further engage the public with new vehicle fuels and technologies in a way that may begin to fundamentally alter norms and buying behaviour. These gaps in the evidence are addressed in research recommendations R1 and R4.

Traffic, air pollution and climate change are the environmental issues of most concern for the future, but are not particularly strong current concerns. Consequently, the evidence suggests the public are not yet convinced the state's role should be anything more than enabling. There are some signs of an increasing acceptance of interventions to limit individuals' emissions in principle. However, the level

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<sup>5</sup> Cognitive dissonance centres around the idea that if a person knows various things that are not psychologically consistent with one another s/he will, in a variety of ways, try to make them more consistent. To reduce cognitive dissonance, a person may change their opinions and/or behaviour, or may distort their perceptions and/or information received about the world.

of support for government action to reduce carbon emissions diminishes significantly with respect to specific policies to tackle emissions from transport and diminishes even further in relation to financial restrictions on mobility.

Therefore, contrary to the apparent increasing willingness as expressed in surveys of people to sacrifice for environmental goals in general, transport appears to be the least acceptable area of policy for the public with respect to tackling climate change. Moreover, within transport, financial penalties are the least supported. It is difficult to conclude whether support for financial instruments to influence transport behaviour is decreasing or increasing. When gauging the level of public support/resistance of interventions, the evidence highlights the necessity to take into account the transport (as well as the research) context. For example, merely asking whether motorists should 'pay higher taxes for the sake of the environment' has witnessed lessening support over recent years (as shown by the British Social Attitudes Survey). However, support for pricing mechanisms increases considerably when the revenues raised are earmarked for re-investment in infrastructure. It also appears that when people are included in a dialogue about the issues, they appear willing to pay more, and that this willingness is more 'stable' once this dialogue has taken place. The implication is that, in designing carbon mitigation policies, research that elicits people's willingness to pay, either in monetary terms or by means of other types of sacrifice (such as less powerful cars), needs to be carried out in a way that engages people with the issues of climate change and possible policy options. There is reason to believe, therefore, the introduction of information on personal, societal and political trade-offs can galvanise support for policies to manage the demand for travel. This is reflected in research recommendation R8.

### 3. The attitude-behaviour gap

This review explored the question of why knowledge and attitudes about climate change or environmental issues often fail to be translated into changes in travel behaviour to mitigate its effects - this is the infamous attitude-behaviour gap.<sup>6</sup> Indeed, the attitude-behaviour gap could be described as one of the greatest challenges facing the public climate change agenda. This is true of all attempts to influence individual behaviour, not only travel. However, the drivers and barriers to travel behaviour change are extremely complex. In this regard, a source of the difficulty perhaps lies in the expectation that there should be a consistency between attitudes and behaviour in the first place.

With respect to influencing travel choices and closing this gap, the big question is: does it actually matter whether people have a detailed knowledge of the causes and consequences of climate change? It would appear there are two opposing views on the importance of information with respect to its role in closing the attitude-behaviour gap:

1. Those that believe if only people are informed and knowledgeable, they will act in accordance with this new knowledge (termed the 'deficit model');
2. Those that believe information is necessary but not sufficient to encourage individual action. Advocates of this belief recognise the need to understand behaviour change from a number of different perspectives (anthropological, socio-psychological and economic) and at a number of different levels in society and strive for a more civic or deliberative ideal of public engagement.

The evidence review suggests the latter view represents the emerging consensus. Hence, an understanding of the different roles played by knowledge, attitudes and behaviour is required before it is possible to have an appreciation of the factors that inhibit, drive and facilitate behavioural change.

In order to fully understand the role of these factors, it is instructive to place them in established socio-psychological models. Unfortunately, there is no 'grand unified theory' of behaviour change. Instead, numerous theoretical frameworks have been developed to explain different aspects of the attitude-behaviour gap. Chapter 3 of the main report reviews a number of theories at four different levels (see Table 3.1) in order to assess the evidence on the factors that are important barriers or drivers to behaviour change. These barriers and drivers are then reviewed in turn in Chapter 4. The theories reviewed were as follows:

Table 3.1 Theories reviewed in this chapter

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<sup>6</sup> Also known as the 'attitude-action' or 'value-action' gap.

<b>Individual Level</b> (concentrate on individual maximisation of utility and the role of beliefs, values, attitudes and norms)	<b>Interpersonal Level</b> (account for the role of social factors, habitual, imitative and learned behaviours)	<b>Community/Network Level</b> (suggest behaviour change can be more effectively influenced by concentrating on the community/ network level)
1. The deficit model 2. Rational choice theory 3. The theory of planned behaviour 4. Norm activation theory 5. Values-beliefs-norms theory	6. Triandis' theory of interpersonal behaviour 7. Social learning theory	8. Social capital theory 9. Diffusion of innovations
<b>Stages of Change Models</b> (track the transition from anti- to pro-environmental behaviour and identify feedback mechanisms)		
10. Transtheoretical model (TTM) 11. Systems theory		

The evidence shows clearly that no one theory is sufficient, on its own, to explain the links between attitude and behaviour. This review suggests that all the attitude-behaviour models (and their constructs) discussed are complementary, each offering a unique insight into the attitude-action gap with respect to travel choice - insights that can readily be used to inform travel policy. This review has also demonstrated that the application of these theories to travel behaviour has so far been ad hoc and the state of the art is currently immature. To the extent that theory has been applied to travel behaviour, attention has been paid almost exclusively to the individual level. Yet research centred on the individual usually ignores the interactive relationship of behaviour in its social, cultural and economic dimension, thereby missing the possibility to fully understand crucial determinants of behaviour.

Ajzen's Theory of Planned Behaviour (TPB) is by far the most common and influential theory used to explore the attitude-behaviour gap for innumerable behaviours in the social, environmental, and health psychology fields, including travel. Although the strength of this theory is its simplicity and wide applicability, other individual and interpersonal level theories additionally measure the psychological processes giving rise to altruistic/ pro-environmental behaviours, variously including notions of moral norms, social norms and values. However, the review notes that some influences on travel modal choice are not sufficiently accounted for by any of the accepted models. These include: affective evaluations (e.g. freedom and status), social-symbolic motives (self-identity) and habitual behaviours, reviewed in Chapter 4.

In addition, all of the theories have difficulty examining climate change. This is because climate change is a somewhat intangible, ambiguous and a contested phenomena. For instance, is climate change conceptualised as 'pollution'? Is it sea level rise? Is it warmer temperatures? Is it local or global? It is difficult to measure attitudes and behavioural response when the attitude 'object' is open to interpretation in this way. This may be one reason why climate change has been examined so infrequently using behaviour change theory or otherwise and why it is more common to find studies on general or specific environmental damage which is more readily understood by the public. In either case, the fact that attitudes and constructs have been measured and potentially interpreted by respondents in a variety of different ways, means that it is very difficult to compare across results. Most of these theories, therefore, are too simplistic on their own for a study of travel behaviour and climate change.

## Review of public attitudes to climate change and transport: Summary report

A good start for any research in this area, therefore, would be some in-depth understanding of how climate change is conceptualised by members of the public and to gauge emotional response in relation to these interpretations (research recommendation R1) and how the public understanding forms from various information sources such as the media (R3). In addition, there is wide scope for new insights into individual and societal processes of change with respect to travel mode choice, journey frequency, car purchasing and the interaction between other lifestyle choices and travel. In particular, the review identifies the need to establish the relative importance of the barriers and precursors to changing travel behaviour (R4) - and recommends that this is achieved by extending existing theoretical frameworks; considering social, affective, habitual, imitative and learned determinants of behaviour in future research; and employing deliberative methods of investigation at the individual and collective level.

#### 4. Barriers to changing travel behaviour

Regardless of the theoretical framework applied, conclusive evidence from a variety of diverse disciplinary sources shows that only influencing knowledge and/or attitudes rarely leads directly to behaviour change. Given that behaviours are mediated by a number of different psychological, social and situational factors at a variety of social levels, the review indicates that many other factors besides attitudes need to change before behaviour is successfully influenced. While these factors often act as barriers to change, if understood and mobilised, they can be turned into drivers of change.

These behavioural factors apply at the personal or at the collective level and may consist of either subjective or objective factors. Interactions between them are complex and any attempt to categorise or model these barriers will inevitably be simplistic. This is both because they require further understanding and because different barriers will apply to different people, for different behaviours in different situations. However, the following four-quadrant framework can be used as a starting point:

Table 4.1 A Typology of barriers to travel behaviour change\*

INDIVIDUAL SUBJECTIVE	INDIVIDUAL OBJECTIVE
<ul style="list-style-type: none"> <li>■ Values</li> <li>■ Frames</li> <li>■ Moral norms/ sense of responsibility</li> <li>■ Perceived behavioural control</li> <li>■ Self efficacy/ agency/ locus of control</li> <li>■ Denial</li> <li>■ Instrumental attitudes</li> <li>■ Affective attitudes</li> <li>■ Identity and status</li> </ul>	<ul style="list-style-type: none"> <li>■ Knowledge/ Awareness of consequences</li> <li>■ Habit</li> <li>■ <i>Personal capabilities**</i></li> <li>■ <i>Actual resource constraints**</i></li> </ul>
COLLECTIVE SUBJECTIVE	COLLECTIVE OBJECTIVE
<ul style="list-style-type: none"> <li>■ Social dilemmas</li> <li>■ Group cultures/ shared norms</li> <li>■ Trust in others and in government</li> </ul>	<ul style="list-style-type: none"> <li>■ Contextual/ Situational factors</li> <li>■ Communication and the media</li> <li>■ The nature of the climate change problem</li> </ul>

\*Based on Ken Wilber's four-quadrant structure (Wilber 2000), cited in Alexander Ballard and Associates 2005).

\*\*Not discussed in this review

These variables are found by the evidence review to modify the relationship (both positively and negatively) between stated intention and action for a variety of travel behaviour choices (mode choice, car purchasing, acceptance of policies). Each factor is reviewed in turn in the main report. No single behavioural factor or factor-type is identified as being more important than another. Instead, the review notes that objective and subjective factors are interactive. For example, in many choice situations attitudes have been found to be an important explanation for why a certain behaviour is carried out for the first time it occurs. However, the behaviour is evaluated less over time and attitudes gradually diminish in importance in favour of habitual behaviour.

A similar type of interaction has been found between contextual factors and attitude. If the external constraints are too great, people will be discouraged from changing their travel behaviour no matter how concerned about climate change or how pro-environmental they are in themselves - people simply may not be able to act. Likewise, no matter how favourable the external circumstances, some powerful psychological and normative barriers to behaviour may prevent these from being realised.

The review also notes that the factors that influence travel behaviours are different for different types of travel behaviour, for different segments of the population, in how they interact and in their dynamic feedback effects. Compared to other areas of travel research, it appears from the material sourced that the impact of these factors on travel behaviour is poorly understood. Identifying the most important behavioural factors and barriers is therefore identified as a priority issue for further research (R4).

## 5. Segmentation

There is a general consensus in the literature that a staged and targeted strategy of travel behaviour change is likely to be more effective than a 'one size fits all' approach. There is no single public opinion on climate change. Therefore, the degree to which informing people about climate change is a useful policy objective will be different for different groups of people and for different aspects of travel behaviour.

Indeed, segmentation research starts from the premise that there is little point in addressing the average consumer, (or in this context, the average level of car dependence or attitudes to climate change). Instead, different people must be treated in different ways because they are motivated by different factors, experience different impediments to change and are affected in different ways by policy. As such, the same behaviour can take place for different reasons and the same attitudes can lead to different behaviours.

In addition, the evidence suggests behaviourally-based interventions can be significantly more cost-effective than traditional service delivery, and targeting resources can enhance this efficiency. In order to assess the potential for behaviour change, it is necessary to identify the malleable behaviours and understand who the people are that may react to certain messages and interventions. This requires an understanding of the characteristics and size of the various segments in the population most likely to respond to these policies. The greatest potential for behaviour change is often at the margins, and this is not always recognised in the design of transport policy. Segmentation allows easy wins to be targeted, identifies various starting points for policy and provides a rich assessment of resource requirements, thus adding value to existing programmes.

However, research on how best to define target groups of travellers is in its infancy. In the transport sector there have been very few attempts to define distinct mobility segments in a systematic and psychologically meaningful sense. Travel behaviour research has almost exclusively applied a priori methods of segmentation based on age, income or some aspect of travel behaviour (high car user vs. low user). The general supposition is that there are variations in travel demand that are determined by household characteristics such as family size and composition, income and occupation.

The evidence on the influence of demographic variables such as age and gender is however mixed. To the extent that demographic variables represent objective constraints - such as income or access to alternatives (such as a car), there is evidence to suggest that environmental concern and the use of different travel modes is related to socio-demographic position. Otherwise the picture is confused. For instance, many studies find younger people to exhibit greater environmental consciousness whereas others find them to have a more optimistic outlook. Education and affluence are increasingly found to be a weaker predictor of attitudes and behaviour as attitudes are increasingly transcending demographic lines. As a result, apparently contradictory findings can be explained by the fact that demographic segments are not necessarily homogenous in terms of motivation.

Consequently, the most informative and policy relevant segmentation studies use post-hoc research based on psychographic measurements to systematically analyse combinations of factors and define new categories of users. These are interpretable in terms of their attitudinal and aspirational profiles and their potential modal switchability.

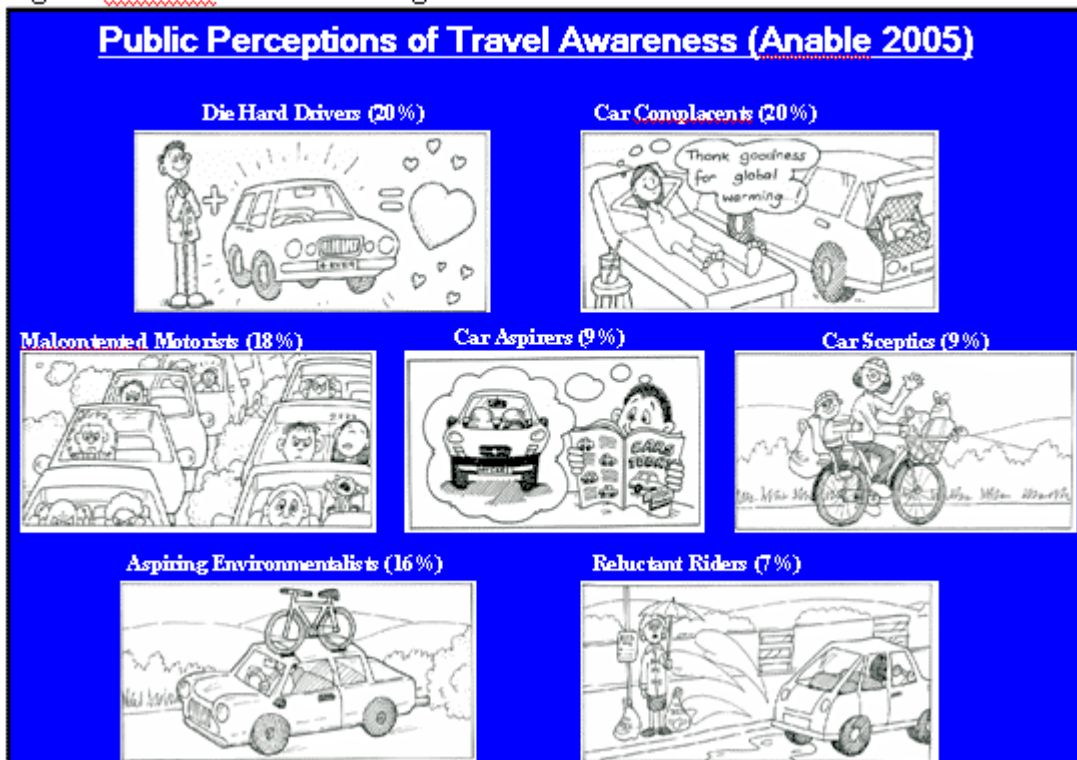
There are few useful examples of the application of psychometric or statistical segmentation to travel behaviour. The US Transit Co-operative Research Programme of the Transportation Research Board (TCRP 1998) has produced a comprehensive guide to the application of this technique to public transport and recommends a variety of techniques such as psychographic segmentation and benefit segmentation (what sort of benefits people seek).

Anable has applied psychographic segmentation to travel behaviour at the Scotland-wide level. The survey used 19 core attitude statements incorporating measurement of moral norms, identity, habit, psychological attachment to the car and contextual constraints to identify segments using factor and

cluster analysis. The resulting segmentation provided a straightforward yet sophisticated means of viewing the complexity of people's orientation towards the environment and travel. Seven distinct psychographic groups were found, each with varying degrees of mode switching potential (Figure 5.1).

Each group represents a unique combination of preferences, worldviews and attitudes, indicating that different groups need to be serviced in different ways to optimise the chance of influencing mode choice behaviour. The most important distinguishing factors were perceived behavioural control, moral norms, psychological attachment to the car (including viewing the car as a status symbol) and habitual behaviour. It therefore identifies which participants may be most susceptible to travel behaviour change and the main barriers and drivers of this change. Overall, the analysis illustrated that at least 40% of the population have a high propensity to switch modes, albeit for different reasons. This implies that future travel campaigns would not use 'one size fits all' messages, but will target certain sectors' motivations and perceptions such as the stress of driving, the desire to be less dependent on the car and the feelings of altruism that can be felt by some people when they use their cars less.

Fig 5.1 Anable's seven travel segments



This study suggests the most sensible strategy will be to concentrate resources and campaign messages on those segments that are most likely to change behaviour (e.g. the Malcontented Motorists) and to accept that some people are very unlikely to change (e.g. Die Hard Drivers). The segmentation suggests that it would not be worth trying to encourage those people who do not currently use alternatives at all and have no intention of using them (e.g. Die Hard Drivers). Instead it may be more productive to (i) encourage those who already use alternative modes (e.g. Aspiring Environmentalists) to use them a little more, (ii) encourage those who express a willingness to reduce car travel (e.g. Malcontented Motorists) to begin to experiment with alternative modes perhaps by providing assistance and encouragement in choosing another way and (iii) endeavour to raise the level of travel awareness of those with currently unrealised potential for 'switchability' (e.g. Car Complacents). In order to target this information most effectively, the attitudinal data would be

coupled with further information relating to such things as geographical distribution of the segments and the types of information most typically accessed.

In a similar study, the Energy Saving Trust (EST) has undertaken some detailed market research into energy consumption behaviour in the UK with the aim of developing a pioneering communications strategy. Using a combination of attitudinal and socio-demographic variables, a segmentation study has identified 10 fine grained segments according to where they live and their energy consumption behaviour and attitudes. These segments include the 'environmentally mature', the 'educated advocates', the 'comfortable conservatives' and the 'little Britains' among others. The model has been used to analyse information on behaviours and attitudes of the public towards energy saving and the environment, collected by monthly omnibus surveys since August 2005. From this we are immediately able to see the breadth of opinion and potential for action in the UK with respect to low carbon energy behaviour. In the aggregate, it would appear from the research that there is only a marginal willingness in the population for people to make a personal contribution to saving energy, although the interest in the purchasing of greener vehicles is somewhat higher. Nevertheless, some segments do think about the energy they use. The segmentation allows us to see the proportion of the population who are most likely to do this and how the motivations for potentially saving energy (money saving or concern for the environment) differ between groups. These results are assisting the EST in designing campaigns which portray images of alternative desirable lifestyles. Most importantly, unlike Anable's more academic approach to segmentation, the inclusion of socio-demographic factors (based on postcode) means that we know who to target, with which kinds of message and where they are located.

Segmentation can be criticised for usually being cross-sectional and not modelling any process of social change. To address this, studies could be designed with the intention of developing an understanding over time of how the segments evolve in response to changes in social norms, transport infrastructure and understanding of climate change.

The evidence review suggests segmentation is a cornerstone of any travel behaviour change programme, regardless of whether that programme is attempting to change behaviour by changing attitudes first or not. It is not a purely academic exercise as it will add value to existing policy approaches by allowing easy wins to be identified, provide a sophisticated means to assess resource requirements for a given policy objective, assess the potential impact of (and support for) any given policy and identify targeted messages and details of policy design. Altogether, a nationwide segmentation study into the socio-psychological motivators of travel behaviour will establish a robust evidence base for policy interventions aimed at behavioural change in this area.

## 6. Interventions to change attitudes and behaviour

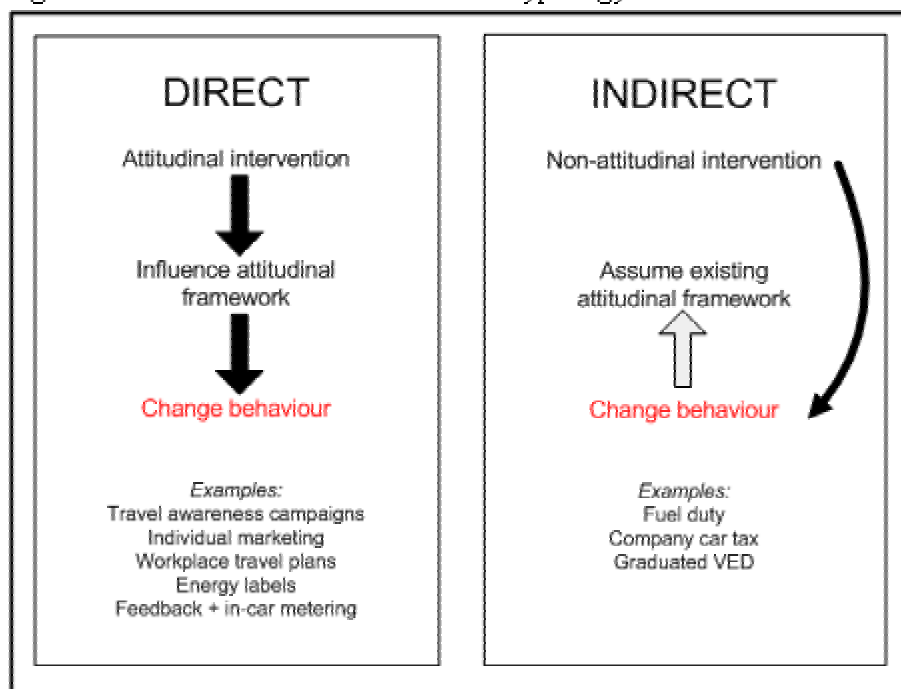
Within the context of this evidence review, interventions designed to change travel behaviour can be one of two types:

1. First they can be *direct* in the sense that they address the attitudes of the target audience directly with the aim of modifying travel behaviour through attitudinal change. Information campaigns such as 'Are You Doing Your Bit?' and 'Choose Another Way' are examples of direct interventions.
2. Second, they can be *indirect* in that they aim to change behaviour without necessarily changing the attitudes of the audience concerned - although these measures may have the added bonus of changing attitudes in the desired direction (such as Vehicle Excise Duty). Indirect interventions include the large range of existing tax instruments and price signals that operate within the existing attitudinal framework. These measures may also have other functions - e.g. the raising of revenue (Figure 6.1).

In practice there may be a degree of interaction between direct and indirect interventions. For example, an information campaign may improve the support for, and increase the effectiveness of, a new tax measure.

Although information provision is usually necessary to change behaviour through the mediation of attitudes and intentions, it is rarely sufficient in itself to encourage pro-environmental behaviours. What is more, the provision of environmental and economic information can have a negative impact on pro-environmental behaviour due to the generation of reactance and cognitive dissonance effects. This can result in attitudes (e.g. pro-car) becoming more entrenched while behaviour does not change in the desired direction.

Fig 6.1 Direct and indirect intervention typology



Travel awareness campaigns use a wide range of media aimed at improving general public understanding of problems resulting from transport choices, and what options are available for behavioural change. The campaigns stem from experience of, and longer established use of,

campaigns applied to road safety (notably drink-driving and seat belts); and other social issues such as smoking, drinking, suicide, domestic violence, literacy, health and citizenship.

This evidence review did not find any examples of local or national level campaigns specifically targeting transport and climate change. However, a comprehensive assessment of three years of the 'Choose Another Way/ Learn to Let Go' campaign in Scotland revealed that around 8% of the population had considered changing behaviour as a result of the nation-wide campaign. It also showed that awareness of a variety of travel initiatives had significantly improved over the period. However, in the aggregate, travel behaviour did not significantly change over the period. Further evidence suggests localised travel campaigns typically reach 20-40% of residents but mainly have an effect on the attitudes and intentions of those targeted, not their behaviour. However, where campaigns take place in conjunction with other initiatives such as the promotion of a new transport service, behaviour is likely to change in addition to awareness and attitudes, although it is very difficult to isolate the contribution of the informational element.

Travel plans cannot be considered purely 'direct' informational strategies as they usually involve an element of service or infrastructure provision. Nevertheless, recent reviews of the evidence suggest that travel plans are more successful than larger scale awareness campaigns at effecting travel behaviour change. The most successful fully implemented workplace travel plan typically result in at least a 20% reduction in journeys made by car - although this level of success is only attained by the best and most consistently applied travel plans. In reality, travel plan implementation progresses slowly with measures being introduced in stages.

Energy labels are an instrument to inform consumers and to stimulate innovation as manufacturers of appliances or cars anticipate market transformation. Once again, it is difficult to ascertain the degree to which any behaviour change is attributable to the provision of information by an energy label as they are usually introduced alongside other measures such as voluntary agreements or minimum standards. In July 2005 a new 'green' car-labelling scheme was introduced in the UK to enhance the pre-existing statutory fuel economy label. This uses the A to G style rating first adopted by 'white goods' to rate the car's carbon dioxide emissions using categories similar to those for graduated Vehicle Excise Duty. As of June 2006 (11 months after introduction), a monitoring study conducted by LowCVP found the level of consumer awareness (people who have recently bought or are about to buy a car) of the car-label was only 29/40% (unprompted/prompted) and the level of full compliance (labels displayed on all cars in showrooms) was only 55% (Murray 2006). Although the awareness and use of the label is likely to increase over time this is likely to limit the effectiveness of the early stages of the car label scheme.

Although it remains to be seen whether the new car-labelling scheme will be effective in the longer term, the initial monitoring suggests a growing interest in the label. While less than a third were aware (unprompted) of the label's existence, when questioned, 64% of those surveyed indicated that they considered the label an important source of information (Murray 2006). While there is no current incentive for sales staff to promote fuel-efficient models per se, 18% of those in the survey utilised the label 'extensively' with a further 54% using it in a limited manner when interacting with potential customers. However, it remains to be seen whether this growing interest in the label will translate to increased sales of cars with lower carbon emissions.

The use of energy-use feedback also provides an approach to reduce environmental impact through the provision of information. Feedback has most commonly been applied in the context of home energy use. For example, interactive meters allow interrogation about levels of consumption, expenditure and resultant carbon dioxide emissions. Similarly, information can be included on the normal electricity or gas bill showing consumption over time. A review of 38 feedback studies carried out over a period of 25 years showed savings ranging from 5% to 20%.

The evidence that feedback may produce a similar beneficial effect on travel behaviour has been observed in cars that show the driver the efficiency with which they are driving. One example is the use of in-car metering that informs the driver of car costs and fuel consumption. In a collaborative experiment between Cranfield and Trinity College Dublin, a vehicle trip computer that could display

cost and 'mpg' information was fitted to twenty vehicles (Cousins 2006). The findings included: no measured reduction in trip making or any short-term change in other trip characteristics; drivers and their families liked having the instruments in their cars; and drivers underestimated the total time spent driving by 40%. The most significant effect was that 20% of the participants reported buying smaller more fuel-efficient cars when contacted after the experiment.

Carbon offset services are a relatively new public and business service directed at offsetting domestic, business and transport emissions impacts including car use, public transport and air travel. As part of the Sustainable Aviation coalition launched in 2005, the UK aviation industry has made a commitment to evaluate carbon offset initiatives for air travellers by the end of 2006. Although it is too early to gauge the level of uptake for UK carbon offset services, figures from Climate Care show (for all energy applications) an eight-fold increase in sales over the period 2005-06, with a ratio of business to private customers of 2:1. From a more theoretical perspective, one study examined carbon-offset services available to airline passengers in the Netherlands. This found, for people with prior knowledge of the climate-offset option, the change in intention after analysing reasons about the value of protection of nature and the environment was accompanied by a change in personal norm and attitude. The (general) implication is that, despite the weak link between knowledge and pro-environmental behaviour, knowledge must be an operand in establishing environmental concern and should not be neglected.

The premise of indirect interventions for the purpose of this review is that behaviours can be changed without necessarily changing attitudes first. A particularly clear example emerged from the review with respect to recycling behaviour. In this case, behaviour is dominated by service availability, awareness and knowledge of that service, all serving to reinforce recycling as the norm. However, there is often a weak link between attitudes, intentions and recycling behaviour and recycling is not based on deeply held values, concerns or notions of moral responsibility.

This review concludes that, although raising levels of general awareness of climate change (through the provision of information and education) may well enhance levels of stated concern (although these levels are saturated in many cases), the effective transformation of behaviour is much more likely if situational factors are also improved (access to adequate pro-environmental services and infrastructure) along with sufficient support given to engendering new social norms. The implication is that measures that set out to only increase attitudes and intentions are likely to be the most ineffective measures, but measures that set out to change behaviour without a targeted strategy of information and attitude campaigning are also set to be less effective and possibly even counterproductive. In other words, a combination of direct and indirect policies provides the optimum solution.

Chapter 6 reviews a selection of measures that have been used to encourage more sustainable travel behaviours without necessarily changing attitudes. These include vehicle fuel excise duty, company car taxation and graduated vehicle excise duty - all of which have had some success in reducing carbon emissions in the transport sector. Vehicle fuel excise duty can be considered successful from an environmental perspective, but the public acceptability of the fuel duty escalator has been severely tested in recent years. This review found little research specifically examining the potential for a concerted public engagement effort to improve the level of support for this policy measure. Such a campaign could focus holistically on the issues of road tax, fuel duty, environmental taxation and the cost of motoring from the individual, societal and cross-national perspective. In general the evidence reviewed in this study would suggest that a 'stick' measure such as the fuel duty escalator and vehicle excise duty (whose band differentials are currently insufficient to stimulate significant behavioural change) would benefit from such a campaign.

Any behaviour change campaign needs to take account of how messages are received and interpreted by a target audience. If a communication strategy can be arranged to meet the psychological needs and motivations of the target audience, then it stands the best chance of being effective. Social Marketing offers a strategic framework - at a micro and a macro level - to organise the application of social science to the problem of transforming markets and behaviours. Such campaigns engage and

motivate by building green brands, involving companies, voluntary organisations and community networks and link to government policy and legislation. Research, including market segmentation, is integral to the process and six steps have been identified in the literature:

1. *Listening*: Background analysis, especially of customers, but perhaps also of competitors;
2. *Planning*: Setting mission, objectives, and goals; defining marketing strategy;
3. *Structuring*: Establishing a marketing organization, procedures, benchmarks, and feedback mechanisms to carry out the strategy;
4. *Pre-testing*: Testing key elements;
5. *Implementing*: Putting the strategy into effect; and
6. *Monitoring*: Tracking program progress, adjusting strategy and tactics as necessary

Social marketing is already a well-established approach with a highly developed set of techniques designed to foster change. One of its most well known proponents is the Canadian Dr Doug McKenzie-Mohr, an Environmental Psychologist who has, for more than a decade, practiced the social marketing approach with much success. Over 100 case studies detailing the work of McKenzie-Mohr Associates can be viewed on the company's website [www.cbsm.com](http://www.cbsm.com). The company has also done much to develop a broad international community of social marketers.

In contrast to conventional approaches, ... social marketing has been shown to be very effective at bringing about behaviour change. Its effectiveness is due to its pragmatic approach. This approach involves: identifying barriers to a sustainable behaviour, designing a strategy that utilizes behaviour change tools, piloting the strategy with a small segment of a community, and finally, evaluating the impact of the program once it has been implemented across a community.

*(McKenzie-Mohr 2006)*

There has been little application of Social Marketing techniques to address travel behaviour at the community level. In the field of travel behaviour, Social Marketing has mainly been applied to individualised marketing strategies. Yet, existing research and experience provides compelling and robust evidence that engaging communities rather than individuals can be more effective in diffusing pro-environmental practices. This is what is known as community-based social marketing (CBSM). In the words of McKenzie-Mohr and Smith (1999):

Community-based social marketing draws heavily on research in social psychology which indicates that initiatives to promote behaviour change are often most effective when they are carried out at the community level and involve direct contact with people. The emergence of community-based social marketing over the last several years can be traced to a growing understanding that programs which rely heavily or exclusively on media advertising can be effective in creating public awareness and understanding of issues related to sustainability, but are limited in their ability to foster behaviour change.

*(McKenzie-Mohr and Smith 1999; cited in Kurani 2002)*

Communities can be addressed at many scales from the household, to neighbourhoods (e.g. car clubs) to municipal level (e.g. urban congestion charging). While persuading communities to change their behaviours may be more challenging than securing an individual response, the resulting changes in behaviour are likely to be more profound and longer lasting.

Chapter 6 in the main report outlines CarbonNeutral Newcastle (CNN) as a case study of a CBSM approach to delivering sustainable development. It began its work in this area by identifying attitudinal subgroups to provide foundation for the development of the Carbon Neutral Adoption model to be used to assess the success of different marketing communication and education initiatives. Interestingly, rather than focus on raising the public knowledge of climate change, the

organisation takes the position that it is preferable to accept a level of 'untidiness' in how people think and focus the attention on improving behaviours.

CNN note that many people are looking for role models and leadership on this issue, and will accept a level of compulsion. However, they recognise that morale and empowerment is fragile and easily undermined by mixed messages and lack of leadership by local and national government. In particular, the local authority was seen to have an important leadership role. CNN note that there is a 'web of barriers' and 'switch offs' that could present something of a minefield for marketers aiming to change behaviour. In particular, scientific and policy contradictions and inconsistencies are found to be very de-motivating and lead to cynicism and disbelief regarding the importance of personal climate change action. Other barriers range from basic ignorance regarding climate change facts and the actions to reduce emissions, through barriers of cost and effort/ inconvenience involved, to an unwillingness to give up a comfortable lifestyle (car and flight usage in particular), and a feeling of climate change as a problem too difficult to address. There is also some hostility to implication of 'guilt' that participants were using too much energy. More positively, there is clear evidence of many motivators including self-interest (saving money) and altruistic ones (caring for the planet, for future generations). The key motivating factors are simplicity, convenience and tangible/ visible benefits. These various factors are found to apply across the board, even cutting through belief in climate change and concern about climate change. Thus, financial savings (reduced energy bills, Council tax discounts, etc) are also cited by many who believe strongly in climate change.

DEFRA has conducted research into climate change communications which has noted that campaigns for sustainable behaviour change should employ a wide array of targeted measures. These include policy instruments, infrastructure provision, and information provision. They identify five principles that need to be followed within a social marketing strategy aimed at promoting more sustainable behaviours. These can be usefully applied to behavioural change strategies employed in a transport context:

- *Enabling* - providing opportunities for choice and informing people about these options. This may involve using creative communications such as 'guerrilla marketing' to create a buzz through word of mouth. It will also involve taking account of how messages are 'framed' to reduce the risk that messages will produce behavioural resistance.
- *Engaging* - this involves the target audience from the outset by building a relationship with the target individuals/ communities over time (an approach known as co-production).
- *Encouraging*- this refers to the use of information, education, incentives, penalties and the law to encourage, and where necessary, enforce behaviour change. However, a key conclusion from the review is that hearts and minds need to be won over to the idea of taking individual/ community action and that the social, political and/ or economic climate has to change if the general public are to be convinced about the need to take action.
- *Exemplifying* - this means setting an example and ensuring consistency. For widespread behavioural change to occur, environmental organisations, councils, governments must all follow their own advice. Even though the message to the public may be that they do not have to do everything so long as they do something, if they are to be convinced, those who represent and promote green values should aim to be a good example across a whole range of lifestyle behaviours. This is linked to the issue of trust as one of the most significant predictors of policy support and the idea that as people recognise the need for collective action on certain issues, they are reluctant to change their behaviour unless they think that others will do likewise.

- *Catalysing* - this is required if the package of policies is still not enough to stimulate sufficient behavioural change. For instance, evidence shows that public transport use and solo-driving are self-sustaining because attitudes that are consistent with a modal choice are reinforced by the mode chosen. Given that reinforcing feedback loops are characteristic of a chaotic system, the behavioural change process is one of moving from the existing to a new stable state (known as an *attractor* in chaos theory). Therefore, any intervention strategy needs to take into account the reinforcing nature of existing travel attitudes and behaviours. This can be achieved by designing interventions that can disrupt existing feedback loops and then establish new patterns of attitudes and behaviours. The positive message is that, if environmentally detrimental feedback loops can be broken, change will proceed at a faster than expected rate, once the initial barrier has been overcome.

## 7. Research methodology

Only a handful of studies have examined transport and climate change using anything other than quantitative survey techniques. Moreover, the majority of studies attempting to answer questions such as why do people act environmentally? and what are the barriers to pro-environmental behaviour? have been centred on the domestic behaviours (e.g. home energy use, composting and recycling). Until quite recently, transport energy use has been relatively ignored by psychologists and sociologists and, likewise, transport researchers and practitioners have not taken advantage of insights offered by these disciplines. Where transport is featured, many of the studies are conceptually based review articles that reflect the fact that researchers are still struggling to conceptualise the inherently complex ways in which transport activities interact with the natural processes defining the climate change problem.

This is exemplified by the fact that there are some fundamental weaknesses with the nature of the existing evidence. Eight key issues have emerged from this review with respect to the quality of the evidence on the link between attitudes to climate change and travel:

1. Reliance on superficial understanding from quantitative methods.
2. Inconsistent and narrow use of the concept 'attitude'.
3. Assumption of a *linear* link between knowledge, attitudes and behaviour.
4. Assumption on a *causal* link between attitudes and behaviour.
5. Measurement of attitudes in a vacuum divorced from context and external influences.
6. Focus on individual behaviour and a narrow theoretical underpinning.
7. Mono-disciplinary nature of the research.
8. Lack of attention to holistic and lifestyle issues.

A main conclusion of this evidence base review is the need to engage the public using deliberative methodologies to deviate from traditional 'top down' methods of information provision. New forms of research and communication need to be two-way, explore formats for learning on all sides of the issue, have a deliberative component and not necessarily strive to reach consensus. They also need to take account of 'where people are at', their capacity for absorbing information and what they want to know, not what we think they ought to know. Deliberation can be more than a mere discussion of the issues as emphasis must be given to the results and decisions that arise from the process. Genuine engagement of the public through deliberative methods presents a profound challenge (Owens 2000). In particular, these methods cannot remove contextual constraints on travel behaviour where they currently exist. Further critical appraisal is necessary to assess the merits of these techniques as applied to travel behaviour.

In the area of transport and climate change there are few examples of the use of deliberative methodologies to engage with the public on these issues or elicit their understandings. However, some steps have been taken to qualitatively engage with the public in more far reaching ways. These include the use of:

- *Open-ended questioning techniques* - although based on 'one way' survey instruments and therefore still inferior to qualitative methods, the use of open-ended questions can markedly improve survey-based methods.
- *Integrative approaches* - bringing together expertise from the natural and social sciences.
- *Multi-method approaches* - using qualitative and quantitative methods as part of the same research programme.

## Review of public attitudes to climate change and transport: Summary report

- *Scenario testing, visual aids and mapping exercises* - respondents can be presented with the consequences of climate change in the form of scenarios for the future as a basis for uncovering current perceptions about an issue, generating discussion, introducing the idea of trade offs (e.g. intergenerational, geographical, environmental and policy trade-offs) and stimulating behaviour change.
- *Q sorting* - a process whereby a person is presented with a set of statements about some topic, often numerous and overlapping, and is asked to rank order them into 'piles' from their individual point of view along a continuum according to some preference. The statements are matters of opinion (not fact) and the fact that the Q-sorter is ranking the statements from his or her own point of view renders this a subjective, participatory process.

Appendix 3 in the main report provides examples from the evidence review of the application of these techniques to the study of travel behaviour.

## 8. Research recommendations

The following areas have emerged from this review as priorities for further examination. Together they will develop a greater understanding of public levels of knowledge and emotional engagement in the issue of climate change, the precursors to travel behaviour change and how to engage with and motivate the public.

The evidence gaps and research recommendations are presented as nine distinct themes. However, there is some overlap between them and it is important that they are not considered in isolation from one another. In particular, some of the later themes (e.g. R7) rely on the lessons learnt in previous recommendations in order to achieve its stated aims.

The nine recommendations are as follows:

### **R1: Understanding how to engage with the public.**

Summary:

Chapters 1 and 2 illustrate the extent to which research has relied on relatively superficial quantitative data to elicit rather complex and heterogeneous attitudes about climate change. Whilst this evidence is useful in other ways, it does not provide the basis on which to develop an understanding of public engagement with climate change issues in order to devise targeted and inspiring campaign strategies and interventions.

Methodology:

The best way of gaining a more intelligent, rich and meaningful understanding of knowledge is to use participatory methods which engage people in a dialogue about the scientific and policy issues surrounding climate change, offering information in a variety of formats to the public and interpreting their response. This may include using novel, mixed and truly interdisciplinary techniques such as presenting scientific scenarios (with social and economic components) and information on alternative futures within citizens' panels or deliberative opinion polling (Chapter 7 provides more detail on 'deliberative techniques'). The idea would be to gauge emotional responses, measure relevance and concerns and to build on this process in an iterative, non-intrusive manner.

How will this fill the evidence gap?

Delving deeper into public knowledge on this issue will provide a baseline for further research and some evidence on which to base subsequent campaigns.

Method: Deliberative

Priority: High

Timing: Immediate

Responsibility: DfT

### **R2: Understanding the demand for air travel.**

Summary:

Whilst data exists on the socio-demographic composition of the phenomenal recent and projected growth in air passenger demand, there is poor understanding of the underlying motivations of this travel and the degree to which 'air dependence' is leading to hard to reverse patterns of travel. It follows that our understanding of public knowledge of the link between air travel and climate change and the decision making process with respect to flying, is also very low.

Methodology:

## Review of public attitudes to climate change and transport: Summary report

As a baseline for more participatory approaches, and the other recommendations in this review, a national study of air travellers could be completed through focus groups and quantitative surveys. Existing data sets need to be collated and data gaps identified. Qualitative research should precede quantitative data collection to identify the main drivers of demand and to inform subsequent quantitative methods to identify the main market segments and their respective demand elasticities.

How will this fill the evidence gap?

This research should provide a baseline understanding of the main drivers of the demand for flying and the size and nature of the attitude-behaviour gap for this type of travel.

Method: Review + Deliberative

Priority: High

Timing: Immediate

Responsibility: DfT

### **R3: Media**

#### Summary:

Chapters 1 and 2 identified the misconceptions surrounding the issue of climate change and Chapters 3 and 4 outlined the importance of social norms and feelings of self efficacy in relation to local, national and global problems. Because the news media are a key source of information for almost every societal issue, there is an evident research gap in analysis of the media's impact on transport issues in general and in relation to transport and climate change in particular. Research needs to improve significantly our understanding of how scientific information on transport and climate change takes shape in the national and local news media and how this information is noticed, interpreted and used by the public.

#### Methodology:

There is scope for developing analysis of the communications messages relating to transport issues beyond simplistic textual analysis to quantify and understand the nature of the positive and negative arguments presented. This could involve the use of semiotics to analyse the dominant frames embedded within the coverage and to explore the wider cultural and symbolic arenas that may affect public opinion. Indeed, there are three major divisions within traditional mass media research. They are: research into the audience of a given communications message or medium; research enabling study of the language, logic and layout of communications messages; and research into the impact of mass communications. All three divisions ultimately look at the effect of the media influencing (and changing) opinions and attitudes of those receiving the communications.

How will this fill the evidence gap?

If a clear understanding is developed about how public understanding evolves from narratives in the news then this research may suggest a potentially powerful means for capturing this process to aid effective policy making.

Method: Qualitative + Deliberative

Priority: High

Timing: Immediate

Responsibility: DfT/ Research Council

### **R4: Barriers to changing travel behaviour**

#### Summary:

Research is required to develop our understanding of the barriers to travel behaviour change and their relative importance and interaction. Chapters 3 and 4 drew upon social-psychological theory to identify such barriers (and drivers). These included subjective and objective as well as individual and collective barriers. A typology was offered, with the caveat that the barriers themselves and the interactions between them required further in-depth research to understand how they worked for specific types of travel behaviours and for different people. The idea will be to utilise methodologies that allow the public to express in their terms the important barriers to change. The aim is to get closer to the question we are not yet able to answer with any real authority: how does the understanding of climate change/ environmental impact affect public attitudes, choices and travel related behaviour and what are the opportunities to influence this behaviour? To do this, it is necessary to have a detailed understanding of which issues are important to the public, their relative importance and the magnitude of effect they will have for different types of travel behaviour for different people. In addition, further understanding is necessary to illuminate the two-directional causal chain: (i) how does each barrier affect behaviour? and (ii) how can it be influenced?

#### Methodology:

Projects using action research or innovative qualitative techniques such as Q-sorting (Appendix 3) could be set up to address all four types of barrier (Chapter 4) and their relative importance and interaction. This would draw on social-psychological insights into the nature of those barriers and motivations and constraints on behaviour. In addition, studies should be capable of addressing the deeper levels of learning such as cognitive dissonance and social networks.

How will this fill the evidence gap?

This research should further our understanding of why attitudes in all their guises do not always translate into actions. It should uncover deeper insights into the emotions that need to be pulled on to change attitudes and influence behaviour in preparation for more targeted, community level social marketing campaigns (R7).

Method: Review + Qualitative

Priority: High

Timing: Following

Responsibility: DfT/ Research Council

## **R5: Identity**

Summary:

Chapter 4 concluded that, despite the fact that the car has long been recognised as far more than a means of getting from one place to another, empirical evidence of the relevance of self image and identity is practically non-existent in transport studies. Examining the ways in which individuals view themselves in society with respect to different travel behaviours could enrich our understanding of how to empower people to reposition themselves within social groups which communicate allegiance to certain 'green' ideals. Evidence of the role of identity as a precursor to travel choice must move away from the anecdotal to the empirical to understand the nature and the role of symbolic meanings attached to cars, buses, bikes etc and to reveal the extent to which green travel is contrary to the image that some people wish to represent.

Methodology:

This will involve the development of innovative qualitative techniques to enable research to tap into meanings attached to various forms of travel. This will involve the application of a range of disciplinary approaches from semiotics, marketing and social psychology. The central technique will likely use a variety of images to elicit information on how individuals see the stereotypical image of, say, a bus user compared to how they see themselves and the degree to which certain themes are culturally prominent and malleable.

How will this fill the evidence gap?

Understanding the role of identity will aid our understanding of the relationship between attitudes to climate change and mode or vehicle choice. This will illuminate one of the most difficult 'barriers' to behaviour change and assist attempts to make climate change and green travel 'trendy'.

Method: Qualitative/ value based surveys (psychometrics)

Priority: High

Timing: Following

Responsibility: Research Council

## **R6: Segmentation**

### Summary:

The review clearly shows the strategic advantage of identifying population segments for designing effective interventions. Chapter 5 reviews the limited research that has so far been done using sophisticated segmentation techniques. This suggests a staged and targeted strategy is likely to be more effective than a 'one size fits all' approach.

### Methodology:

This research will need to rely on input from marketing and communication specialists in addition to specialists in the measurement of complex psychological constructs and their statistical interpretation. In addition, the segmentation study should be adequately resourced in order to develop a robust instrument to be used to monitor progress of interventions at a variety of different scales and over the long term. This may involve pre-testing and experimenting with a variety of questioning techniques. Meaningful segments for the purpose of designing targeted campaign messages and behavioural interventions will only be discovered once an instrument has been designed to measure the most important factors motivating behaviour. Consequently, the segmentation study will only be as good as the variables measured in the survey instrument. This element of the research programme will therefore need to follow on from the previous research recommendations which provide a deeper understanding of the antecedents of travel choice and the 'frames' people use to make sense of issues such as climate change. Segmentation can be criticised for usually being cross-sectional and not modelling any process of social change. To address this, studies could be designed with the intention of developing an understanding over time of how the segments evolve in response to normative and contextual developments with respect to travel and climate change.

How will this fill the evidence gap?

A large-scale segmentation study would aid an understanding of the most important factors motivating travel behaviour in different groups for different behaviours and across different geographical scales in the UK.

Method: Value based surveys (psychometrics)

Priority: High

Timing: Following

Responsibility: DfT

## **R7: Testing community based social marketing**

### Summary:

Social marketing is a set of tools based on social-psychological theories designed to advance social causes by applying commercial marketing techniques to develop a form of dialogue and build trust with the public. There has been little application of Social Marketing techniques to address travel behaviour at the community level. In the field of travel behaviour, Social Marketing has mainly been applied to individualised marketing strategies. Chapter 6 shows that a key element in successful social marketing strategies is an adequate piloting and testing stage. This research would aim to establish a robust evidence base for policy interventions aimed at behavioural change by constructing a strategy which removes as many of the barriers to the selected behaviour as possible within a limited allocation of resources.

### Methodology:

This research should also be informed by community based social marketing campaigns used for a variety of purposes other than travel. The research could develop small-scale pilot(s) of community based social marketing strategies based on specific knowledge, attitudes or values around 'case study'

issues such as car purchasing or a local travel issue. Focus groups, in-depth interviews, participant observation, and surveys are used in a pre-test - post-test control group design.

How will this fill the evidence gap?

The research will draw on the lessons learnt from previous social-psychological insights in order to examine some of the implications of these cognitive processes for social marketing techniques and to identify the role of participatory problem-solving and community based social marketing applied to the issue of climate change and travel behaviour.

Method: Qualitative/ action research

Priority: High

Timing: Following

Responsibility: DfT + cross departmental

## **R8: Trade-offs and policy acceptance**

### Summary:

Chapters 2 and 4 presents evidence in the area of climate change and behavioural research that demonstrates public acceptability can be a major barrier to policy delivery especially where there is a potential tension between, on the one hand, an agenda of encouraging 'personal responsibility' and, on the other hand, of the shaping of personal behaviour by the state. It seems that to resolve this, it is vital there is wide understanding by the affected parties of the need for policies and any compensating individual or societal benefits associated with changing behaviour.

### Methodology:

Research to investigate notions of public acceptability of specific policies could apply a participatory approach and a two-way process of information exchange which allows trade offs to be explored and matches demand for information by the public with its supply. The willingness to pay (Chapter 7; Appendix 3) will be one aspect of this investigation of trade-offs, but through the use of a dynamic process where feedback loops and preference formation can be examined and the inter-relationships between notions of fairness, trust, free rider issues, causal responsibility and effectiveness and any other issues to emerge can be understood.

### How will this fill the evidence gap?

Exploring acceptability using participatory, staged approaches that allow the dynamics of preference formation to be explored will strengthen the link between communication and policy, offer a more sophisticated approach to policy delivery and be vital to the success of policies to reduce carbon from the transport sector.

Method: Deliberative

Priority: High

Timing: Following

Responsibility: DfT + research council

## **R9: Lifestyle**

### Summary:

Climate change demands that people examine their lifestyles, of which travel is one component. The fascinating, and as yet unanswered question, is the extent to which the link between attitudes and behaviour differs across different behaviours. This poses a number of interesting questions:

- Which behaviours are easiest to change? It would appear from the evidence that people find it more difficult to make the link between household energy use and climate change than between their travel behaviour and climate change. Yet, travel behaviour seems to be a harder nut to crack. Why is this and what are the implications for policy?
- If we focus on other individual or household level behaviours, will travel follow, or does it require separate treatment? If so, how and why is it different? Are at least some of the barriers to change the same for the different behaviours in order that generic campaigns and policies can be designed?
- To what extent do people consider the sustainability of the whole range of their travel behaviours? How prevalent is the concept of a personal carbon balance in respect of transport? What influence does awareness of climate change impact in one area - e.g. air travel - have in respect of other transport decisions?

- What are the potential unintended behaviour changes or rebound effects? Might carbon savings from one activity (e.g. domestic energy saving) be 'spent' on another (e.g. travel abroad)? Could this mean there are real difficulties with attempts to change behaviour through market forces unless a comprehensive solution can be identified and negotiated?

Methodology:

This evidence base review did not set out to answer these questions specifically and a review of the literature, with a focus on travel behaviour, in relation to broader lifestyle issues is recommended. Following from this, specific issues could be explored using deliberative approaches - particularly to explore aspects such as personal carbon trading and how information about comparative energy and carbon use may be received.

How will this fill the evidence gap?

An evidence base review on the issue of travel and lifestyle will provide a foundation upon which to identify priorities for further understanding.

Method: Review + Deliberative

Priority: Medium

Timing: Immediate (review) + Following

Responsibility: Cross departmental + Research Councils