

# TARGETING MOBILITY MANAGEMENT POLICY USING MARKET SEGMENTATION

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This paper asserts that in order to achieve sustainable change in travel attitudes and behaviour, mobility management needs to adopt principles from both attitude and marketing theory. The merit of using psychological theory, psychometric questioning techniques and statistical segmentation to understand mode-choice is assessed. In particular, statistical segmentation is used to identify the motivations and characteristics of groups of potential 'mode switchers' to assist the design of mobility management policy at the organisational level - in this case a major UK countryside leisure provider (The National Trust).

A detailed self-completion mail-back questionnaire, based on an expanded version of a psychological theory of attitude-behaviour relations, namely the Theory of Planned Behaviour (TPB), was administered following a short intercept survey to around 1000 National Trust visitors. A 69% response rate was achieved. Multi-dimensional attitudinal statements were factor-analysed to identify the structure of underlying psychological constructs and factor scores were used to segment the respondents using cluster analysis in order to identify the characteristics of those most likely to change their travel behaviour.

Six distinct psychographic groups were identified. Their current mode choice behaviour and reactions of each group to marketing messages and specific transport initiatives is discussed. Two groups already exhibit above average use of green modes, but are distinguishable by the extent to which their behaviour is discretionary. Two further groups exhibit potential for at least partial conversion to alternatives to the car for leisure day trips, but the preferences, perceived difficulties and environmental values of the two groups differ. The importance attached to journey attributes and their association with each mode was found to differ among the segments. Socio-demographic factors were found to have little bearing on the travel profiles of the segments demonstrating that attitudes largely cut uniformly across personal characteristics. Most significantly, the differences in mode choice behaviour and intention between the groups are interpretable with respect to the theory used. However, the research indicates that travel mode choice requires a unique, expanded version of the TPB incorporating notions of moral norm and psychological attachment to the car to improve its explanatory utility. The results are used to recommend how targeted transport solutions and marketing principles can be designed to best influence behavioural change at the organisational level.

## 1 INTRODUCTION

It is widely recognised that Mobility Management involves a detailed understanding of travel behaviour and the reasons for individual journeys within specific contexts and organisational settings. However, there is a move towards demand management policies without a full understanding of car dependent attitudes and the ability and willingness of people to change behaviour. The research outlined in this paper utilised psychological theory and a synthesis of data collection and multivariate analysis techniques to move away from statistics purely measuring behaviour to those which facilitate an understanding of the attitudes, belief systems and characteristics of those most likely to change behaviour.

Although the principles and methods explored in this paper are equally applicable to all sectors of travel demand, this study focuses on day trip travel to leisure attractions, specifically National Trust properties. The National Trust is an obvious case study of mobility management in this particular travel context. A major conservation heritage organisation attracting around 12 million visitors a year, the National Trust has been attempting to confront the dual dilemma of promoting public access whilst preserving landscapes and buildings. However, it is increasingly realising that access does not necessarily mean by car. In 1995, the organisation passed a resolution stating that the proportion of visitors arriving at properties by car should be cut from 90% (a conservative estimate) to 60% by the year 2020. However, the National Trust falls victim to the more general lack of understanding of car dependent attitudes and the specific need to have a detailed grasp of the motivations, constraints and attitudes of its own visitors. Their attempts so far to manage the problems without a clear understanding of the trends have led to the implementation of solutions on an ad hoc and often temporary trial basis. As a result, some of the 'green transport' initiatives it has introduced have not reached their potential. The danger is that the intense competition for limited resources will mean that justification for the earmarking of funds for such projects will rapidly lose foundation.

In this light, it is clear that this organisation is one of many that requires more than a tool which merely provides baseline figures highlighting current and future trends. Instead it needs a method by which realistic solutions can be designed and targeted with the benefit of data collection to identify the most effective solutions in a variety of situations. This research set out to achieve that goal.

## 2 THE USE OF ATTITUDINAL THEORY

To understand how we might be able to promote alternatives to car use, it is important to identify the salient factors that increase the likelihood that an individual will choose such actions. The requirement for such

approaches is to identify not only the socio-economic and demographic variables that could affect preferences and choices, but also an individual's willingness and ability to change, including any resource constraints and external structural factors. Hence, methodologies used to identify not only how and what but *why* individuals behave as they do have to encompass a number of interrelated factors.

However, economic modelling frameworks based on simplified assumptions of travel choice behaviour generated a mathematical approach at the expense of consideration of the human element and true behavioural processes. At most, behaviour is explained with reference to theoretical underpinnings from micro-economic theories of (rational) behavioural choice, almost exclusively relating to mode and route decisions. These methods are predominantly based on the desire to ascribe utility to various pre-defined travel attributes in order to allow some prediction of how preferences would change if existing products were altered. Things that cannot be ranked or rated are, however, often not measured. Furthermore, the attributes included for measurement are not generally derived from any empirical or theoretical foundation (Gärling et al 1998).

Attitude research has been unable to compete with these approaches providing numerical and modelling dimensions. Emphasis on attitudes has recently reappeared on the agenda in the broad context of travel awareness campaigns and the need to broadly inform people of the consequences of their actions in the hope this will encourage them to alter their travel choices (TSG 1998). In addition, significant interest has been generated by individual approaches to altering perceptions and attitudes to travel through techniques such as 'travel blending' (Ampt 1999). Once again, however, research on attitudes to travel and modal choice is generally not conducted within any theoretical framework. This is despite the fact that outside the domain of travel behaviour research, the prediction of behaviours from knowledge of people's attitudes has been under investigation for some time. In particular, a growing interest in the behavioural components of environmental problems has meant that the relationship between environmental attitudes and ecological behaviour has been well explored (see for example Grob 1995; Stern and Dietz 1994; De Young 1996). Essentially, despite being commonly held in travel behaviour research that knowledge and awareness will automatically lead to attitudinal and hence behavioural change, socio-psychological research evidence to date suggests that the antecedent conditions associated with behaviour are both complex and elusive. That is to say that elements of the decision making process beyond just attitudes need to be changed before car use will be reduced.

Travel behaviour research could benefit from the incorporation of new concepts and frameworks from this wider body of attitudinal research. This research draws upon behavioural/ attitudinal theory in order to develop a conceptual model of mode choice decisions made in the context of travel to countryside recreation destinations. In particular, one of the most influential of these theories on the causal link between attitudes and behaviour, the Theory of Planned Behaviour (TPB) (Ajzen 1991) has been adopted as the core of a conceptual model tested by qualitative and quantitative research.

According to the TPB, human behaviour is guided by three kinds of considerations:

- ✧ *Behavioural Beliefs*: beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes. These produce a favourable or unfavourable **attitude** toward the behaviour
- ✧ *Normative Beliefs*: beliefs about the normative expectations of others and motivation to comply with these expectations. These result in perceived social pressure or **subjective norm**.
- ✧ *Control Beliefs*: beliefs about the presence of factors that may facilitate or impede performance. These give rise to **perceived behavioural control (PBC)**.

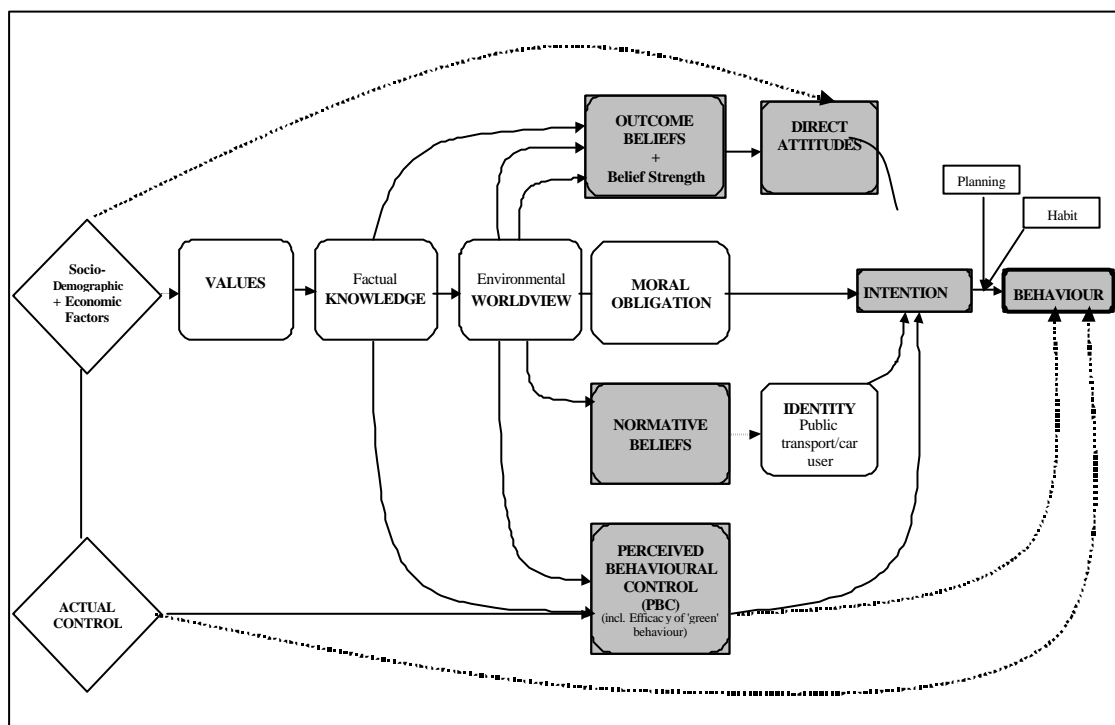
Hence a person's behaviour is explained in terms of his or her beliefs regarding the consequences of performing a behaviour and ones evaluation of those outcomes. In combination, these components lead to the formation of behavioural **intention**. As a general rule, the more favourable the attitude, subjective norm and the greater the perceived control, the stronger should be the person's intention to perform the behaviour. Finally, given sufficient **actual control**, people are expected to carry out the behaviour. Therefore, this theory purports that *intention* mediates between attitude and behaviour. However, PBC should be considered in addition to intention. For example, even if individuals have strong intentions to carry out an activity due to positive attitudes and social norms, those who are confident they can carry it out with few obstacles are more likely to persevere than those who don't. Moreover, PBC can serve as a proxy for actual control which is difficult to measure empirically.

A conceptual model of day trip travel mode choice was developed using this theory as its core together with additional factors identified from the literature and focus group research. The model is illustrated in Fig.1. Additional factors added to the TPB are summarised as follows:

- ✗ **Moral norm:** a feeling of personal obligation or commitment to contribute to the preservation of the environment. It supports those who claim that concern for the environment is related to moral thinking (Stern and Dietz 1994) and has been proven to contribute extra explanatory power over and above the TPB constructs (Harland et al 1999).
- ✗ **Environmental attitudes and knowledge:** it can be expected that moral norms develop from environmental concern and knowledge (ibid).
- ✗ **Efficacy:** perceived belief about what can be achieved, for example, with respect to ecological behaviour. This is an element of perceived control (Axelrod and Lehman 1993).
- ✗ **Identity (behavioural norm):** several authors have shown that behavioural norm – a construct that refers to perceptions of other’s behaviour – provides a more adequate account than subjective norm of the social pressures impacting on behaviour (Forward 1994).
- ✗ **Habit:** when behaviour is habitual, behavioural responses are activated automatically and actions can be instigated without the mediation of attitudes or intentions (Verplanken et al 1994). According to the TPB, past behaviour does relate to intentions for future use but the effect is indirect and is mediated by attitudes and subjective norms. However, a number of studies have found that habits correlate more strongly with intention and behaviour than with other variables in the TPB (Aarts and Dijksterhuis 2000, Gärling et al 1998, Forward 1994 and 1998).

These factors are all represented in the model (below), validated and built upon by focus group research with National Trust visitors. The components of the TPB are shaded in grey. Not all of the model components are included in the discussion that follows due to space constraints.

**Fig.1: Conceptual Model of modal choice based on the TPB (shaded components)**



### 3 THE USE OF MARKET SEGMENTATION

Segmentation is a key concept in market research. The basic proposition of market segmentation is that in any given population and whatever the organisational setting, there exists a variety of sub-groups that are relatively homogenous in terms of certain essential characteristics who are likely to respond in different ways to different promotional messages. An essential component of segmentation analysis is the achievement of ‘customer focus’ and the definition of products and services to satisfy the needs of the market. Marketing strategies can then be related to the needs of these individual market segments.

There are essentially two different approaches to market segmentation (Pas and Huber 1992). In ‘a-priori’ approaches, the groups are specified from the outset and the needs, preferences and constraints of the members of these pre-specified groups are examined. In a transport context this could be as simple as ‘public transport user vs non-user’ and this is indeed the typical application of any type of segmentation in transport research and planning.

However, in order to understand the complexities of decision making, the analytical procedure needs to simultaneously and systematically deal with the relative role that each factor (ideally identified using a theoretical framework) plays. This involves 'allowing for the data to speak for itself' and generating natural associations of people in the sample. Cluster analysis is a purely empirical method of classification because it makes no prior assumption about important differences in the population (beyond the measurements upon which it is based) and was therefore used in this research.

#### 4 METHODOLOGY

A lengthy self-completion mail-back questionnaire was administered in the summer of 2000 after approaching visitors with a short intercept survey at two National Trust properties to the southeast of Manchester in NW England. Of those that agreed to take the lengthier questionnaire home with them (it took between 20 minutes and 2 hours to complete), 66%<sup>1</sup> returned a usable survey.

One of the properties (Dunham Massey) was chosen due to its exemplary transport links, being both on a National Cycle Route and having its own hourly shuttle bus service to the local railway station, with connecting services to the Manchester metro network. The second property, Quarry Bank Mill, is served by a public bus route and attracts more families with children and 'one-off' visitors than Dunham Massey. The aim was to attract a good diversity in the range of attitudes and behaviours in order to draw conclusions about all the relationships in the conceptual model. This involved ensuring that bus users and cyclists were captured in adequate numbers, even though they may be over represented with respect to the actual visitor population.

The questionnaire was constructed largely using multiple overlapping attitude statements<sup>2</sup> hypothesised to pertain to each of the components in the conceptual model. Behaviour was measured using observed behaviour on the survey day, self-reports of general travel behaviour and the frequency of use of modes for all travel, day trip travel and work travel. Before any multivariate statistical analysis was undertaken, factor analysis was used to reduce the number of variables by identifying the smallest number of sets of highly correlated variables and to create a set of factors to be treated as uncorrelated variables in further analysis. In total, 105 attitudinal statements were subjected to principal components analysis with varimax rotation. 19 factors were generated. It is beyond the scope of this paper to detail these factors. The resulting constructs largely corresponded to the conceptual model components, including moral norms, general attitudes towards the car, environmental beliefs, social (combined with behavioural) norms and perceived behavioural control. Table 1 displays 17 of the factors that were subsequently used in the cluster analysis to find naturally occurring homogenous attitudinal groups of visitors.

**Table 1: Factors used to derived the clusters**

<p style="text-align: center;"><b>Attitudes Towards Car Use</b></p> <p>Factor 1. <i>Moral responsibility to use the car less</i></p> <p>Factor 2. <i>Attachment to the car for leisure</i></p> <p>Factor 3. <i>General car-dependency</i></p> <p>Factor 4. <i>Affects of congestion on travel</i></p> <p>Factor 5. <i>Enjoyment of travelling by car</i></p> <p>Factor 6. <i>Efficacy of reducing travel behaviour</i></p>
<p style="text-align: center;"><b>Attitudes Towards Alternatives to the Car</b></p> <p>Factor 7. <i>Perceived Behavioural Control</i></p> <p>Factor 8. <i>Willingness to sacrifice for the env.</i></p> <p>Factor 9. <i>Concern for negative effects of car use</i></p> <p>Factor 10. <i>Social + personal normative beliefs</i></p> <p>Factor 11. <i>Attitude towards road building</i></p> <p>Factor 12. <i>Attitudes towards cycling</i></p>
<p style="text-align: center;"><b>Attitudes Towards the Environment</b></p> <p>Factor 13. <i>'Green' identity</i></p> <p>Factor 14. <i>Romantic views of nature</i></p> <p>Factor 15. <i>Anthropocentric view of nature</i></p> <p style="text-align: center;"><b>'Green' Behaviour</b></p> <p>Factor 16. <i>'Green' purchasing</i></p> <p>Factor 17. <i>Political activity</i></p>

The variables produced by the factor analysis were entered into a cluster analysis procedure. The goal of cluster analysis is to identify homogenous groups of clusters of cases. It does this by maximising the

<sup>1</sup> Almost 100% of those approached stopped for the intercept survey (N=1222), and 78% agreed to take the questionnaire home with them. The final total (666) represents an overall response rate from the first point of contact of 55%.

<sup>2</sup> All using 5 point likert scales

distance between groups whilst simultaneously minimising the distance within a group. This involved using a two stage approach utilising an agglomerative procedure (Ward method) to identify structure in the data and generate cluster centres, and using these as a starting point for a more robust non-hierarchical (K-means) cluster procedure. Stopping rules, cross validation procedures and subjective criteria identified as appropriate from the literature were used to choose the correct number of clusters (Hair et al 1998).

## 5 PROFILES OF THE SEGMENTS

The cluster analysis concluded that 6 relatively stable groups could be identified. By virtue of the clustering procedure and its use of latent variables created by the factor analysis, each of these clusters has a unique psychographic profile. After some time was spent on profiling, each segment was given a name to represent its unique set of characteristics. Below is a brief description of the segments based on these factors and Figs.2-7 display cluster scores on a selection of original attitude statements which represent constituent elements of the factor scores.

In summary, the population falls into 6 distinct groups with respect to their scores on various components of the TPB and additional factors such as environmental concern, participation in pro-environmental behaviour and moral obligation. In particular, the four 'car owner' segments<sup>3</sup> display stark differences on the extent to which they feel responsible for their environmental effects of car use and perceptions of behavioural control over using alternatives to the car for day trip travel. The two non-car owning segments are also differentiated by these variables, although it is clear that 'actual control' factors in the form of age and income play a part in the attitudes of these groups (see s.5.2 below). Subjective norm is the component of the TPB, which displays the least significant differences between groups.

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<sup>3</sup> As some attitude statements pertained only to those claiming to have access to a car for the majority of leisure day trips, there was a large amount of missing data on these variables. In order to maximise the use of the variables created by the factor analysis, the sample was split prior to the clustering procedure into car owner and non car owner groups: 4 of the former and 2 of the latter segments emerged

### **(1) DISCONTENTED DRIVERS – 35%**

These individuals exhibit a high moral responsibility to reduce car use, an above average willingness to sacrifice for the environment and a feeling of guilt when the car is used unnecessarily. They claim fairly high participation in pro-environmental behaviours, though less than groups (4) and (5). However, they need more persuasion that reducing their own car use will make much difference, as they believe other people will not reduce theirs (efficacy).

These individuals stand out due to their frustration with congestion. Nevertheless, they enjoy car travel and believe it would be difficult to reduce, more so than group (2) though less than group (3).

Although they express a desire to use alternative modes, they perceive far higher difficulties than all the other groups except group (3), who do not claim to want to reduce car use anyway.

***This suggests that although they could be willing to reduce car use for altruistic motives and to avoid congestion, they are held back by weak perceptions of behavioural control.***

### **(2) COMPLACENT CAR ADDICTS - 26%**

This group do not see many problems with using car use, nor the point of reducing it. They are not attempting to limit its use for environmental or any other reasons and exhibit low participation in green behaviours. Their lower education levels may have a bearing on this lack of concern.

Their rejection of alternative modes is less likely than group (3) to stem from a particular love of car travel (or a strong dislike of alternatives). Instead, this group do not see any reason why they should reduce car use.

Their score on the perceived behavioural control factor sets them apart from groups (1) and (3) as they perceive less constraints in terms of time, information acquisition and carrying luggage. Accordingly, they are less likely to believe that their lifestyle cannot be adjusted to living without the car.

***This suggests the obstacles to using alternatives to the car are less related to PBC than a lack of awareness of the environmental implications of behaviour and a moral imperative to change.***

### **(3) NO HOPERS – 19%**

This group exhibits the lowest desire to reduce car use and the highest psychological car dependency.

Despite claiming to be more concerned about the negative effects of car use, valuing nature more for its own sake and displaying slightly greater rates of participation in green behaviours than (2), they are similar in that they are unwilling to sacrifice for the sake of the environment and feel strongly about an individual's right to use a car.

They differ from (2) in that they particularly enjoy car travel and are much more likely to believe that all their car use is necessary. This group also exhibit statistically significantly weaker normative beliefs than all the other groups.

They perceive the highest number of obstacles preventing the use of alternatives, particularly time constraints.

***This suggests a strong resilience to reducing car use as moral and social norms, attitudes and PBC are not in favour of forming intentions to change.***

### **(4) ASPIRING ENVIRONMENTALISTS - 18%**

Youngest of all the segments, this group feels the most responsible for environmental problems. Pro-environmental behaviour is seen as important and worthwhile. The negative effects of car use clearly enter into the decision making process.

Although just under half still admit they would find it difficult to give up the car altogether, this is significantly less than groups 1-3. They don't enjoy travelling by car. However, they are not overly concerned with congestion as their complaint with the car is broader than this.

Nevertheless, the majority (though less than groups 1-3) still judge public transport to be problematic. Compared to group (5) it is clear that they feel more restricted by time constraints and other obstacles.

***This suggests a practical approach to car use. Both moral norms and attitudes contribute to a high propensity to use alternatives. Perceived constraints limit choice, but these may be less 'perceived' and more 'real' than other groups.***

### **(5) CAR-LESS CRUSADERS – 4%**

Statistically this group match (4) on most measures to do with the environment, although they are slightly less prepared to sacrifice and have more romantic views towards the value of nature.

The most distinguishing feature of this group is the significantly stronger perception of behavioural control than all the other groups. There is some indication that individuals in this group are slightly more influenced by personal and social norms, though the difference is only significant from group (3).

Because of the way the cluster analysis was performed, we already know that the ***behaviour of this group favours alternative modes.*** However, ***this analysis suggests this may be due to a high sense of environmental awareness and concern and fewer perceptions of the difficulties with these modes.***

### **(6) RELUCTANT RIDERS - 3%**

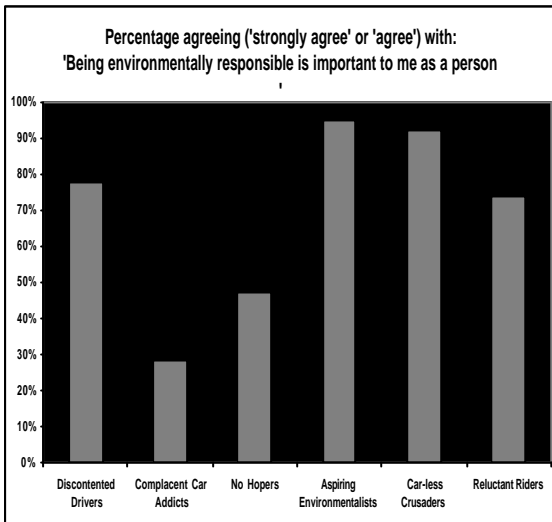
This group does not appear to be particularly motivated by environmental issues. Despite moderately high concern for the negative effects of car use, they are more reluctant to sacrifice for the sake of the environment and participate in fewer 'green' activities than groups (1), (4) and (5).

Of the two non-car owner groups, it is evident that these individuals are less content with the use of alternatives. Although time constraints are not a particular problem, a high number perceive many problems with using public transport. Indeed they are the same as (2), though less than (1) and (4) in this respect.

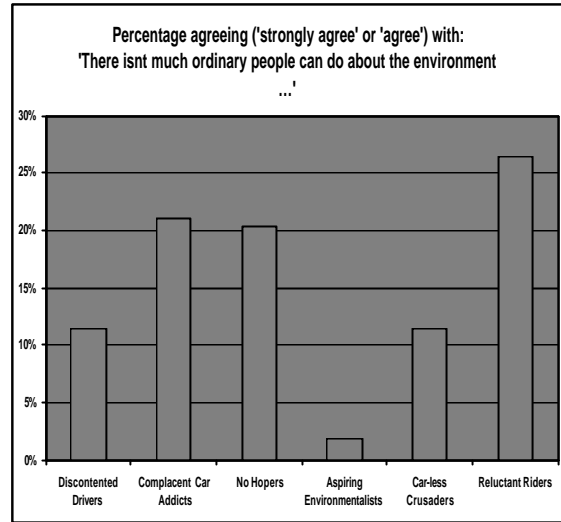
***This suggests that this group use alternatives less voluntarily than (5) as they are not motivated by altruistic motives and perceive many constraints with their use. Their older age profile and lower income point to 'actual' constraints on behaviour.***

**Figs.2 – 7: Cluster scores on individual attitudinal statements constituting factors  
(Note different scales)**

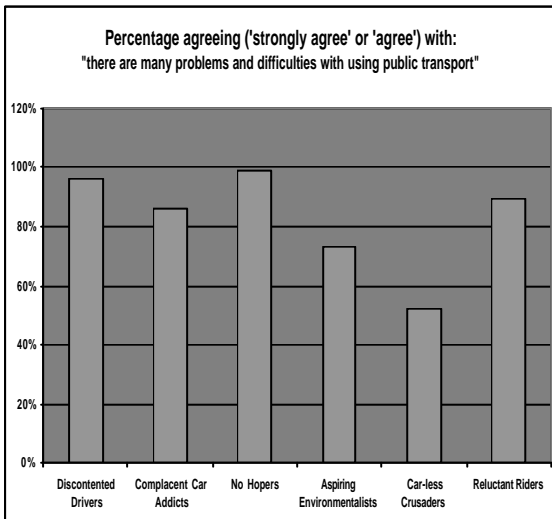
**Fig.2: Moral Norm**



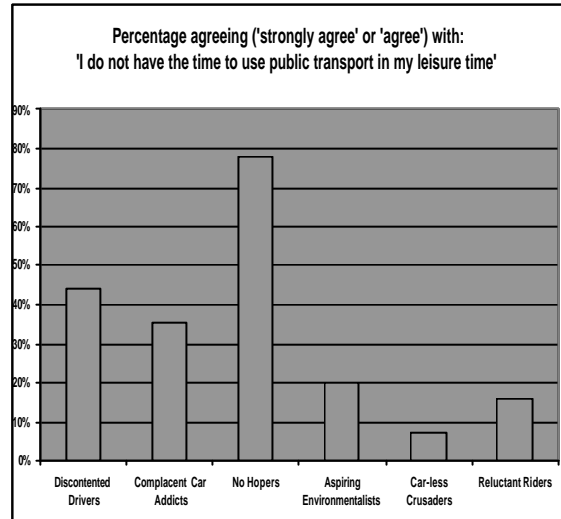
**Fig.3: Efficacy**



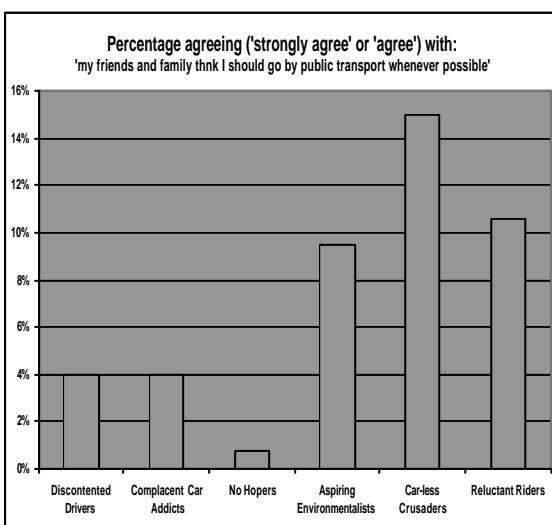
**Fig.4: PBC - general**



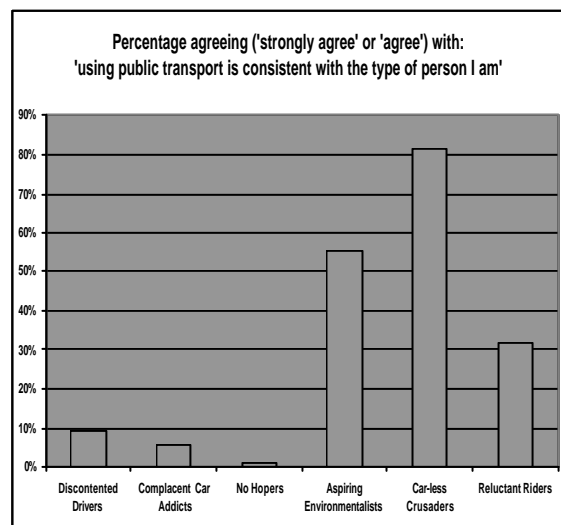
**Fig.5: PBC- time**



**Fig.6: Subjective Norm**



**Fig.7: Behavioural Norm**



## 5.1 Travel Behaviour

The main objective of the segmentation analysis is not only to identify the salient features of each cluster with respect to the variables used to create them, but to assess whether these attitudinal groupings have any predictive value with respect to travel behaviour i.e. can they predict the likely propensity to use alternatives to the car for day trip travel? Attitudinal variables that have been identified as playing a vital role in profiling the segments do not necessarily illuminate our understanding of the modal choice process if the segments cannot be distinguished on this behaviour. The aim is to discover whether the population falls into distinct segments according to their predisposition to use alternatives to the car for general and/ or leisure travel. In addition, if two or more similar behavioural segments are identified, the analysis will determine whether they can be distinguished with respect to their motivations and constraints acting on this behaviour i.e. to determine whether *the same choices are made but for different reasons*.

The outline statistics in Table 2 below illustrate that the attitudinal clusters correspond to distinct behavioural groups with respect to behaviour and intention to use alternatives to the car for both general and day trip travel. Two segments, the *No Hoppers* and the *Complacent Car Addicts* exhibit very high car dependence and low intention to use alternative modes. The two non car-owning segments, as would be expected, show the opposite trends. However, most interesting from the point of view of mobility management and influencing current trends are the *Discontented Drivers* who currently exhibit high car use but also demonstrate a relatively high intention to change. Moreover, as discussed below, these behavioural trends can be explained with respect to the components of the conceptual model used. Coupled with the motivational factors captured by the segmentation, not only does this approach identify target markets but also provided detailed diagnostic information about each segment that is useful in designing services and promotional strategies to induce this mode switching behaviour.

**Table 2: Selected indicators of travel behaviour and intention per cluster**

	1. Discontented Drivers	2. Complacent Car Addicts	3. No Hoppers	4. Aspiring Env'talists	5. Car-less Crusaders	6. Reluctant Riders
<b>RESOURCES</b>						
Drivers Licence	96.5%	93.7%	95.2%	88.0%	40.7%	52.6%
Vehicle Availability <sup>4</sup>	0.87	0.83	0.88	0.77	0.29	0.42
<b>SELF-REPORTED TRAVEL BEHAVIOUR<sup>5</sup></b>						
Ave. % trips by car	65%	66%	74%	42%	8%	25%
Ave miles travelled (drivers only)	8911	9247	10477	6902	2107	5625
% using alternatives for day trips 'always' or 'a lot of the time'	2.0%	4.0%	0.8%	18.8%	85.2%	52.3%
<b>OBSERVED BEHAVIOUR</b>						
% using alternatives on survey day	3.2%	4.8%	0%	12%	100%	46.2%
<b>INTENTION</b>						
% intend to use alternatives for a day trip in next 12 mnths	18.0%	12.0%	7.3%	50.0%	100%	72.2%

## 5.2 Socio-demographic Characteristics

Traditionally in market research and in the investigation of travel behaviour, social characteristics have been relied upon as correlates with behaviour. Similarly, attitudes, preferences and beliefs have been found to be dependent on such characteristics as gender and age (Golob and Hensher 1998). Therefore, it is necessary to investigate the demographic composition of the segments in order to prove or disprove the hypothesis that any changes in attitudes and differences in travel behaviour could simply be attributed to personal characteristics.

Overall, there are very few statistically significant differences between the four regular car access segments demonstrating that attitudes and opinions largely cut uniformly across demographic characteristics. However, the *Car-less Crusaders* and the *Reluctant Riders* are notably different from the other four groups on many characteristics, although not so much from each other (Table 3.). The non-car owning groups tend to be older, particularly the *Reluctant Riders*, and consequently comprise more retired members and fewer children at home. However, education appears to be the demographic variable which distinguishes the

<sup>4</sup> The Vehicle availability measure indicates the degree of car availability per car driver. It is constructed by dividing the number of vehicles per household by the number of adults with a drivers licence in the household.

<sup>5</sup> Although strictly speaking this measure refers to past behaviour, it is known that modal choice is relatively stable over time and reports of past behaviour can therefore serve as indicators of likely future behaviour.



groups most strongly and significantly. The *Aspiring Environmentalists* comprise the most highly educated segment and the *Complacent Car Addicts* are the least educated of the car owner groups, possibly contributing to the differences in environmental concern and moral norm exhibited. It must be noted that age, income and socio-economic status vary less within this sample of respondents than among the general population. As such, it is not wholly surprising that income etc does not vary significantly among the groups. Nevertheless, any differences that do exist within the sample do not appear to be reflected in the cluster solution apart from between the car user and non-car user groups. This suggests that personal characteristics are not an important determinant of attitudes or any differences in behaviour found between segments of equivalent vehicle availability.

**Table 3: Personal Characteristics of each segment**

		1. Discont- ent Drivers	2. Complac- ent Car Addicts	3. No Hopers	4. Aspiring Env'talist s	5. Car-less Crusader s	6. Reluctant Riders	Sample Ave.
<b>Gender</b>		F (55%)	M (59%)	F(56%)	M/F	F(59%)	F(84%)	M/F
<b>Age</b>	< 34 yrs	16%	17%	14%	21%	8%	0%	16%
	> 65 yrs	17%	8%	19%	12%	35%	63%	17%
<b>Employment</b>	FT + PT	64%	63%	62%	70%	39%	21%	62%
	Retired	28%	23%	29%	18%	50%	68%	28%
<b>Income</b>	< 10k	8%	3%	6%	7%	20%	47%	8%
	> 40k	35%	40%	27%	37%	24%	6%	33%
<b>Education</b>	NONE	6%	6%	9%	1%	7%	32%	7%
	>	53%	48%	53%	69%	37%	32%	49%
<b>With kids still at home</b>		30%	31%	35%	35%	4%	5%	30%
<b>Single adult household</b>		9%	9%	7%	15%	37%	42%	12%
<b>2<sup>nd</sup> earner in household</b>		53%	48%	58%	44%	17%	11%	48%

### 5.3 Attitudes and the Theory of Planned Behaviour

So far it has been established that the clusters formed on the basis of underlying psychological constructs correspond to groups of people with different mode choice intentions and behaviours. The utility of this approach can be assessed by identifying those constructs, or combinations of constructs, that are important for identifying the propensity to use green modes. Although this approach enables a detailed interpretation of the ways in which each group thinks and processes information about the choice of travel mode, it is beyond the scope of this paper to outline the unique combination of variables which define each segment. What is clear, is that these groups are interpretable in terms of the dimensions of the conceptual model and the TPB. As a general rule, and as predicted by the TPB, the more favourable the attitudes (outcome beliefs and (lack of) attachment to the car), the stronger the moral norms and the greater the perceived control, the stronger are the intentions to use an alternative mode for day trip travel.

Two of the three TPB constructs, **perceived control** and **outcome beliefs** were pivotal in defining the segments. It is clear that perceived behavioural control ultimately dictates intention and behaviour in most cases. For example, the *Discontented Drivers* and the *Complacent Car Addicts* exhibit relatively similar behaviour. However, their attitudes, particularly with respect to environmental concern and moral obligations are very different, as are their intentions. In this case, the *Discontented Drivers* low perceptions of control serve to moderate their behaviour vis a vis their intentions. The *Aspiring Environmentalists* and the *Car-less Crusaders*, on the other hand share many of the same norms and attitudes regarding alternative modes, but their behaviour is markedly different. This illustrates that positive attitudes to the environment do not in themselves bring about favourable intentions/behaviour but require these beliefs to be combined with strong control beliefs in order to translate these convictions into behaviour as is the case with the *Car-less Crusaders*. In addition, the *No Hopers* display negative attitudes towards alternatives to the car so that even if they possessed strong perceptions of control, intentions would still be low. However, the behaviour of the *Reluctant Riders* appears to be determined more by actual constraints of car ownership than perceptions.

On the face of it, this may appear consistent with other findings which claim that although information about the negative environmental effects of the car raises public awareness, the information is not usually sufficient to change behaviour (Tertoolen *et al* 1998). Nevertheless, in this analysis, environmental concern combined with a sense of **moral obligation** has helped to account for some of the variance in attitudes, intentions and behaviour. This is particularly evident with the *Reluctant Riders*, whose convictions AND intentions are not as favourable as their non car owner counterpart; also with the *Aspiring Environmentalists* whose environmental

concern and sense of responsibility is significantly greater than that of the other car owner groups and whose behaviour reflects this. Although not sufficient on their own, the inclusion of measures of environmental concern and moral norm provide additional beliefs that can be targeted in order to change behaviour. By extending the TPB and measuring explanatory factors within an interrelated framework, understanding is improved about the factors underlying the decision to perform or not perform a given behaviour and a greater probability exists that the behaviour can be modified.

In addition, as outlined below, examination of the specific **outcome beliefs** associated with each of the four transport modes provided a detailed account of the major considerations that feed into favourable or unfavourable dispositions towards a mode and hence influence behaviour. Most importantly, the 'bundles of attributes' that were important and associated with each mode differed among the segments. Most travel research furnishes an abundance of descriptive information about the benefits of alternative modes. Indeed recent research commissioned for the DTLR (2001) indicates that convenience, flexibility and immediacy are among the key factors underlying modal choice. However, this research utilised psychological, affective as well as instrumental factors specifically associated with travel for a leisure day trip, and thus offers new insights. Moreover, instead of a snapshot of public opinion, it examines the psychological processes through which these factors are associated with behaviour.

In summary, the segmentation analysis helps us to identify the factors underlying a decision to perform or not to perform a given behaviour. The evidence clearly shows *that the same behaviour can take place for different reasons* and that the same attitudes (eg positive attitudes to the environment) can lead to different behaviour (eg a reduction or no reduction in car use). However, the more knowledge that exists about the factors underlying a decision to perform or not to perform a given behaviour, the greater the probability that the behaviour can be modified. One of the principal aims of attitude-behaviour models such as the TPB is to inform behavioural interventions. Different components of the model *each reveals a different aspect of behaviour and each can serve as a point of attack to change it*' (Ajzen 1991, p206). Ajzen and Madden (1986) argue that it is reasonable to target a policy intervention on any of the determinants of intention as long as there is room for change. Therefore, even though measures such as environmental concern and abstract knowledge may not have any direct effect on intentions or behaviour, they provide further areas to target as a means of modifying behaviour.

#### 5.4 Outcome Beliefs

Marketing essentially regards products and services as 'bundles' of attributes, of which cost is merely one. A service a mode provides can be described by the series of attributes that the traveller finds important. Attitude research requires identifying salient outcome beliefs. The difficulty lies in identifying the appropriate attributes. Typically, transport studies have utilised simple descriptors for comparison such as journey time, costs and speed. The objective of this study, however, was to break away from conventional thinking and concentrate on psychological constructs describing the 'state of mind' of an individual whilst on a journey to a leisure destination. The final list, by no means comprehensive, comprised 22 potential psychological (e.g fun, control, sense of freedom, flexibility, safety) and instrumental (sociable, scenery, value for money) outcomes of travelling on a day trip for leisure identified through the focus groups and the literature. Using five point scales, respondents were asked:

- (i) **How important** each aspect is for them personally when travelling on a day/ afternoon out for leisure;
- (ii) How **each mode** (car, public transport (train or bus), bicycle and coach) rates on a 5 point scale for each attribute being measured.

The evaluation of each outcome belief and the corresponding evaluation of each mode were scored so that a 5 indicated the most positive evaluation and a 1 indicated a negative evaluation.

It was hypothesised that different groups of people seek different benefits and perceive different outcomes from various modes of transport. The segmentation analysis has identified groups of respondents with similar preferences, dislikes and perceived deficiencies with each mode, representing market segments that have the same unmet needs and the greatest potential for behavioural change. It is beyond the scope of this paper to detail the specific outcome beliefs differentiating the segments. However, to present an overall picture for each segment, Fig.8 displays the mean deficiency score for each cluster for each mode<sup>6</sup>. For each individual in the sample, a calculation was made as to 'performance' of each mode in relation to their rating of the importance of each attribute.

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<sup>6</sup> Deficiency score = (Mode attribute rating – Attribute importance)/ Attribute importance) – all positive scores are set to zero on the basis that where expectations are exceeded by a mode on a particular attribute, the extra utility is not appreciated. For example, if 'environmental friendliness' scores low in importance but the bicycle scores high on this attribute, the bicycle is not appreciated *more* because it exceeds the 'ideal' on this attribute.

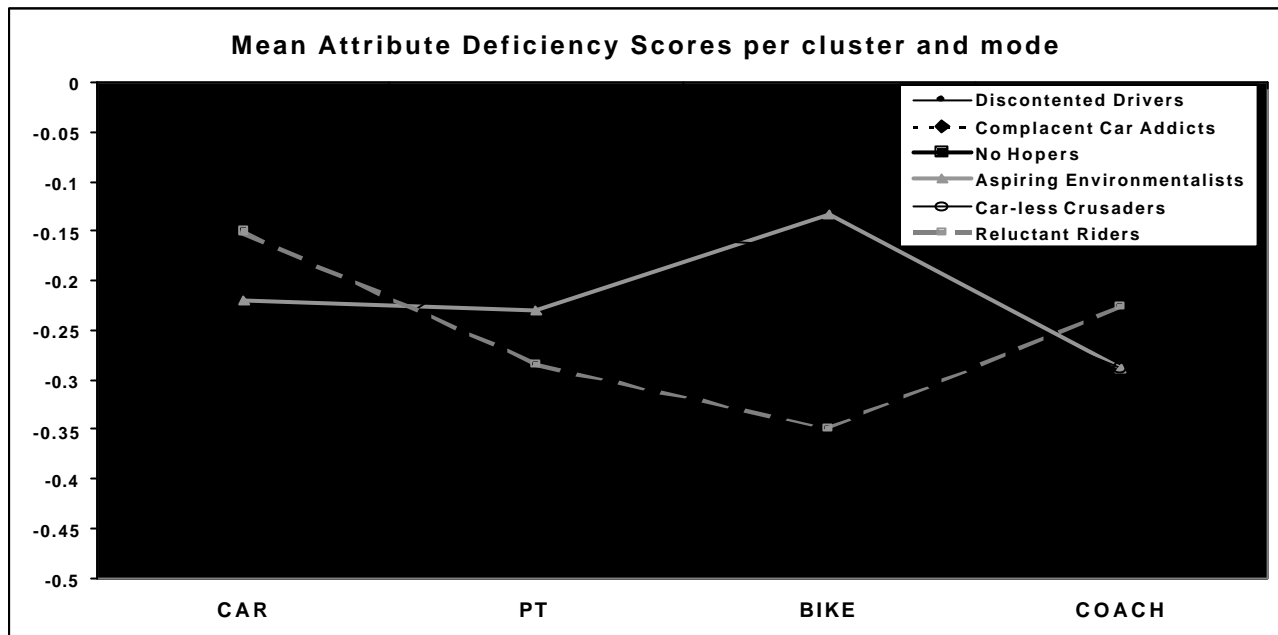


Fig 8: Mean attribute deficiency score per cluster and mode

The interpretation of the clusters in terms of these outcome beliefs indicates that the clusters exhibit distinct differences in the degree to which public transport, cycling and coach travel are perceived as a viable alternative to the car for day trip travel. The main trends are as follows:

- ✘ **ALL of the segments apart from the *Car-less Crusaders* perceive the car to meet their needs more adequately than public transport** (with respect to the attributes included in this analysis). For the *Aspiring Environmentalists* the difference between the two modes is negligible. However, for the other three car owner groups AND the *Reluctant Riders*, public transport falls far short of the car's performance.
- ✘ **ALL of the car owner groups rate the bicycle as meeting their preferences more adequately than public transport.** In the case of the *Aspiring Environmentalists*, the bicycle out-performs all other modes including the car. However, the *Reluctant Riders* rank cycling lower than all other modes and the *Car-less Crusaders* still prefer public transport.
- ✘ **Coach travel out-performs public transport** for all groups except the *Aspiring Environmentalists* and *Car-less Crusaders*. The analysis identified specific attributes such as scenery and 'sociability' offered by this mode and appreciated by certain segments.

The identification of constructs most relevant to change and those most likely to be threatened when people are asked to change behaviour are of great interest to policy makers. The analysis revealed, for example, that the *Complacent Car Addicts* rate value for money higher than any other segments yet assess the car as offering the best cost advantage. Understanding the beliefs about the benefits as opposed to actual benefits is of considerable importance because these beliefs are likely to influence attitudes, intentions and behaviours regardless of their accuracy. The *Reluctant Riders* are looking for a hassle free experience with time constraints, fun and adventure of little concern, but lack of stress and the ability to see the scenery of most concern. The *No Hoppers* will not compromise on privacy, freedom and control and perceive the greatest discrepancies between the car and all other modes on their ability to satisfy these journey requirements. The *Aspiring Environmentalists* are more likely to seek out fun, adventure and benefits in terms of health and fitness as well as being conscious of the environmental effects of their mode choice. The analysis may be viewed as representing potential drives or motivations to use individual modes and this is necessary in order to design tailor made services and promotional campaigns targeted to particular market segments.

## 5.5 Policy Implications

The real value of segmentation lies in its ability to be translated into achievable strategies by using the information to guide decisions. Table 4 consolidates the segmentation evidence in order to illustrate the potential to identify and target the most effective interventions. The table defines each segment in terms of its 'potential switchability', and identifies some factors which may be considered indicative of susceptibility to reduce car use or of the main motivators against change. In addition, it suggests what each segments most likely choices would be if it were to opt to travel on a day trip without the car. Overall, the table comprises a framework that could be used to define promotional campaigns.

**Table 4: Potential interventions to influence each segment's modal split**

	Intention <sup>1</sup> / Behaviour <sup>2</sup>	DRIVERS to use alternatives	CONSTRAINTS	POTENTIAL; POLICY OPTIONS; NEXT BEST MODE
<b>Discontented Drivers</b>	18% / 2%	*Moderate moral obligation *Congestion (negative attitudes towards the car) *Positive qualities of public transport	*Perceived control *Positive attitudes towards the car *Efficacy	<b>MODERATE</b> *Promotional messages reinforcing moral obligation and positive qualities of PT (e.g scenery, novelty) and negative aspects of the car (congestion) <b>Next best mode:</b> Public Transport (PT)
<b>Complacent Car Addicts</b>	12%/4%	*Positive qualities of PT and some indifference to the car	*Psychological attachment to the car *Lack of moral imperative	<b>LOW</b> *Education into negative effects of car use and cost of car use *Promotion of positive qualities of PT (value for money, relaxation) <b>Next best mode:</b> PT and Bike
<b>No Hoppers</b>	7%/1%	None – likely to avoid National Trust properties if constraints imposed on car use.	* Perceived control *lack of moral imperative *strong behavioural and social norms *strong car attachment *unfavourable attitude towards all alternatives	<b>VERY LOW</b> *weaken stereotypical images of PT users *push (draconian) measures – but could react to National Trust if they are seen to 'preach' moral responsibility and restrict behaviour <b>Next best mode:</b> none
<b>Aspiring Env'talists</b>	50%/19%	*High moral norm *Efficacy *Positive attitude towards PT *some negative views of car *slightly favourable norms *wants to set an example to others	* Perceived control * attachment to practical benefits of car use * actual control * procedural knowledge	<b>HIGH</b> *Promote positive aspects of alternatives (fitness, adventure, fun for children and negative environmental consequences of car) *Promote how individual actions make a difference *Information on alternatives will be used <b>Next best mode:</b> PT and bike
<b>Car-less Crusaders</b>	100%/85%	*High moral norm *Efficacy *Positive behavioural and subjective norms *positive attitude towards pt *dislike of the car *High PBC	*Actual Control (lack of alternatives and some age/ fitness problems re. cycling)	<b>VERY HIGH</b> *Provision of alternatives *information will be used *Reinforcement of environmental message *Reinforcement of positive aspects of pt and bike (fun, relaxing etc) <b>Next best mode</b> PT and bike
<b>Reluctant Riders</b>	72%/52%	*Lack of car ownership (Actual Control) *moderate moral obligation some positive views on public transport	* Perceived control *Likes car travel	<b>VERY HIGH</b> *Promote positive attributes of pt and coach travel (scenery, sociability, relaxation) *Information provision <b>Next best mode:</b> Coach & PT

The results imply that efforts to encourage the use of alternatives are best concentrated on those segments with the greatest potential to increase their frequency of use. If the objective is to stimulate behavioural change as opposed to attract more individuals from the non car-access segments, the evidence suggests that, rather than expect those who do not use alternatives at all, or have no intention to use them to start, it may be more productive to (i) encourage those who already use alternative modes a little already to use them a little more (the *Aspiring Environmentalists*), or (ii) to encourage those who express a willingness to reduce car travel to begin to experiment with alternative modes (the *Discontented Drivers*). In the light of the figures for intention and past behaviour included on the table, this amounts to an incremental strategy. However, even small incremental gains can have a significant effect on the total numbers using green modes and may help to sustain a change in beliefs, attitudes and future intentions.

## 6 CONCLUSIONS

This research has indicated the need to increase the sophistication of mobility management initiatives at the organisational level beyond a 'one size fits all' approach. Overall, there is strong empirical evidence in this sample for the existence of subgroups which exhibit varying degrees of mode switching potential, but each with different motivations. In particular, there are a number of potential user segments other than those usually considered with more conventional a-priori approaches. Interpretable in the context of the TPB, the attitudinal segments essentially provide an indication of how hard people are willing to try to leave the car at home for day trip travel and under what circumstances. The identification of a number of groups with a susceptibility to change their travel behaviour (at least incrementally) where opportunities do exist provides a sound research base upon which to design clear objectives and to systematically develop policies that focus on the relevant differences between types of people. In this example, the success of the National Trust's mobility management policy depends on the extent to which it uses this insight to inform promotional literature and design more selective, tailored green transport initiatives. The Trust could also benefit from using this research to win support for the 'cause' from decision makers internally who currently believe that the proportion of potential 'mode switchers' is much smaller than suggested here.

Segmentation provided a way of finding naturally occurring groups and left preconceptions aside. The results demonstrated the importance of attitudinal variables over personal characteristics as cluster membership could not be predicted by any demographic or behavioural variables. This suggests that mode choice is much more complex and that commonly used a-priori classifications may oversimplify the structure of the market. Most significantly, each segment represented a unique combination of each type of belief, proving that different groups need to be served in different ways to optimise the chance of realising changes in behaviour. Had the analysis been carried out on the aggregate sample, many of the findings would have been moderated leading to potentially erroneous conclusions. For instance, the fact that environmental concern is of particular importance to some people but not others may have averaged out to appear insignificant overall. Without the insight gained from the segmentation analysis, one may have concluded that attitudinal factors were poor indicators of mode choice in this context. Instead, comparing these constructs in any given subgroup has shown that there are no universal appeals that will successfully influence a range of individuals to change their travel behaviour. The richness of the profiles provides readily interpretable information to those responsible for designing mobility management policy, providing a means to develop strategies and marketing messages targeted at those most likely to change their behaviour.

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