ATTITUDE & TRAVEL BEHAVIOUR CHANGE USING SURVEY FEEDBACK: INSIGHT FROM DUTCH AND AUSTRALIAN EXPERIENCE

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abstract: Travel demand management (TDM) addresses the problems of energy consumption and pollution associated with increased motor vehicle use through strategies focused on improving asset utilisation, physical restraint, pricing, and urban and social changes. This paper concerns the last of these areas and examines programs aimed at changing attitudes and subsequently travel behaviour through individual measurement and personalised information. While Australian research results reviewed here are encouraging, results from the Netherlands highlight psychological processes which can reduce the effectiveness of these programs. This research area has important implications for the development of information campaigns designed to influence travel behaviour.

1. INTRODUCTION

Many countries are facing the challenges associated with increasing motor vehicle ownership levels and increasing use of private motor vehicles. These trends produce a variety of impacts. While the relative importance will vary from country to country, some of the issues include:

- consumption of non-renewable resources (fossil fuels),
- increasing dependence on imported oil which can add to balance of payments problems,
- increasing urban congestion often arising from increased use of private motor vehicles which imposes congestion costs on the business sector particularly freight transport,
- higher noise levels associated with increases in motor vehicle use, and
- increased vehicle emissions resulting in deteriorating air quality in many urban areas.

There is a growing awareness that a continuation of current trends in relation to motor vehicle use is likely to be fundamentally in conflict with any aim of achieving a sustainable urban transport system.

There are a variety of solution approaches which can be adopted to address these issues; however, they can be broadly grouped into two categories:

- 'demand satisfaction' which traditionally means expanding capacity in an attempt to accommodate forecast demand, or technological improvements in vehicles to reduce emissions, and
- 'demand management', which involves a variety of approaches designed to influence the demand and reduce or eliminate the need for capacity expansion.

There is a great deal of interest in the last approach which includes a variety of measures which can be grouped into strategy areas focused on improving asset utilisation, physical restraint, pricing, and urban and social changes (Wayte, 1991). This paper concerns the last of these TDM strategy areas (urban and social changes) and in particular methods aimed at changing social attitudes and thereby travel behaviour, through community education, individual measurement and personal information.

Reducing the use of the car through urban and social change (as opposed to legislative and pricing measures being considered and/or implemented in parts of the USA, Europe and Asia) has primarily taken the form of "travel awareness" campaigns which have largely been pioneered in the UK (Hertfordshire County Council, 1993; Hampshire County Council, 1993). These programs have aimed to encourage people to reduce car use by "campaigns" in which brochures, leaflets and other materials have been provided to people to inform them about the problem (increasing congestion, pollution, deteriorating air quality etc.) and suggest solutions (eg. car sharing, greater use of public transport, work at home etc.). The emphasis of this paper is on research which has sought to extend these travel awareness campaigns by introducing tailored feedback to program participants based on their actual travel behaviour.

The structure of this paper is as follows. Section 2 introduces a conceptual framework to clarify the relationship between travel awareness initiatives and travel behaviour. This framework is used to distinguish between traditional 'passive' campaigns, which rely on printed literature and advertising, from 'active' travel awareness campaigns which use feedback from travel surveys. Section 3 compares and contrasts independent research conducted in the Netherlands and Australia where 'active' feedback based campaigns have been used to influence travel behaviour. The final section, Section 4, presents the conclusions drawn from the review and identifies directions for future research.

2. CHANGE THROUGH TRAVEL AWARENESS

To produce change through travel awareness there are two important prerequisites (Rose and Ampt, 1997):

- there has to be a reason or objective for change, and
- there has to be scope for change.

Each of these issues is considered below.

First, the introductory section highlighted some compelling reasons for change, at the national or local level, to address the oil dependence and pollution issues associated with vehicle use. Unfortunately individuals may not relate to these reasons for change because they may not feel that their action will have any effect. However there is evidence that at least some segments of the population are receptive to environmental concerns as evidenced by the environmental movement and increasing levels of environmental awareness. Experience at the household level with recycling, composting and 'green' consumer purchases suggests that there is a market segment which is prepared to include broader considerations into their decision making.

In a random telephone survey of 1000 households in the greater Sydney region (Sydney, Newcastle and Wollongong in Australia), 89 % of respondents expressed concern or at least some concern for air pollution in the greater Sydney region (Gollner, 1995). The majority of those surveyed perceived motor vehicles as being the major cause of urban air

pollution ahead of industrial sources. Respondents were also asked how frequently they take some action because it's better for the environment. While 89 % of respondents said they take some general action once a week or more frequently because it would be better for the environment, only 59 % said they take some action about car use because of the environment. The general environmental action would include recycling, composting and purchase of environmentally 'sensitive' products. This highlights the challenge of getting people to move from awareness of a problem towards change in behaviour. Unquestionably, the best climate for change is if there is a common perceived goal. In Sydney, it is reduction of pollution, though in other cases it might be congestion or improving the quality of life.

We now turn to the issue of the scope for change. Research conducted in the UK has highlighted that not all private motor vehicle trips are essential. The study, conducted for the Royal Automobile Club (RAC) Foundation for Motoring and the Environment, examined car dependence. The following quotes from the final project report (RAC, 1995) highlight the scope to reduce car dependence:

> *At the extreme, there are between 5 per cent and 10 per cent of car owners whose commitment to their cars seems very marginal indeed. But a larger proportion of people - perhaps a quarter to a third - report they would like to travel less by car, if circumstances allowed, and this includes a proportion of those who value car use for flexibility and independence.*
>
> *This underlies a critical distinction - between car-dependent people and car-dependent trips - which will be essential to get right in any consideration of changing circumstances or policies: as a general principle, seeking to persuade large numbers of people totally to change their attitude to car use is likely to be less successful, at least in the short term, than seeking to achieve a change in choices about how - and whether - to make specific targeted journeys.*

The research considered here relies on feedback from travel surveys to target changes in choices for specific journeys. At this point it is appropriate to introduce the conceptual framework which links travel awareness initiatives to travel behaviour.

At the centre of the work considered in this paper is the relationship between awareness, attitudes and travel behaviour (Figure 1). The link between attitudes and travel behaviour has been recognised in the literature for some time (Golob *et al,* 1979). There are other factors which influence travel choices/behaviour including the perceived availability and characteristics of alternative modes (Ben-Akiva and Lerman, 1985). As highlighted in Figure 1 awareness feeds into attitudes for example where awareness of environmental issues may influence attitudes towards use of a particular mode. It is also important to highlight that the linkages between awareness, attitudes and behaviour also have a time dimension and so changes in awareness or attitudes may not result in an immediate behavioural change. For example, a family may have their level of awareness raised about the impacts of motor vehicles on the environment. This may result in their being favourably inclined to modify their travel behaviour to reduce vehicle use. However, their travel behaviour may currently be constrained by two young children who need to be taken to day care. In the near future the children will be able to walk to school and this will provide the family with an opportunity to reduce vehicle use. Finally, the framework highlights that experience gained when travelling can influence people's perceptions and attitudes.

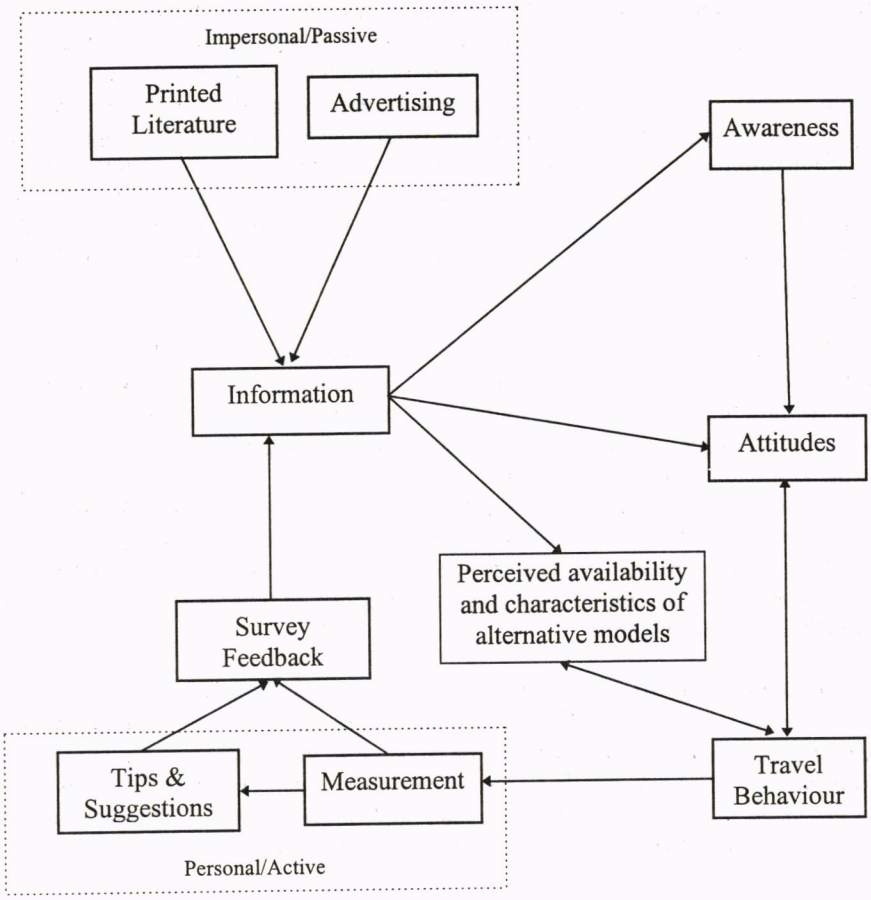

Figure 1: Conceptual Framework

As highlighted by Figure 1, information can potentially influence awareness and attitudes. The traditional sources of information are printed literature/brochures and advertising using either print or electronic media. These forms are largely impersonal and can also be classified as passive since they require no active engagement from the recipient. The other form of information is a more personal, and active form, which relies on measurement of behaviour and feedback to respondents about their level of travel activity and/or tailored tips/suggestions about how to change their travel behaviour.

The first type of information, the impersonal/passive type, is not uncommon in the transport field. For example, Energy Victoria in Australia produced a colour brochure as a guide to energy efficient transport choices (Energy Victoria, 1991). In the UK there is growing interest in 'travel awareness' campaigns which aim to reduce vehicle use by information provision and some respondent involvement.

The two most well-known examples of these have been initiated by local authorities and are TravelWise, begun in Hertfordshire (Hertfordshire County Council, 1993) and HeadStart (Hampshire County Council, 1993). Over 20 authorities have now subscribed to the TravelWise approach and have introduced it, often customised for local conditions, in their regions.

Once launched, the major thrust of TravelWise tends to be publicity (Steer Davies Gleave, 1996). The most popular forms of publicity have tended to be advertising on the outside of buses, leafleting and radio advertising. However, TravelWise is not only a publicity campaign (Steer Davies Gleave, 1996) because it has been promoted through the logo appearing on official council documents like transport strategy documents and public transport timetables. In addition to the publicity campaign, and branding of documents, particular events have been organised under the banner of TravelWise. These include 'walk to school weeks', 'bike to work days' etc.

HeadStart was launched by the Hampshire County Council shortly after Hertfordshire introduced TravelWise. However, Hampshire describes its approach as being a 'bottom up' approach in contrast to the TravelWise 'top down' approach. The distinction is that TravelWise is aimed at everyone; tying to influence them to a greater or lesser extent by recognition of a name, logo and concept via a mass media campaign. In contrast, HeadStart focuses on taking the message to community groups and trying to significantly affect the ways these groups think about transport (Steer Davies Gleave, 1996). The main thrust of the Headstart campaign is the conduct of workshops with community groups. Target groups include parish councils, parent and toddler groups, fitness groups etc. In addition business conferences have been held with the aim of getting commitments to the development of commuter plans and on another front a 'Safer Routes to Schools' campaign is being developed (Steer Davies Gleave, 1996).

Each of these programmes has its own merits, as noted earlier. Certainly raising awareness of the issues is a critical first step in changing behaviour. There are, however, two important components that most of these initiatives lack (Rose and Ampt, 1997):

- an objective and a method to ensure that there are *behaviour changes* as well as awareness and attitude changes (ie. people actually use the car less); and
- a monitoring system, to check whether and what type of changes are actually occurring.

The active forms of information feedback, employed in the Dutch and Australian research described in the following section, include features to overcome these deficiencies.

Before turning to the review of the Dutch and Australian studies it is worth noting that the approach of using survey feedback as a basis for behavioural change (Figure 1) represents a somewhat fundamental shift in the field of travel behaviour research. Usually it would be a cause for concern if the process of conducting the survey produced a behavioural change because this would represent a form of bias in the collected data. A classic example would be the collection of vehicle speed data using a radar gun. If motorists are aware that the survey is being undertaken, perhaps because the observer is visible to motorists, then they are likely to reduce their speed, because they may suspect that it is a police enforcement exercise. As a result, the data would be biased since low speeds would be observed. A similar effect can be a cause for concern with panel studies (Richardson, Ampt and Meyburg, 1995) where repeated measurements may influence the behaviour which is being measured because respondents start to think more about their behaviour as a result of

completing repeated surveys. In these cases the changes in behaviour which result from undertaking the survey are undesirable because they produce a bias in the results. In contrast, in the studies considered here, the survey forms an integral part of the process designed to produce a behavioural change.

While undocumented, it is appropriate to acknowledge that travel awareness schemes in general, not only those pioneered in the UK but also the Dutch and Australian models, are treated with scepticism by parts of the transport profession. While they are certainly not the 'Holy Grail' of urban transport planning they may form one part of the solution of our increasing urban transport problems. At the very least, they may have a role to play in reducing the rate of growth in motor vehicle use in urban areas and could play a part when a package of measures, include pricing initiatives such as electronic road pricing, are introduced by Governments. The 'package' approach could include a range of carrot and stick initiatives aimed at managing demand. The travel awareness component could then be designed to provide support and/or assist people in making changes in their travel patterns in response to other parts of the policy package.

3. DUTCH AND AUSTRALIAN EXPERIENCE WITH SURVEY FEEDBACK

In this section independent research conducted in the Netherlands and Australia is reviewed. These research initiatives are described separately in Sections 3.1 and 3.2 respectively and then they are compared and contrasted in Section 3.3.

3.1 Dutch Initiatives

The research reviewed from the Netherlands has been conducted independently by psychologists at two tertiary institutions: the University of Groningen and the University of Utrecht. These Dutch research initiatives are reviewed separately and then jointly compared and contrasted with the Australian research in Section 3.3.

The research conducted at the University of Groningen has focused on the role of problem awareness in willingness to voluntarily reduce car use and in the acceptability of policy measures aimed at reducing car use. In the context of this paper only the results relating to voluntary car use reduction are considered.

The underlying hypothesis of the work is that "the more that people are confronted with problems of car use (in densely populated areas, in city centres and by reading information) the higher their problem awareness would be and the more they would be willing to reduce their car use (Steg *et al,* 1995). The research involved two large field studies in which car users, with and without small group discussion, assessed their own car use, reported their problem perceptions and indicated their willingness to change their car use. The first field study involved about 550 car users who were interviewed individually by trained interviewers. In the second study about 350 car users participated in 53 group discussion sessions. The experimental design framework for this research is summarised in Table 1.

Table 1: Experimental Design Framework for Steg *et al*'s Research

Study	Total Respondents	Prior to Discussion: Assessment of own car use	Prior to Discussion: Advance Information	Prior to Discussion: Proportion of Respondents	Form of Discussion
I	539	Four day travel diary (Thur, Fri, Sat, Sun)	No advance information	1/3	One-on-one Interview
			Information on present problems of car use	1/3	
			Information on present and future problems of car use	1/3	
II	336	Four day travel diary (Thur, Fri, Sat, Sun)	No advance information	1/2	Group Discussion
			Information on present and future problems of car use	1/2	

Respondents were asked to complete a four day travel diary (Friday through Monday) to place their travel into context. In the interviews each trip was discussed in turn to explore whether it was necessary and whether it was possible to use another mode. Attitude measurement was undertaken before and after the process.

The experimental design involved differences in the information which participants received prior to the interviews/group discussions. Some respondents received no information prior to the discussion session while other respondents received information about the future and /or present problem with car use.

Only the main results of this research are highlighted here, with full details available in Steg *et al* (1995), (1996a) and (1996b). This research provides important insight into the underlying psychological processes which influence travel behaviour. The results suggest that the more thoroughly people thought about the problems resulting form motorised traffic the lower was their problem awareness. In psychological terms this is a form of reactance:

> *People are confronted with a discrepancy: they perceive car use as a problem, but they are using a car themselves and they are not willing to give up the enormous advantages of car use. This may evoke cognitive dissonance. People are motivated to reduce this dissonance, either by reducing their car use or by changing their beliefs about the seriousness of the problem.* (Steg and Vlek, 1996a)

In the field study, most people chose the second option and began to evaluate the problem as being less serious than they had initially. The extent to which some respondents were

willing to reduce vehicle use differed between the studies but was on the order of a 10 per cent reduction in the number of kilometres.

Steg *et al* conclude that problem awareness is a key variable. Car use can be reduced via structured strategies aimed at changing social conditions and structures or by cognitive-motivational strategies aimed at influencing people's attitudes, norms and beliefs. Cognitive-motivational strategies are easier to design and apply but their effectiveness is generally lower (Steg and Vlek, 1996a). They suggest that 'heightened problem awareness, co-responsibility and perceived controllability therefore seems a useful strategy, provided that there are sufficient feasible alternatives for car use available'.

The other research conducted at the University of Utrecht aimed to examine the psychological processes underlying results reported in the literature where information campaigns had produced no change, or very small change in car use (Rogers and Storey, 1986; Wallack, 1981). Specifically, the study considered the psychological resistance produced by providing 'intensive, individually directed persuasive information about the negative consequences of private car use' (Tertoolen, 1977, and Tertoolen *et* al, 1997). The information supplied to participants focused on two arguments reflecting the Dutch policy to reduce car use:

- negative collective environmental consequences, and
- financial consequences for the individual associated with motor vehicle use.

Tertoolen's study involved the recruitment of 350 regular car users in one urban area in the Netherlands where there was rail and bus service and bicycle-friendly infrastructure. The experimental design for the study is shown in Table 2. A control group did not complete the travel diary and received no feedback. All treatment cases completed the travel diary but they received different types of information. Some received only environmental information, other received only financial information, some received both and some received neither.

Table 2: Experimental Design for Tertoolen's Study

Treatment Condition	Self Monitoring: Travel Diary	Feedback		
		Provided	Contained Environmental Info	Financial Info.
I	*	*	*	
II	*	*		*
III	*	*	*	*
IV	*			
Control				

Notation: * = attribute present in this treatment condition

The travel diary was completed for eight consecutive weeks and feedback delivered via a person-to-person interview/talk. Feedback focused on the consequences of car use in terms of negative environmental and individual financial consequences. The results are described in detail in Tertoolen (1996) and Tertoolen *et* al (1997). Here we review the results in relation to the impact of the financial and environmental information, separately and collectively.

Similar to the work of Steg *et al*, Tertoolen *et al* detected cognitive dissonance at work in the reaction of respondents.

> *...(R)espondents who were relatively environmentally aware before they were exposed to the experimental treatment and who used their car more than they had anticipated, showed a reduction in their environmental awareness. When the discrepancy between attitude (environmental awareness) and behaviour (car use) is pointed out, then apparently people are more likely to alter their attitude than their behaviour. Car users who drive a lot, yet have a positive attitude towards the environment, start thinking that the environment is less important and point out that others are more responsible for the problems than themselves. (Tertoolen, 1996)*

The response to the financial information was also of interest. Some car users held the view that they had paid for the right to pollute because they pay excise duty on fuel and other taxes. Current Dutch environmental policy was rated lowest by participants who received only information about the costs of operating their car. By showing people how expensive it is, the government environmental policy, which was seen to be (partly) responsible for the high expenses, received the lowest rating from respondents. Thus reactance could be interpreted as a form of protest by people who feel they have already paid a compensation for their damaging behaviour. This has implications for the development and implementation of policies based on polluter pays (Tertoolen *et al*, 1997).

Another result of the Dutch research suggests that the simultaneous provision of information on collective environmental consequences and individual financial consequences can lead to neutralising effects. In some cases the results of the combined environmental and financial information were comparable to the results of the control group which received no information (Table 2). It is not uncommon for policies to be developed on the basis of a package of measures on the assumption that there will be an additive relationship between the effects of the components of the package. The results of Tertoolen's research suggests that not only may this be a wrong assumption but the opposite may actually hold.

3.2 Australian Initiative

The Australian research is being conducted by Monash University (Melbourne) in conjunction with Steer Davies Gleave (UK). This research is being undertaken for a major motoring organisation, the NRMA, based in the state of New South Wales with its headquarters in Sydney.

The NRMA is the largest motoring membership organisation in Australia. It initiated a major public initiative called Clean Air 2000 which aims to reduce pollution caused by car travel in Sydney prior to the year 2000 Olympics. Clean Air 2000 is a twofold initiative (Gollner, 1996) focusing on:

- encouraging behavioural change in the way people use their cars, and
- the solutions to vehicle induced air pollution and increasing traffic congestion.

While part of the Clean Air 2000 initiative involves working with government and transport service providers to address the second of these points, this paper primarily focuses on the first.

In developing an approach it was considered critical that it not be but rather based on an individual action plan. Put simply it was to be a 'how to' rather than a 'should do' campaign. The key elements of the action plan were to be (Rose and Ampt, 1997):

- to give people a knowledge of their existing patterns of travel,
- to present this knowledge in the context of the household or family,
- to give them 'customised' feedback related to their actual travel for one week,
- to allow them to experiment with reducing car travel by following tips/suggestions included in the feedback.
- to let them check or measure their reductions in vehicle use, and
- to give them a simple way of ongoing maintenance, once travel changes had occurred.

Based on this philosophy a concept was developed which was based on:

- the provision of easy-to-understand information on the need for change;
- the provision of a set of 'kits' in which each of the steps in the travel blending process were described and the relevant tools to carry out these steps were provided.

Following a period of intense development work in late 1995 the concept developed into a package of four 'kits'. These kits include information as well as diaries for measuring vehicle use and individual travel behaviour. Table 3 highlights the contents of the kits in terms of information, survey instruments and feedback.

Table 3: The Travel Blending Program

Kit Number and Title	Kit Contents		
	Information	Survey Instruments	Tailored Feedback
1: Getting Started	Booklets explaining the need for action to reduce motor vehicle emissions and outlining the Travel Blending Program	'Before' Travel Diary for each person in the household and log book for each vehicle	
2: Help Make a Difference	Booklet to encourage respondents to think about their vehicle use and how it could be reduced through 'Travel Blending'		Printed household feedback: travel patterns; trips/time by mode; vehicle use & emissions, tailored tips & suggestions for reducing vehicle use
3: Are you on Track?	Booklet explaining the reasons for the second round of travel diaries	'After' Travel Diary for each person in the household and log book for each vehicle	
4: Keeping the Air Clean	Letter thanking the household for their involvement	Simplified vehicle log book for on-going monitor of vehicle use	Comparative analysis of results from 'Before' and 'After' surveys

As highlighted by the above table each of the kits includes an information component. The survey instruments are simplified self completion questionnaires which are mailed back to for analysis and preparation of feedback. The feedback is distributed twice. The first feedback reports on the household's travel patterns. This includes a set of tailored tips or suggestions about how the household and individual members of the household could reduce vehicle use. The tips/suggestions are based around the concept of travel blending, a term which was developed as a name for the overall campaign.

Travel blending is the terminology used to describe a way for individuals to reduce the use of the car which involves (Rose and Ampt, 1997):

- *thinking about activities and travel in advance* (ie. in what order can activities be done, who should do them, where should they be done etc.) and then
- *blending modes* (ie. sometimes car, sometimes walk, sometimes public transport etc.), or
- *blending activities* (ie. doing as many things as possible in the same place, or on the same journey), or
- blending *over time* (ie. making small sustainable changes **over time** on a weekly or fortnightly basis).

While it could be applied on a daily basis, it is more likely that people will be able to commit small changes over time. Thus, for example a commitment to use public transport to work one day per week would have the potential for that individual to reduce their weekday peak period vehicle use by 20 percent. In this way, rather than saying people should always use public transport the message is to blend travel choices in a manageable but sustainable way to reduce motor vehicle use. Importantly, the blending approach is based on allowing people to participate in the same activities which they currently undertake.

The second feedback sheet reports a comparative analysis of the 'Before' and 'After' surveys and highlights changes in vehicle use and emissions which resulted from members of the household practising travel blending.

A pilot test of the Travel Blending program took place in Sydney in 1996. The pilot involved a total of 46 respondents and 27 vehicles from 13 households. At least one family member in each of the participating households worked for the NRMA. As noted earlier the travel blending program is not focused solely on travel to work but it can be initiated within an organisation. The early stages of roll-out will most likely see the program offered to NRMA employees so that the organisation can lead by example in later public stages of the roll-out. It was therefore appropriate for the pilot to focus on households containing NRMA employees. It should be emphasised however, that not all households involved in the pilot were sympathetic to the program and so it was certainly not a case of preaching to the converted.

The participating households received the four kits, completed two sets of travel diaries and vehicle log books. At the conclusion of the pilot, detailed interviews were conducted with entire households. The results of the pilot proved to be very encouraging not only in terms of changes in attitude/awareness but also because respondents reported changes in behaviour which they attributed to the program (Rose and Ampt, 1997). There was unanimous agreement that the travel blending package resulted in increased awareness of

the use the motor vehicle and its associated environmental consequences for people of all ages. The tailored feedback was given as the major reason for this. The tailored feedback sheets also served to stimulate discussion within participating households. Importantly, despite the great deal of professional design effort which went into the brochures, in most participating households individual's reported that at best they had skimmed them. However, the tailored feedback sheet was the one exception with all respondents indicating that this sheet was read and that it provoked discussion within the household. Clearly this has implications for travel awareness campaigns which rely only on traditional printed material, which is not personalised, to communicate their message to participants.

Respondents provided concrete examples of behavioural change which they attributed to having been involved in the travel blending program. This included substitution of bus for car access to a station, and greater use of carpooling, including a case of a long trip into the country where carpooling saved approximately 600 km of vehicular travel. Other respondents identified specific longer term plans for change, including residential location and use of alternative modes, which were not able to be implemented within the time period of the pilot. Rose and Ampt (1997) discuss the results from the trial in more detail.

Attitudes were measured informally after the households had completed the travel blending program and therefore it was not possible to measure any change in attitudes. However, the interviews did not highlight any cases where cognitive dissonance was suspected. Preparations are now proceeding for a larger trial involving about 250 households. In preparation for the larger sample size software is being written to undertake the analysis of the travel diaries and produce the tailored feedback. The trial will include explicit measurement of attitudes before and after the travel blending program and this should provide a basis for measuring cognitive dissonance effects if they are present.

3.3 Comparative Remarks

Now that the Dutch and Australian work has been described, these separate research initiatives can be compared and contrasted. Table 4 summarises key features of the Dutch and Australian research. This summary highlights a number of issues:

- Respondents in each of the studies completed multi-day survey instruments. While the desirability of multi-day diaries has been discussed in the literature (Golob and Meurs, 1986; Hanson and Huff, 1981) the concern over response rates has always dampened professional enthusiasm for this approach. The experience from these studies suggests that there is scope to collect multi-day travel survey data to explore the day-to-day variability in travel behaviour.
- There is a difference between the Dutch and Australian research in terms of the focus on an individual or a household. Much decision making, particularly that related to travel behaviour, is made at the household level (Jones, 1979). This intra-household interaction is potentially important in terms of the potential to reduce vehicle use. For the household as a whole to reduce vehicle use there may be some compensating changes within the household. For example, for one partner to travel by work by public transport may require the other partner to make a detour on the way home to purchase groceries.

Table 4: Key Features of Dutch and Australian Research employing Survey Feedback

	Steg *et al*	Tertoolen *et al*	Rose & Ampt
Survey Methodology	Self Completion	Self Completion	Self Completion
Target	One person per household	One person per household	All members of the household
Approx. Sample Size	900 (550 + 350)	350	50
Travel Survey Duration	4 days	8 weeks	2 x 1 week periods
Feedback Format	Interview or Group Discussion	One-on-one discussion with respondent every two weeks	Printed and sent in the week following the 'Before' and 'After' diaries were analysed
Feedback Content	Travel patterns	Travel patterns, effect on environment and own finances	Travel patterns, environmental effects and tips/ suggestions to reduce vehicle use
Attitude Measurement	Before and After survey	Before and After survey	Qualitatively after the pilot survey, Before and After survey planned for 1997 trial
Results to Date	Cognitive Dissonance detected	Cognitive Dissonance detected	Positive attitudinal and behavioural change

- The Dutch and Australian studies differ in the format of the feedback provided to participants. The Dutch work has been conducted as a pure research exercise and therefore it was possible to use resource intensive, face-to-face methods in the feedback. In contrast, the Australian work has been undertaken on the basis that if the method is shown to be effective than it will be rolled-out to the wider community. This effectively rules out a face-to-face approach for the feedback, because of the resource implications, and necessitated the use of a printed form of feedback.
- There are clearly differences in sample size across the studies. As noted earlier, the Australian method has only been pilot tested to date with a sample size close to that of Tertoolen's planned for the 1997 trial. The Dutch studies both identified a cognitive dissonance effect but this was not apparent in the small scale Australian study. However, it is acknowledged that until the 1997 trial of the Australian Travel Blending program is undertaken there is only limited attitudinal insight provided by the pilot study. The experimental design for the 1997 trail includes before and after attitude measurement and so the experimental design provides an opportunity to identify cognitive dissonance if it is present.
- The positive behavioural changes observed in the pilot of the Australian study may be related to the emphasis on encouraging participants to commit to an initially small, manageable change. The thrust of Travel Blending is not that people need to change their travel behaviour every day but rather that they commit to blending their

choices over time. It is possible that by taking this approach, akin to encouraging people to walk before they run, that respondents may not react to the program in the same way as encountered in the Dutch research. People are more likely to participate if they feel that they can do so without undertaking a fundamental lifestyle change.

- If survey feedback does produce the desired attitudinal and behavioural changes then it would be interesting to examine the extent to which those changes are maintained over time. At the very least a follow-up survey after twelve months would reveal the extent to which any reductions in vehicle use had been sustained.

4. CONCLUSIONS

The initiatives discussed in this paper represent a relatively new frontier in travel behaviour research. The limited number and size of the studies caution about drawing generalisable conclusions. However, if the European experience is a barometer, there is likely to be increasing interest in this type of approach to Travel Demand Management. To date the size of the studies which have been conducted provide a relatively small sample size and therefore it is difficulty to draw generalisable conclusions.

It does seem fair to say that the results reported here would not provide much hope that purely paper based (information leaflets/brochure) based campaigns could hope to have much influence on people's behaviour. The results from the Dutch work suggest that even with tailored feedback it is difficult to produce behavioural change while the results from the pilot of the Australian Travel Blending program are more encouraging.

Travel awareness schemes potentially have a role to play as one part of the solution to our increasing urban transport problems. At the very least they may have a role to play in reducing the rate of growth in motor vehicle use in urban areas and could play a part when a package of measures, including a range of carrot and stick initiatives, is introduced with the objective of managing demand.

Increasingly, communities around the world will realise that the problems associated with urban transport are not able to be satisfactorily resolved using demand satisfaction approaches and that demand management will be an important policy option in the future. As noted in the introduction there are many dimensions to travel demand management and urban and social changes are important among these. This necessitates further research on the links between values, awareness, attitudes and travel behaviour and the way of influencing each component of that behavioural system. There is also a need for research to examine the longer term impacts of travel awareness initaitives.

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