



Travel blending: an Australian travel awareness initiative

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Abstract

This paper outlines a new approach to reducing car use in order to address environmental concerns. The individual action program, known as Travel Blending®, involves participating households being sent a series of four kits, containing information booklets and travel diaries, over a nine-week period. The travel diaries are analysed and a summary of the household's travel patterns, and the emissions produced by their vehicles, is sent back in a subsequent kit along with suggestions explaining how they could reduce vehicle use. Households complete another set of travel diaries after four weeks and these are analysed so that a comparative summary can be returned to the household with the final kit. The paper describes results from two Australian studies. The first, a pilot study, involving about 50 individuals, was undertaken in Sydney, Australia. The second study involved about 100 households from Adelaide, Australia. Quantitative results from the Adelaide study indicate about a 10% reduction in car driver kilometres with a slightly higher percentage reductions in car driver trips and total hours spent in the car. These results, while very encouraging, must be interpreted cautiously. Further research will be required to explore the generalisability and magnitude of the effect of the Travel Blending® Program on travel behaviour. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Throughout the world there is increasing attention being focused on the effects of the car in terms of environment, congestion and negative life-style implications. In the early 1990s in the US, Clean Air legislation and the Intermodal Surface Transport Efficiency Act (ISTEA) combined to focus attention on the link between motor vehicle use and air quality. In the UK, the Royal

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Commission on Environmental Pollution (1994) strongly signaled the need for change when it suggested that transport “has become possibly the greatest environmental threat facing the UK and one of the greatest obstacles to achieving sustainable development”. More recent examples range from a global focus on pollution reflected in the Kyoto summit to concerns about cleaning the air (Clean Air legislation and voluntary and legislated emission reduction schemes; and Sydney’s Clean Air 2000 Program). Broad concerns with the car’s impact on the world around us in terms of congestion and life style, were also reflected in the UK government’s recent White Paper (Department of Environment, Transport and the Regions, 1998).

A variety of solution approaches have been formulated and are being implemented to varying degrees to address these issues. These include:

- technological improvements in the motor car to reduce emissions,
- construction of new infrastructure to reduce congestion or provide public transport or other alternatives to the private car, and
- other measures, excluding provision of major infrastructure, which aim to modify travel decisions. (These are sometimes referred to as ‘travel demand management’ or ‘mobility management’ measures.)

The last of these approaches 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 strategy areas (urban and social changes). In particular, it describes a method aimed at changing social attitudes, and subsequently travel behaviour, through individual measurement and personalised information.

Reducing the use of the car through urban and social change (as opposed to legislative and pricing measures common in the US) has primarily taken the form of “travel awareness” campaigns that have largely been pioneered in the UK. The 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 “tell” them about the problem (too much congestion, too much pollution etc.) and “suggest” solutions (e.g. car sharing, work at home).

The link between attitudes and travel behaviour has been recognised in the literature for some time (Golob et al., 1979). Knowledge or information can influence attitudes and hence ultimately behaviour but many of the programs to date contain few if any components explicitly designed to step beyond the “raising awareness” phase.

This paper considers a travel awareness program called ‘Travel Blending®’ which has been pioneered in Australia. The program through which the concept of travel blending is communicated and supported within participating households represents an innovation not only in terms of travel awareness programs but also in travel behaviour research. This paper explains the approach and compares it to international initiatives. Insights into the effectiveness of the approach are provided by two studies conducted in Australia.

The structure of this paper is as follows. It begins with a review of the UK based public awareness campaigns and identifies issues which led to the development of quite a different approach for two major travel awareness campaigns in Australia (Section 2). The context of the ‘Travel Blending®’ Program, as it is known, is described in Section 3 along with an outline of the concept of travel blending and the components of the program. Experience from the two Australian studies is reported in Section 4 while conclusions are identified in Section 5.

2. Foundations of travel awareness campaigns

In the UK, several initiatives, broadly termed “travel awareness”, have been instigated to encourage people to reduce car use. Their prime objective has been to make people aware of the need for the reduction in car use, and ways in which this could be achieved.

The first stage, and generally the key component of these initiatives, has been an advertising campaign assisted by a set of brochures, posters, bumper stickers and logos to show people the problems of congestion and pollution and to point out the alternatives (e.g. car sharing or pooling, use of public transport, trip chaining, and so on). Later stages have often included more targeted efforts such as ‘walk to school’ weeks or ‘ride to work’ campaigns and facilitated discussions with community groups to get them to understand the issues more thoroughly than can be done with an advertising campaign.

The two initial examples of these were initiated by local authorities and are TravelWise, begun in Hertfordshire (Hertfordshire County Council, 1993) and HeadStart (Hampshire County Council, 1993). More than 50 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 with an emphasis on advertising on the outside of buses, leafleting and radio advertising. However, TravelWise is not merely a publicity campaign 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; trying 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 ‘Safe Routes to Schools’ campaign is being developed.

Each of these programs, and others which are now being developed, has its own merits, as noted earlier. Certainly raising awareness of the issues is a critical first step in changing behaviour. The Travel Blending® approach described in the following section has been designed to incorporate two important components that most of these initiatives lack. First an objective and a method to ensure that there are *behaviour changes* as well as awareness and attitude changes (i.e. people actually use the car less); and second an in-built monitoring system, to measure whether and what type of changes are actually occurring.

When considering the application of travel awareness campaigns it is important to not limit consideration to peak hour, work-based travel. Work journeys represent only about a quarter of all travel in most cities and other journeys (e.g. recreational travel and trips by people other than workers) are growing much faster than work travel (Ampt and Richardson, 1994). Importantly,

the diversity of an awareness initiative like the Travel Blending® Program means that everyone has an opportunity to change. Travel Blending® may mean sharing a car to a restaurant, getting someone to pick something up for you, a child walking to sport or simply turning multiple car trips into chains. Unlike other approaches, the focus here is on the individual, but in the context of the household. This is critical since, from a behavioural perspective, much decision-making, particularly that related to travel behaviour, is made at the household level (Jones, 1979).

3. The Travel Blending Program

3.1. Background

The Travel Blending® Program was initially developed as part of 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 an initiative of the NRMA, Australia’s largest motoring membership organisation. 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, the Travel Blending® Program, was developed to primarily focus on the first.

After the pilot study had been completed in Sydney, the Department of Transport in South Australia (TransportSA) initiated a trial which took place in Adelaide, the capital of South Australia. The TransportSA study sought to identify the characteristics of the approach which best suited Adelaide, and those which needed to be modified, as well as to determine if the program would reduce vehicle use and if so, by how much. In Adelaide the Travel Blending® Program was delivered under the name ‘TravelSmart Adelaide’.

3.2. Features of the Travel Blending® Program

When embarking on a strategy to encourage behavioural change in the way individuals use their cars, it was recognised very quickly that the focus needed to be on achievable change. Achievable meant that it should not rely on an ‘overnight’ change in lifestyle but rather should be based on sustainable reductions in vehicle use.

Initial interviews were conducted with a small sample of individuals in Sydney to explore some of the initial concepts relating to the Travel Blending® Program. The outcome of these interviews confirmed the philosophy of a need for an approach which was not prescriptive but rather was based on an *individual action plan* – in essence a *How To* rather than a *Should Do* emphasis was preferred. The key elements of the action plan were to give people a knowledge of their existing patterns of travel presented in the context of the household or family. Further to give them ‘customised’ feedback related to their actual travel for one week and to allow them to experiment with reducing car travel. Finally there was a desire 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 and the provision of a set of ‘kits’ in which each of the steps in the 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 program developed into a package of four ‘kits’. The overall Travel Blending® Program, which incorporates 2 one week travel diaries, tailored feedback to participants and supporting information is unquestionably a unique program to bring about behavioural change.

3.2.1. Tangible change based on measurement

A fundamental premise underlying the development of the Travel Blending® Program is that many people are likely to find it difficult to reflect upon their past travel behaviour. Because they do not directly ‘see’ the effects of their travel, the consequences are not ‘tangible’. Consider the contrast with recycling or adopting a ‘green’ approach to consumer purchases. At the end of each week people see tangible evidence of what they are doing for the environment by the amount of material they put out in the recycling bin. However, individuals have no tangible evidence at the end of a week that their actions to modify their travel behaviour have produced results. Therefore a fundamental component of the Travel Blending® Program is a series of diaries which are completed by members of the household. These diaries provide a means of making travel activity ‘tangible’ for the participants in the program, and a basis for giving quantitative ‘feedback’ to participants about their travel activity and *changes* in their travel activity.

Importantly the diaries also have a major role to play in measuring the effectiveness of the Travel Blending® package. Therefore they not only play a fundamental role in the process itself but also provide the basis for evaluation of the program as a whole.

3.2.2. Diaries to measure vehicle use and travel activity

Since the motor vehicle is a major contributor to air pollution it was essential that individuals focus on their use of motor vehicles. However, it was regarded as essential that people’s use of the car be viewed within the context of their total travel activity.

Initially separate vehicle log books and travel diaries were used. Since this was found to increase respondent burden, a single survey instrument is now used to record vehicle use and travel activity. The enhanced travel diaries are used to record all travel outside the home with details obtained of destination, place and purpose, start and end time of each trip, travel mode and for car driver trips, the odometer reading at the start and end of the trip. Importantly, these diaries are completed by all individuals within the household. In this way, the household can begin to consider the interactions between household members which produce their household travel activity.

The diaries were designed to obtain sufficient information to prepare the tailored feedback while serving as adequate memory joggers for participants. They were therefore less detailed survey instruments than is traditional in one day self-completion travel surveys (Richardson et al., 1995).

3.2.3. Feedback and tailored tips

Respondents who complete their travel diaries are sent a ‘feedback’ report and a set of tailored tips on action they could take to reduce their vehicle use. The feedback sheets summarises travel

patterns for each individual (by name) and the household as a whole. This includes details of the total number of trips, trips by mode and total time spent travelling. For each vehicle, the total kilometres travelled is summarised along with the number of engine cold starts and an indication of the emissions produced (in terms of kilograms of carbon monoxide, hydrocarbons and oxides of nitrogen). The emissions estimates are based on a relatively simple model which predicted vehicle emissions as a function of the age of the vehicle and the number of kilometres travelled.

The feedback sheet also includes a number of ideas for how the household members could try to reduce the impact of the car. While some are fairly general, others are quite focused including details of specific public transport services, with relevant details (e.g. which bus stop to use, service times to suit travel needs, how to pay the fare etc.) enclosed, for some trips. In all cases the suggestions are tailored to the travel patterns reported by members of the household. The following examples illustrate the type of feedback suggestions made to participants:

- Craig, would it be possible for you to travel by public transport one day a week or one day a fortnight? You could catch the train from Blaxland Station and change to the 301 bus at Central Station. We have enclosed copies of the train times which seem to suit your travel pattern.
- Julie, we noticed that there were never any occasions on which you did two or more things on one car journey. This is often called trip chaining and many people use it to reduce their car trips.
- Graham, when you have the choice of using the Commodore or the Statesman, try to use the Commodore (if permitted) because it is less polluting.
- Everyone: Remember when you share a ride with someone instead of driving yourself, this is a real benefit to the environment in Adelaide. On the other hand, when someone makes a car driver trip especially to take you somewhere that you could walk, ride or even take a bus or train to, travelling as a car passenger does not help to reduce congestion and pollution.

Individuals only receive tips which are relevant to their travel patterns as reported in the travel diary.

3.2.4. Reducing car travel through 'blending'

'Travel Blending®' is the terminology used to describe a way for individuals to reduce the use of the car which involves a number of aspects. First thinking about activities and travel in advance (i.e. in what order can activities be done, who should do them, where should they be done etc.) and then blending modes (i.e. sometimes car, sometimes walk, sometimes public transport etc.), or blending activities (i.e. doing as many things as possible in the same place, or on the same journey), or finally blending over time (i.e. making small sustainable changes over time on a weekly or fortnightly basis).

The focus of the Travel Blending® concept is on simplicity for any individual and, while it could be applied on a daily basis, most people have made small changes every now and then. Thus, for example a commitment to use public transport to work one day per week has the potential for that individual to reduce their weekday peak period vehicle use by 20%. 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 that they currently undertake. Consistent with the Travel Blending® theme, the suggestions made as part of the feedback are framed in terms of reducing vehicle use on a once a week or once a fortnight basis.

The generic notion of “travel choice blending” has received only limited attention in the literature. Anas and Moses (1984) examined mode choice blending using data on people’s travel choices over a period of six working days. They concluded that the traditional analysis approaches which ignore the possibility that choices can be deliberately blended overestimate the responsiveness of demand to changes in the attributes of modes such as travel cost. So for example, traditional analysis approaches which implicitly deal with a single day’s travel decisions would predict that an increase in parking prices would mean a certain percentage of people would stop driving each day. However, it may be that people blend their travel choices and drive less frequently. The analysis undertaken by Anas and Moses indicates that the traditional approach, which ignores the blending option would overestimate the impact of the parking price impact. This suggests that travel choice blending could reduce the effectiveness of some of the road pricing policy initiatives which are being analysed with traditional analysis approaches. Insight into the extent to which individuals may be prepared to blend their travel choices to reduce environmental ‘costs’ will be provided by the research program described in this paper.

3.2.5. Response aids

Whenever people record travel there will be “non-response”, that is people who are sent the diaries do not complete them. Non-response rates depend on many factors. In rigorously designed one day travel surveys conducted recently in Australia, non-response has varied between 25% and 35% (Richardson et al., 1995). It was therefore perceived as particularly critical to ensure a high ‘item’ response rate to discourage underreporting in the seven day diary.

To help increase this response rate in the Travel Blending® project the kits have been designed with an inbuilt reminder system. The travel diaries are designed to be kept in a purpose designed ‘diary holder’ (cardboard box) which can be kept on the refrigerator (using attached magnets) or stood on a desk/table/counter top. The diaries are designed to display each person’s name and the day of the diary they are completing. When placed in the ‘diary holder’ the names of everyone in the household, and the day of the diary that they are completing, is visible. Thus, for example, a glance at the box would show that Tom and Julia have completed their Wednesday diary but Greg has not completed his diary for Tuesday. This would serve as an inbuilt reminder system where peer pressure within the household would encourage everyone to complete their diaries.

3.2.6. Key features

There are at least two features of this project which are noteworthy in the context of travel behaviour research. First the travel diaries are completed over a one week (seven day) period. This is in contrast with the vast majority of travel surveys which collect data for only a single survey day. Covering the whole week is considered to be critical in this case because the program emphasised modifying travel activity over time. For example, going by public transport one day per week rather than driving. In addition, weekend travel is very different from weekday travel and people may find their capacity to practice Travel Blending® is different at the weekend than through the week. The use of seven day diaries, while widely acclaimed as being extremely effective in measuring travel behaviour, (particularly day-to-day variability) is acknowledged in the literature (e.g. Golob and Meurs, 1986; Hanson and Huff, 1981) as being subject to various pitfalls such as underreporting and attrition. While this could occur, the requirement for respondents to record full odometer readings for car driver trips means that it would be difficult/inconvenient for

respondents to ‘forget’ to record car driver trips. If a driver failed to record a short trip, the starting odometer reading for the next trip may be in error, and the distance travelled for that trip may be wrong, but the weekly total kilometres would be correct. Thus, while there may be some shortcomings with the data, the total vehicle kilometres for each vehicle is expected to be recorded quite accurately and that figure is of critical importance because it is used to estimate the emissions produced by the vehicle. The data obtained from the weekly travel diary is therefore regarded as adequate to enable participants to develop an appreciation for the nature of their current travel patterns and motivate them to change their behaviour. As Tukey (1960) noted, perfect information is not needed for decision making. Likewise, in this situation perfect information is not needed in order for people to change their travel behaviour to reduce motor vehicle use and the associated environmental impacts.

The second distinguishing feature of this project is that households receive feedback when they return the diaries. The normal expectation when people fill in a diary is that they will not receive any feedback. Indeed, if this was a traditional survey, researchers may even be concerned that the very process of completing the survey may affect people’s behaviour. An example here would be a panel study of motor vehicle purchase decisions where the act of surveying the participants each year may result in changes in the factors which they consider in their decisions. These changes could result from the increased awareness which comes from participating in the survey. In this case, the results of the survey would not be representative of the population which had not participated in the survey. In contrast, in this study, the travel diaries are used as a tool to encourage people to modify their travel behaviour.

The feedback approach adopted here could be classified as a form of ‘reflexive’ survey design where that term describes techniques ‘that reflect back to a household its own behavioural reality’ (Turrentine, 1995). When studying the market for electric vehicles, Kurani et al. (1996) used reflexive questions to ‘ask respondents to summarise aspects of (their travel survey data) and to solve a variety of travel related problems derived from their own travel’. While the approach taken in the Travel Blending® Program requires participants to reflect on their travel behaviour it is based on a more active feedback approach. Participants receive summaries of their travel behaviour and tailored tips for reducing vehicle use which are generated on the basis of the participant’s actual travel patterns.

3.3. Delivering the Travel Blending® Program

In all, the Travel Blending® Program involves four ‘kits’ which are given to households which indicate a desire to participate in the program. They are explained personally to one household member in each case. The focus of the kits and their contents are outlined below.

3.3.1. Kit 1: Getting started

Included in the first kit is a letter of introduction from a prominent local personality. In Sydney this was the Chairman of the Clean Air 2000 advisory committee, in Adelaide it is the State Minister for Transport. Also included are two information booklets dealing with ‘Why’ and ‘How’ issues. In Sydney there are titled “Why clean the air”? and “How can we do this”? while in Adelaide the titles used are “Why use cars less”? and “How can we use cars less”. The ‘Why’ booklet explains the link between vehicle use and urban transport problems, including air

pollution, and describes why these problems will continue to worsen unless action is taken. The 'How' booklet outlines the range of potential solution approaches and places the need for individual action into perspective against other initiatives. This booklet introduces the concept of Travel Blending® and indicates that the first step for an individual in changing their travel patterns is to understand what travel they currently undertake. In this way the rationale for completing a one week travel diary is explained.

Kit 1 includes a one week travel diary for each member of the household. Also included is a diary holder box with magnets for the fridge which serves as a depository for the diaries and an inbuilt reminder system. A set of 'Count your Kilometres' stickers is included. These stickers are designed to be placed on the steering wheel of the vehicles to serve as a reminder for the driver to complete the odometer readings in their travel diary. Participating households complete the travel diaries over a seven day period and return them in a pre-paid envelope for processing.

Once the travel diaries are received at the study office, the data is coded into a database, analysed and used to produce tailored, personalised feedback sheets for the household. In the pilot study in Sydney, that analysis and feedback generation was done manually but now a special purpose computer program has been written for this task. This program amounts to a form of knowledge based system (Ringland and Duce, 1988) where the travel diary data is processed through an 'IF-THEN' rule base to determine which of the tailored tips should be included on the feedback sheets for that household or person. The feedback sheets are then returned to the household as part of the second kit.

3.3.2. Kit 2: Help make a difference

This kit contains customised feedback from the travel diaries. The feedback sheets are presented in a folder titled: "Did you know these things about your household"? There is one sheet summarising results for the entire household and a separate sheet for each individual. The ones for each individual contain the tailored travel tips. All feedback sheets for each household are produced on a laserwriter printer and printed onto special letterhead stationery so that they have a similar appearance of the other printed material in the kit.

Also included in Kit 2 is a booklet titled "Thinking about your travel". This brochure is designed to encourage households to think about their travel using the details provided on the travel feedback sheets. It also includes general Travel Blending® 'tips' to help people reduce motor vehicle use and emissions. At the bottom of the tailored feedback sheets participants are encouraged to read the "Thinking about your travel" booklet to learn about other suggestions they could follow to reduce motor vehicle use and emissions.

Finally a "goal card" is provided. This allows either the household as a whole, or individuals, to record their Travel Blending® goals. This goal card had a magnetic strip on the back so that it can be placed on the front of the refrigerator.

Participating households are given about four weeks to practice changing their travel patterns and then they are sent the next kit.

3.3.3. Kit 3: Are you on track?

The purpose of this kit is to measure the impact of Travel Blending® on the household's travel activity. This kit includes another set of travel diaries. The household completes these over a seven day period and returns them for analysis. To encourage a higher response rate, a booklet titled,

“Track your travel 2” explains the importance of completing this second set of diaries and vehicle log. After analysis, the household is sent the final kit.

3.3.4. Kit 4: Keeping the air clean

This final kit includes the summary of travel activity from the second set of diaries and an analysis of the changes in travel between the first and second sets of travel diaries. This comparative summary identifies changes in the total time spent travelling and number of trips by mode for the household as a whole and also for each individual within the household. Changes in motor vehicle use are reported in terms of the changes in total kilometres travelled and changes in the number of cold starts as well as the changes in emissions (kilograms of carbon monoxide, hydrocarbons and oxides of nitrogen). Where appropriate, additional tips are also given. For example, although people may have reduced their kilometres, they may not be using the least polluting car.

This final kit also includes a simple vehicle log book so that the household can continue to monitor their total weekly vehicle use over time as they continue to practice travel blending.

4. Australian experience to date

We now consider results from testing of the Travel Blending® Program in Sydney and Adelaide. The Sydney study amounted to a pilot test focused on a small sample and therefore the results are discussed primarily in qualitative terms. The larger sample size in the Adelaide study makes it possible to report some initial quantitative results.

4.1. The Sydney pilot

In the first half of 1996 the travel blending program was pilot tested. 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 pilot involved 46 individuals and 27 vehicles from 13 households.

The participating households received the kits and completed two sets of travel diaries. 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. Major issues raised in the detailed household interviews were as follows.

4.1.1. Changes in opinions and attitudes

- There was unanimous agreement that the Travel Blending® Program resulted in increased awareness of the use of 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.

- At one extreme, for one individual who did not reduce her car travel, she said that “I started valuing my trips in the car”. This respondent came to appreciate the role the car played “as an important tool to communicate” and for the access it provided for speciality shopping and leisure activities.
- One participant said “I used to consider convenience and cost when making travel decisions, now I consider three things: convenience, cost and environment”.

4.1.2. *Behavioural changes*

Participants provided concrete examples of behavioural change which they attributed to having been involved in the program. Examples were:

- One person used to drive to the station every day. In response to specific suggestions made in the feedback sheet, he now catches the bus one day per week. This results in a 12 km reduction in distance travelled and the elimination of 2 cold starts per week. He needs to get up slightly earlier on that morning, and he chooses a day when he does not go to University after work. Importantly, this participant indicated that this was a sustainable long term change in behaviour.
- Another participant who indicated that she had set no specific goals, and who, indeed, exhibited no change between diaries, had gone to some trouble to organise a group of friends who were travelling from Sydney to a country destination in two rather than three cars as had originally been proposed. This saved approximately 600 km of vehicular travel. This person attributed this experience solely to the increased awareness about vehicle use that resulted from her participating in the program. Importantly, the study team would have regarded this person as being resistant to change on the basis of initial discussions so this made the reported change in behaviour even more encouraging.
- One participant increased walking and car pooling trips although this was swamped by a ‘non-normal’ long car journey. (The issue of non-normal trips will be explored shortly.)
- In two other households, fairly dramatic reductions in car travel were probably largely determined by the fact that one of the household’s vehicles was off the road for repairs. One respondent commented that this “made it interesting because we had to trial other modes”.

A few other participants had specific longer term plans for change – which were not possible to implement in the short time covered by the pilot. They included:

- occasionally riding a bicycle to a friend’s home instead of requiring the mother to drop her off and pick her up,
- organising a car pool system for children’s Saturday morning sport,
- travelling to work by bus one day a week, and
- considering access to public transport in an upcoming residential location decision to enable the household to ‘survive’ with one rather than two cars.

Following the encouraging results from the Sydney pilot, the Department of Transport in South Australia became interested in the concept and initiated a trial in Adelaide.

4.2. *The Adelaide trial*

The Adelaide trial involved inviting a random sample of individuals from four government departments to participate in the study. These were the Department of Transport (DOT),

Department of Environment and Natural Resources (DENR), Department of Housing and Urban Development (DHUD) and the Passenger Transport Board (PTB). In addition, all individuals in the Minister of Transport's office were approached. In total, the individuals who were approached represented a gross sample size of 96 households.

The Travel Blending® Program was always intended to be voluntary and so the gross sample of slightly less than 100 households provided an opportunity to assess refusal and attrition rates. Table 1 summarises the response rates to the Travel Blending® Program in Adelaide.

In all, 84% of participating households in the Adelaide trial received some feedback. Nearly three quarters of the participating households (72%) received comparative feedback (regarding changes from diary 1 to diary 2) for at least some members of the household. This comparative feedback (provided in Kit 4) provided information about changes they had made during the program.

Although the diaries are primarily a tool for participants to observe their own behaviour, one of the benefits of the two-diary format for the Travel Blending® Program is our ability to measure changes in reported travel behaviour and car use. We consider these changes at two levels. First at the level of the person and then in aggregate terms across the entire sample. It is acknowledged that inclusion of a 'control' group would provide a more rigorous basis for estimating the changes. We emphasise that the results reported here are initial and indicative. A control group is being included in a subsequent study that is currently underway in Adelaide.

Table 2 reports results for three variables relating to vehicle use: the number of car driver trips per person, car driver kilometres per person and total hours spent in the car per person. Results are also included for a statistical test of the hypothesis that the means of these variables are the same for diary one and diary two. A *Z* test is used in each case because of the relatively large sample size. The null hypothesis that the means are equal for diary 1 and diary 2 is tested against the alternative hypothesis that the mean for diary 2 is less than the mean for diary 1 (Book and Epstein, 1982).

The results in Table 2 highlight that there were significant reductions in all three variables. The reduction in car driver km is just significant at the 5% level. The results for car driver trips and total hours in the car provide even stronger support for rejecting the hypothesis that these values

Table 1
Responses to the Travel Blending® Program in the Adelaide trial

Response category	Number of households	Percentage of households
Households in which some people participated	81	84
Households where all persons participated	56	58.3
Households which accepted kits, then	28	29.2
• All participated 1st diary, part 2nd	11	11.4
• All participated 1st dairy, none 2nd	10	10.4
• Some participated 1st diary, part 2nd	2	2.1
• Some participated 1st diary, none 2nd	2	2.1
• No participation either round	3	3.2
Households which refused at outset	12	12.5
Total	96	100

Table 2
Estimates of reductions in car use for program participants

	Diary 1	Diary 2	Change	Z test result
Car driver trips/person	14	10.80	–3.2	–2.17*
Car driver kilometers/person	146	114.8	–31.2	–1.69*
Total hours in car/person	7.2	5.3	–1.9	–3.18*

* Significant at a 5% significance level, critical Z value = –1.64.

Table 3
Estimates of aggregate reductions in car use

	Diary 1	Diary 2	Change	% Change
<i>Participants</i>				
Car driver trips	2572	1988	–584	–22.7
Car driver kilometers	26856	21131	–5725	–21.3
Total hours in car	1325	977	348	–26.2
<i>Total people approached</i>				
Car driver trips	3089	2669	–420	–13.6
Car driver kilometers	32251	28534	–3717	–11.2
Total hours in car	1603	1310	–293	–19.3

are the same for each diary in favour of the alternative hypothesis that they are significantly lower for diary 2.

Aggregate changes in vehicle use are reported in Table 3. Again three indicators of vehicle use are considered: the number of car driver trips, car driver kilometres and total hours in the car. In the analysis of the aggregate effects of the program it has been assumed that each person who refused to participate in rounds 1 and 2 travelled in the same way as the average for all persons in Diary 1 (i.e. before they had received feedback) in both rounds, and that any person who participated in Diary 1 but not Diary 2 was assumed to have made no change between the two diaries.

As shown in Table 3, the reductions in car use range from 21% to 26% for participants and between 11% and 19% for the population as a whole. The largest percentage decrease is for time spent in cars (including both driver and passenger) while the lowest percentage decrease is for car driver kilometres. Again it is emphasised that these are initial, indicative results; however, they are particularly encouraging in terms of the goals of the Travel Blending® Program. Additional insight will be provided by larger sample size studies underway in Leeds and Nottingham. TransportSA has commissioned two further studies, one of 350 households, which is essentially complete, and one of 2000 households which began in late 1998. The generalisability will be further tested in an international trial currently underway in Chile.

4.3. Issues and implications

The interviews conducted in Sydney and Adelaide with a sample of participating households after they had completed the Travel Blending® Program also highlighted a host of other issues relevant to travel awareness campaigns. A number of the major ones are discussed briefly below.

People do not read brochures. Although a great deal of professional design effort had been spent on the brochures, in most of the participating households individuals reported that at best they had skimmed them. It was commonly emphasised that there is a lot of printed material coming into the house, either from schools or in the form of printed advertising material and there is not the time to read and absorb all of this material. Clearly this has implications for travel awareness campaigns which rely on a lot of printed material to communicate their message to participants.

There was one exception in terms of the attention given to printed components of the kits: the tailored feedback sheets. All people in all households indicated that these sheets were read and provoked discussion within the household. The reason for the interest in these sheets was that they were tailored to the members of the household and they took a greater interest in them because they had their names printed on them and they knew that the details they contained related to their travel.

Is there a normal travel week? The diary system was designed around a seven day period hoping to capture the variability in day-to-day travel behaviour. However a number of households felt that the diary weeks were ‘not normal’ weeks for them. This may have been because of a trip to the country or a weekend beach holiday. One family had in fact delayed completing the second diary in Sydney because they were waiting for a ‘normal’ week. This prompted one person to suggest that perhaps households have 50 ‘non-normal’ weeks a year.

The nature of this non-normal travel is important because a long car trip over the weekend can swamp any changes people may have made to reduce vehicle use during the week. Indeed some household expressed a sense of ‘failure’ when they received the second feedback in Kit 4 because their vehicle use, and associated emissions, had gone up as a result of one of these non-normal trips.

People did complete two weeks of travel diaries. It is significant that many participants did complete two sets of a one week travel diary. While the desirability of multi-day diaries has been discussed in the literature (Golob and Meurs, 1986) the concern over response rates has always dampened professional enthusiasm for this approach. The nature of the Travel Blending® Program has produced relatively high completion rates; however, a simplified instrument for the second round diary, to further reduce respondent burden, is now being tested.

Packaging travel awareness. The results reported here provide encouraging evidence of the impact of a particular form of travel awareness campaign. There is clearly scope to learn more about the role which travel awareness campaigns can play, as part of a broader package of measures, to manage travel demand and address urban transportation problems. In this context, travel awareness campaigns may represent one ‘carrot’ which could be offered alongside ‘sticks’, such as higher fuel prices and road pricing.

5. Conclusions

This paper has outlined the development of a unique travel awareness campaign built around a series of travel diaries that are completed by members of the household. These survey instruments provide not only a means of making travel ‘tangible’ for participants in the program, but also a basis for giving quantitative ‘tailored’ feedback to participants about their travel activity along with suggestions of changes they could make to reduce vehicle use. These survey instruments and

associated feedback sheets are delivered via a series of 'kits' that are sent to participating households over a nine week period.

The response to the Travel Blending® Program to date has been very positive with evidence that the program not only resulted in increased awareness of motor vehicle use and associated environmental impacts but also changes in travel behaviour which resulted in reduced motor vehicle use. Results from Adelaide indicate about a 10% reduction in car driver kilometres and a slightly higher percentage reduction in car driver trips and total hours spent in the car. These results, while very encouraging, must be interpreted cautiously. Further research will be required to explore the generalisability and magnitude of the effect of the Travel Blending® Program on travel behaviour.

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