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Commuter behaviour: A literature review and outline of a proposed study

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Introduction

There is increasing evidence that ecological concern on the part of most people in Western countries is now a major and permanent component of the modern psyche. In Australia, reports published throughout the 1990's have shown that knowledge of, and concern for the environment have both increased (Australian National Opinion Polls (ANOP), 1991 and 1993; Keys Young, 1994). ANOP (1991) noted that "the environment now occupies a permanent place on the national agenda (p.6)". ANOP went on to state: "In 1993, the community associates the environment with quality of life issues and recognises its potential impact on future generations. A growing link is also perceived between environmental problems and a deterioration of health (1993, p. 6)". Both ANOP reports (1991 and 1993) and a report by Key Young (1994) concluded that when Australians think ahead a decade, the environment emerges as the number one social issues of concern.

In terms of the specific environmental issues which concern members of the community in Australia, air pollution consistently recurs as a major worry. ANOP (1993) reported that in terms of Australians perceptions of global concerns, air pollution was the third highest priority (behind deforestation and water pollution) with 23% of those surveyed nominating it as the most serious problem. When asked about concerns for the Australian environment, air pollution was the second most frequently mentioned concern with 22% of respondents nominating it as most worrying (behind water pollution nominated by 34% of respondents). Cosgrove (1996) also reported that air quality is now seen by the Perth community as a moderately severe problem which will get worse over the next 30 years. In a recent Sydney survey of 1000 residents over 43% of respondents noted that air pollution was now seen as their number one environmental concern (McGeoch, 1995). Concern about air quality is clearly a major issue for many Australian residents.

In some ways, this concern is justified as numerous reports have noted a deteriorating air quality in both Australian and overseas locations. From Phoenix (Anonymous author, 1993), Vancouver (Anonymous author, 1993), London (Ciaburro, Jones and Haigh, 1994) and Sydney (McGeoch, 1995), air quality surveys have reported a deteriorating situation with regard to some categories of atmospheric pollutants. In almost every case, one of the principal causal agents of deteriorating air quality is reported to be an increasing use of motor vehicles for transport purposes. Flechtner and Mayer (1993) reported that motor transport sources produce 30% of all atmospheric volatile organic compounds (cancer causing agents) and over 70% of oxides of nitrogen (a constituent of the corrosive gas ozone). Angell (1989) reported that vehicles produce 70% of atmospheric carbon monoxide (a greenhouse gas) and 34% of hydrocarbons. A study by the Western Australian Department of Environmental Protection (DEP) reported that transport sources in Perth account for over 50% of all known atmospheric pollutants (in press). The DEP also indicated that cars produce over 90% of Perth's atmospheric carbon monoxide, 50% of nitrogen oxides and over 50% of atmospheric volatile organic compounds.

In terms of air quality problems, it is now clear that the amounts of pollutants generated by cars have increased steadily over the past four decades, and this trend is expected to continue (Flechtner and Mayer, 1993; Prendergast, 1990; Angell, 1989). Kearney and De Young (1995) reported that growth in the number of vehicles has doubled every twenty years and outpaces population growth. The Western Australian Conservation Council (Smogbusters, 1995) has noted that the total number of kilometres travelled on Perth roads is expected to double within thirty years. Mathew (1993) reported that the British Department of Transport estimates road traffic increases by 2025 of between 83% (low forecast) and 142% (high forecast).

Past and future solutions to air quality problems

Until recently, the growth in demand for transport and the problems this demand creates have been met in a highly technical fashion. So for instance Ciaburro et al (1994) noted that a common response to increased traffic volumes was the creation of more road infrastructure. Prendergast (1990) noted that the technical solution to air quality problems due to emissions has

seen the development and implementation of vehicle based emission control equipment such as catalytic converters and fuel efficient engines.

Both Kearney and De Young (1995) and Prendergast (1990) have noted that emission control technology on vehicles have reduced the harmful pollutants emitted by each car by up to 96% since the early 1970's, but both also note that technological solutions have been overcome due to the sheer numbers of vehicles being introduced to the roads and the additional kilometres driven.

It is now recognised that technological solutions to air quality problems will not significantly reduce the amounts of pollutants generated by vehicles (Prendergast, 1990). Ciaburro et al (1994) also note that attempting to meet expected demand for travel through the creation of additional infrastructure is no longer achievable or desirable.

A change in travel behaviour in order to significantly reduce present air quality problems, and continue to do so into the future is now accepted as a major solution to emission problems (Prendergast, 1990; Cosgrove, 1996; Ciaburro et al, 1994). Changing commuters' behaviour would seem to be the key to solving commuter-generated air quality problems. Ester and Winett (1981) have made the point that ecological crisis is a crisis of maladaptive behaviour and that to solve present problems and prevent further crisis it is imperative to alter maladaptive behaviour.

In terms of transport sustainability, cars with only one occupant represent a maladaptive behaviour. Studies have shown that road transport is dominated by single occupancy vehicle users. Flechtner and Mayer (1993) noted that 75% of vehicles in America are private cars. Rajendra (1995) noted that 80% of Americans drive to work on their own. A Perth study (ABS, 1994) indicated that over 78% of trips in the greater Perth region were made in single occupancy vehicles. Cosgrove (1996) noted that over 55% of all vehicles arriving in the Perth central business distract (CBD) carry only a single occupant.

It is the reliance on single occupancy vehicles by commuters which constitutes the most important maladaptive behaviour in relation to human generated pollutants in urban areas. For air quality to improve, commuters must be convinced of the need to alter their transport usage from the present maladaptive situation. Equally important to convincing more people of the need for change, is the actual alteration of commuters behaviour to less or non-polluting transport forms.

Travel Demand Management

Over the last two decades a systematic approach to altering transport usage has developed under the term travel demand management (TDM) (Anonymous author, 1993). Travel demand management strategies are useful approaches to traffic related problems because they can be introduced at various levels of an urban system. For instance, TDM can be introduced in individual workplaces, targeted suburban communities, city regions or indeed whole cities. In fact, TDM can even be introduced at a national level and America's Clean Air Acts of the early 1990's recognise this factor.

Travel demand management was initially established to overcome the increasing problems of traffic congestion - of which air quality problems were seen as merely a side effect (Anonymous author, 1993). With the growth of environmental concern and specifically concern about air quality, TDM has moved away from a focus on congestion. Today, TDM represents an ideal strategy for directly lowering emission levels of vehicles (an added benefit would of course be lowered traffic congestion problems).

In essence, TDM aims to reduce traffic volumes by shifting the mode of transport away from the maladaptive use of single occupancy vehicles, by eliminating the need for trips and by lowering peak demand periods by temporal dispersion of trips across a wider time frame. Using TDM for reducing air quality problems also involves convincing people of the need to maintain vehicles in peak condition and to drive vehicles using efficient driving styles.

Shifting the chosen mode of transport in TDM strategies involves people in choosing to walk, cycle, car pool, use public transport or other alternatives to the single occupancy vehicle. Eliminating the need for trips in TDM involves the promotion of telecommuting practices in workplaces, altering urban planning to discourage 'urban sprawl' on the suburban fringes of cities, and promoting the possibility of people living close to work, services and amenities. Temporal dispersion of trips in TDM involves encouraging workplaces to adopt 'flexi-time' working arrangements so commuters can shift the time at which they commute and thus extend the peak period travel time over a greater portion of the day. This in effect, reduces traffic volumes, speeds journey times and makes trips more efficient and less polluting.

In whatever fashion TDM is introduced, implicit to the strategy is the recognition that commuters must change their behaviour. Psychological theory has developed numerous approaches to the task of changing behaviour. At the heart of most attempts to bring about social change is a recognition that attitudes to a particular behaviour play a central role in the individuals motivation to adopt or resist change. According to Baron, Byrne and Suls (1988) attitudes and behaviour are positively correlated.

The importance of attitudes

In terms of attitudes at the present time, a concern for the environment is now a widespread and accepted attitude. ANOP (1993) noted that commitment to the environment has increased considerably and that the community is genuinely committed to adopting environmentally conscious behaviour. ANOP however, also noted that "The community is still focusing its attention on convenient actions...rather than significant lifestyle changes such as...commuting behaviour (1993, p. 8)".

Even though there is a community acknowledgment that vehicle emissions are a major cause of air quality problems there seems little desire on the part of individuals to alter their own transport behaviour (ANOP, 1993). Ciaburro et al (1994) noted a general ambivalence to transport issues and they stated "residents...want quiet, safe streets with minimal air and noise pollution. As motorists, on the other hand, they want to get around as quickly as possible using high standard, fast and direct routes with little regard to the effect on communities through which the roads they use pass (p. 7)". Ciaburro et al (1994) also noted that recognising the need to stem unsustainable and polluting growth in traffic requires a change in public attitudes. Commuters must be convinced of the need to switch to alternative transport arrangements and then follow through with behavioural change.

Atmospheric pollution and deteriorating air quality resulting from increased car use represents something of a modern paradox. On the one hand, the benefit of the car to individuals means the car is perceived as one of the great inventions of human technology. Van Vugt, Meertens and Van Lange (1995) noted that cars do have rewarding qualities which provide personal convenience, efficiency and freedom. The massive increases in car use however, creates problems of congestion, noise, accidents and air quality for society. Individuals who receive the benefits of cars also pay a price in these terms. Attitudes to the car itself are somewhat paradoxical to peoples stated concern for environmental issues. Numerous studies have suggested that attitudes to car transport are favourable with speed, efficiency, low cost, individual freedom, safety, comfort and convenience all coming to the fore (Ciaburro et al 1994; Van Vugt et al, 1995).

Some studies which noted positive attitudes to environmental concern and which suggest that people are aware of the importance of air quality issues have not however, indicated that positive attitudes and high levels of knowledge lead to adaptive changes in behaviour. So for instance ANOP's (1993) finding of air pollution being second most important environmental concern did not lead people to suggest using the car less as a solution. Of the top ten ways in which people can help the environment (such as recycling and using less water), less car use was a behaviour that people seemed unwilling to adopt (ANOP, 1993).

Cognitive dissonance theory

Cognitive dissonance theory (Baron, Byrne and Suls, 1988) offers a useful approach to understanding the present paradox of environmentally concerned attitudes and environmentally damaging behaviours. Cognitive dissonance is experienced as an affective state when a person's attitudes conflict with their actions. Car drivers (behaviour) who are concerned about the environment (attitudes) would be expected to experience cognitive dissonance.

Baron et al (1988) suggested that individuals experiencing dissonance are motivated to reduce the feeling. Motivation for change in response to dissonance can occur by altering attitudes (in this case by being less concerned about the environment); by altering behaviour (in this case by reducing the use of the single occupancy vehicle); or by receiving new information which reassures the person that there is no inconsistency to worry about. Minimising the conflict between behaviour and attitudes via reducing the inconsistency or the importance of the issue are the standard ways in which individuals deal with cognitive dissonance (Barren et al, 1988).

Actively creating cognitive dissonance in order to promote attitudinal or behavioural change is one strategy which has been used in many campaigns promoting social change. Anti-smoking campaign messages which focus on the risks of developing cancer as a result of smoking are one example of the way in which creating cognitive dissonance can motivate behavioural change.

Research todate suggests that cognitive dissonance is likely to play a role in behavioural change only when several factors are involved (Baron et al, 1988). Firstly, the behaviour being performed must be under volitional control. For individuals to experience dissonance, they must have an internal locus of control over choosing to perform or not perform a given behaviour. The person must feel directly responsible for the performance of a behaviour to experience dissonance(as in the case of the choice to drive a car). Secondly, the inconsistent behaviour must have some foreseeable and negative consequences (as in air pollution). Finally, dissonance seems to depend on physiological arousal. Baron et al (1988) suggested that getting at least mildly upset is necessary for dissonance to play a part in motivation for change.

According to cognitive dissonance theory, the first component in any change in public attitudes toward car use must be the creation of a cognitive link within individuals of the relationship between their personal use of cars, increasing traffic volumes and the associated decrease in air pollution. Ciaburro et al (1994) noted that "The premise is that alternative transport facilities are only likely to be used in preference to private cars if members of the public are made aware of the relationship between their own car use...and associated impacts on the environment and everyday quality of life (p. 5)".

Awareness about the issue of air quality is considered as the prerequisite to any shift in attitude and ultimately, to changes in transport mode. Kearney (1994) has noted that behavioural change is difficult to promote unless people have information and understanding of a problem and a range of appropriate behavioural solutions. Kearney went on to suggest that knowledge about a desirable goal, such as reduction in traffic emissions is not enough to stimulate new behaviour - people must have knowledge about the behaviours they are hoped to adopt. Any raising of awareness about an issue must include positive messages about how to act.

In terms of cognitive dissonance, the strategy for altering transport behaviour is to allow individuals to bring their behaviour (type of transport used) into line with their expressed level of environmental concern. A problem of research on awareness raising, attitudinal change and behavioural change, is that it often takes a long time for actual behaviour to alter. Transport studies in Hampshire (Ciaburro et al, 1994) and Nottingham (Nottingham City Council, 1995) in the United Kingdom have noted that transport behavioural change due to TDM is only seen after three to five years.

Primary prevention through awareness raising

Psychological research on social change initiatives have occurred in a number of prevention campaigns principally focussed on health related issues. Campaigns on altering tobacco smoking habits (Pallonen and Fava, 1992), and suntanning (Arthey and Clarke, 1995) are now well documented. In skin cancer prevention campaigns for example, the objective of much prevention activity has taken the form of increasing awareness and knowledge of the dangers of excessive exposure to sunlight and educating the public as to the best ways to avoid exposure to sunlight (Arthey and Clarke, 1995).

Arthey and Clarke (1995, p. 265) stated "Increasing knowledge has been the primary method of behavioural prevention strategies in Australia". Primary prevention campaigns based on increasing public knowledge about an issue have a long history and an accepted efficacy (Hill, Rassaby and Gardner, 1984; Arthey and Clarke, 1995). Altering commuter's behaviour away from a reliance on single occupancy vehicles is essentially a primary prevention strategy.

In terms of the actual adoption of behavioural change due to prevention campaigns, Prochaska and DiClemente (1984) have developed a theoretical model which promotes behavioural change as a five stage process involving precontemplation, contemplation, preparation, action and continued maintenance. The model is highly applicable when considering commuter-based behavioural change. Evidence from present transport patterns (ABS, 1994) suggests that the large percentage of commuters who use single occupancy vehicles are in the precontemplation stage - that is - they have not yet started to think about changing their travel mode. An unknown percentage of this group may be in the contemplation and preparation stages - that is - they are actively considering or preparing to switch transport modes.

Cosgrove (1996) suggested that commuters attitudes to alternative transport modes in Perth were moderately favourable, that the need to develop transport alternatives was seen as urgent, and that a large latent demand for alternatives already exists. Travel statistics (ABS, 1994) which note that about 15% of journeys are made by walking, cycling or public transport would suggest that this group of commuters are in the action or maintenance stages of the model.

The objective of a TDM campaign must be to increase the percentages of people moving from precontemplation to contemplation, or from contemplation and preparation to action, or from action to long term maintenance. The specific objectives of TDM must be firstly, to raise the awareness of air quality issues of those in the precontemplation stage; secondly, to raise the awareness of possible travel alternatives of those in the contemplation and preparation stages; and finally, to model and reinforce behavioural change of those commuters who have already moved to action.

The traditional primary prevention campaigns have tended to present information in a linear fashion with those receiving information doing little more than reading or viewing campaign messages. Traditional information based campaigns can be considered as passive processes in which target audiences play little part. According to Finger (1994) the dominant framework states that information, knowledge, concern and awareness lead to behaviour change. Where this is not the case, it is explained by the social dilemma, ie, where individuals realise that their individual behaviour change is not going to make a difference unless a majority of fellow individuals also change. A problem for the traditional information-based primary prevention campaigns is that, as already noted, individuals are now highly aware of air quality problems and are also highly concerned about environmental problems yet they continue to act in environmentally damaging ways. Finger (1994) suggested that the deficiency model of education may even lead to the public becoming less active.

Public involvement and participatory action research

Two further developments in the prevention field have evolved recently and are termed public involvement in problem solving and participatory action research (PAR). Syme and Sadler (1994, p. 524) have defined public involvement as "the participative planning and decision processes necessary to achieve adequate inputs and exchanges and confidence of stakeholders".

Participatory action research is defined by Seymour-Rolls and Hughes (1996, p. 1) as "a method of research where creating a positive social change is the predominant driving force". The participatory action research and public involvement processes involve collaboration between researchers and individuals, group members or organisations, usually through problem identification, joint action planning and then intervention itself. This approach would seem most suitable to attempts at altering transport behaviour.

The actual research strategy involved in PAR is defined by Seymour-Rolls and Hughes (1996, p.1) as "collective, self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social practices". Public involvement and PAR are ideally suited to allowing commuters to evaluate their own travel needs and decisions and arrive at behaviours which they feel comfortable in adopting in practice.

Inspite of the promise, neither PAR nor public involvement in TDM has not yet emerged as a major initiative but a model provided in the area of water management may be well suited to future TDM initiatives. In water management issues there has for some time been a recognition that the public must be involved in planning water use strategies. Syme and Nancarrow (1992, p. 738) stated that "Many water management decisions are, after all, dependent on human values rather than technical judgement. In this arena the engineer is no more expert than the public she or he serves". Public involvement recognises implicitly that the decision making processes of individuals who are being encouraged to change behaviour are more important than any 'grand plan' promoted by experts.

Transport demand management recognises the fact that the public is being asked to alter their behaviour. Following this recognition is the identification of the utility of public involvement in strategic development and PAR allows for this to happen. Poulin and Kaufman (1995) noted that public involvement in many social problem areas may improve the capacity of a community to address a given problem. In terms of transport generated pollution problems, public involvement via a PAR framework would seem an ideal process to follow.

In public involvement using PAR principles, target public's become involved in problem identification, the search for solutions and the implementation of strategies which they choose as optimal. Price (1990) even suggested "we might routinely ask community members for *their* theories of what is wrong with their community and how to make it right (p. 165)". Public involvement using PAR strategies involve a reciprocal flow of information from researchers to target audiences and back again. In this sense public involvement is considered as empowering of individuals in decision making processes and evidence suggests that outcomes are more stable as participants have 'ownership' of the behavioural solutions they develop. Rogers and Palmer-Erbs identify that participation in the research process is essential in that "broader participation can lead to stronger consensus for change and sounder models - because models arrived at through broader participation are likely to integrate the interests of more stake-holder groups" (1994, p. 4).

Public involvement in a PAR process is a strategy which allows those experiencing a problem in a specific environmental setting (transport users) to participate collaboratively with trained researchers in deciding the focus of knowledge generation, in collecting and analysing information, and in taking action to manage, improve or solve the problem (Whyte, 1991). Public involvement using PAR can be considered an active process, in that action in the form of behavioural change is the outcome of the research process..

The present intervention

In response to Government and community concern about deteriorating air quality in Perth, the Department of Environmental Protection was asked to develop a workplace based TDM strategy. It is worth noting (see figure 1) that the TDM strategy will involve introduction of interventions into suburban community locations at a later time, and comparison of interventions between workplaces and communities will then be possible. The present study will however, introduce an information-based prevention campaign (see figure two) and a staff involvement process (see figure three) based on public involvement and PAR into a number of

worksites, each employing in excess of 100 staff within the Perth CBD. A control condition will also be introduced as a separate element of the TDM strategy.

The information campaign and PAR staff involvement process will run for six months and the primary objective will be to raise awareness about air quality issues. It is hoped to eventually translate increased awareness into behavioural change, but the short time frame means that significant change in behaviour is unlikely to be seen (Ciaburro et al, 1994).

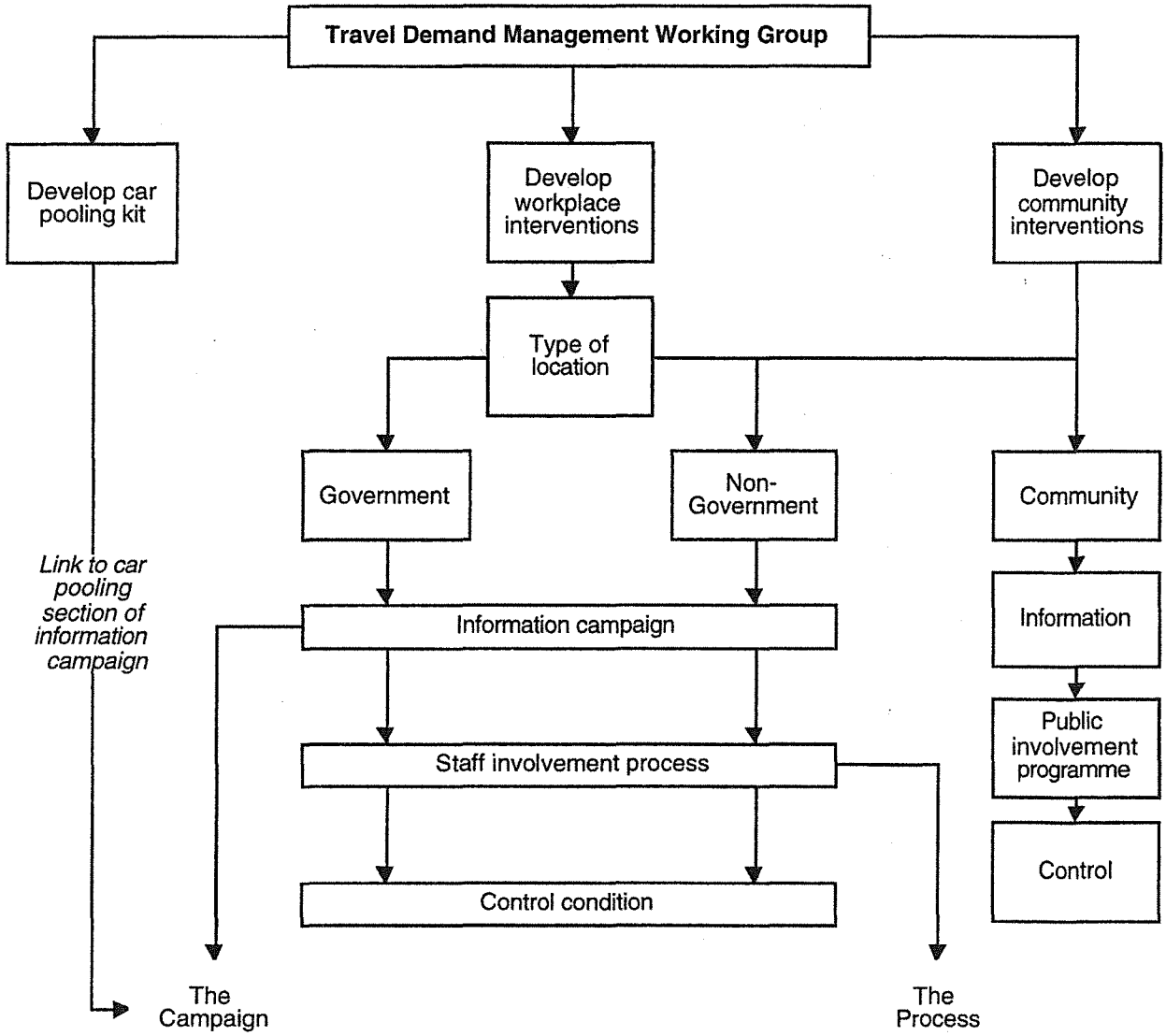

Figure 1. Overview of the intervention trial.

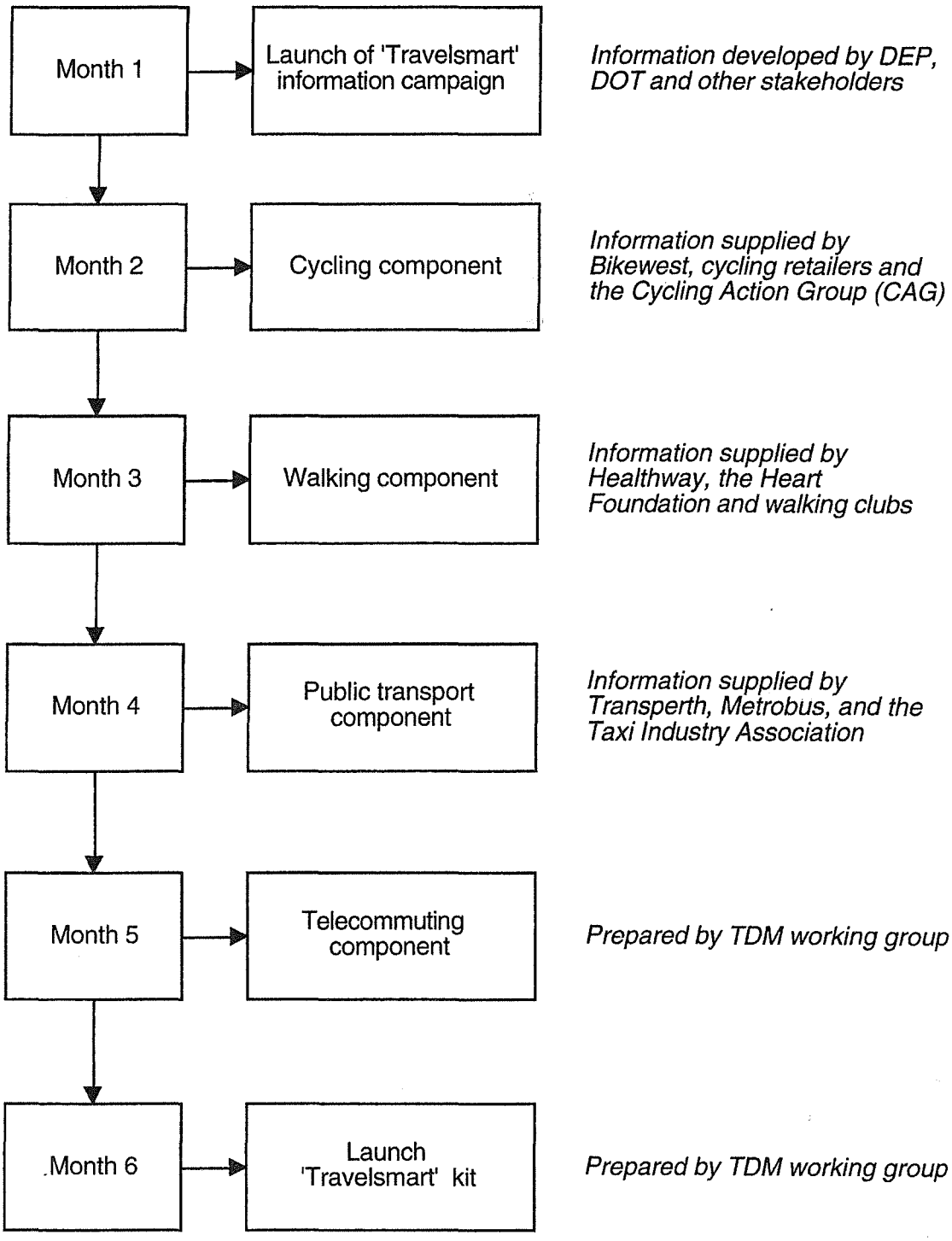

Figure 2. Information Campaign Process.

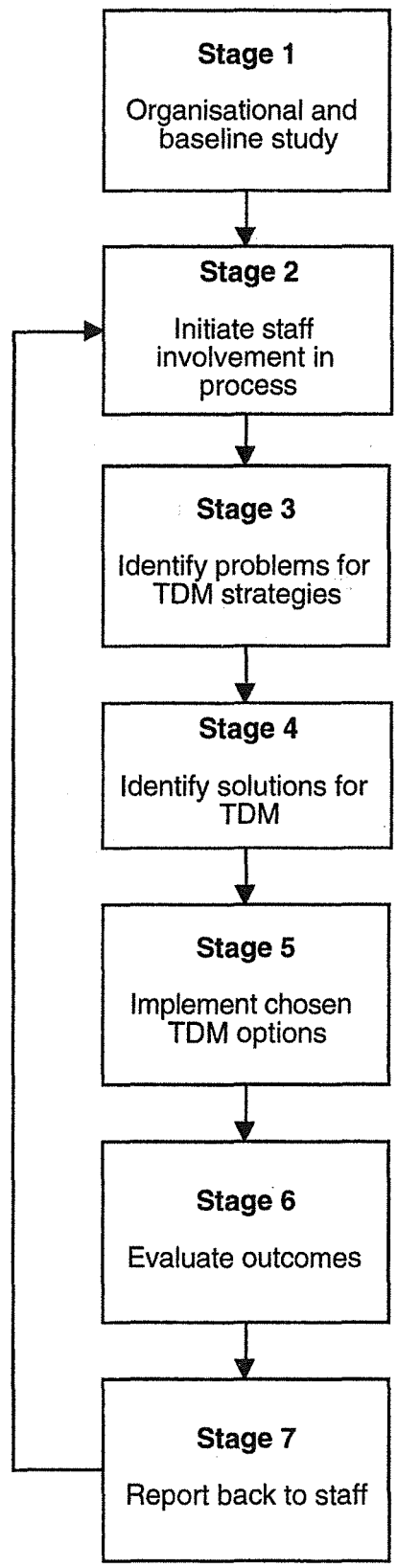

Figure 3. Staff Involvement Process.

The information campaign will consist of six 'blocks' of one month duration with a focus on each of the elements of TDM. The first month of the campaign will include the launch and an overview of all the themes to be included. The second month will focus upon elements of TDM related to cycling. The third month will focus upon walking. The fourth month will focus upon public transport. The fifth month will provide information about telecommuting. The final month will see the launch of a 'Travelsmart' kit including information on car pooling.

The style of the intervention will follow a quasi-experimental design with a pre-test and post-test evaluation component. The intervention itself will consist of three separate trials in two types of organisation. The first type of intervention will take the form of an 'Information only campaign' in which employees receive information in a passive fashion. The second type of intervention will involve an information component (as in trial one) but with the addition of a PAR based staff involvement process.

The staff involvement process is based on public involvement strategies which seek to actively involve people in the decision making process. The involvement process is designed to generate staff activity in response to information campaign messages. The process will encourage staff to identify problems, generate solutions, choose amongst available and practical options, implement policies, evaluate outcomes and re-evaluate problems. The final intervention will consist of a control in which only pre and post baseline information will be gathered.

The two types of organisations involved in the trials consist of Government Departments on the one hand (public sector) and profit-generating industries (private corporations) on the other (see figure three for an overview of the whole process). The efficacy of the three interventions will be evaluated by comparing pre-test awareness about air quality issues with post-test awareness. It is expected that awareness about air quality issues will increase as a result of the information and information and participation interventions.

The quasi-experimental design will also allow for the evaluation of the new style of participatory involvement process against the traditional primary prevention intervention of an information campaign. This second 'macro-evaluation' will involve exploratory research and no directional hypothesis can be stated at this time. Which of the two types of intervention will be most successful in altering awareness is not presently known.

References

Angell, C. D. (1989). Mobility futures: An overview. Transportation Quarterly. 43 (4), p. 549-555.

Anonymous Author. (1993). Transport demand management measures and their potential for application in Greater Vancouver. Transport 2021: Vancouver, Canada.

Anonymous Author. (1993). Travel Demand Management Survey: Annual Report. Metropolitan Phoenix: USA.

Anonymous Author. (1995). A Comprehensive Overview of Transportation Demand Management Public Opinion Research. Greater Vancouver Regional District: Canada.

ANOP. (1991). The Environment and the ESD Process. Government of New South Wales: Sydney.

ANOP. (1993). Community Attitudes to the Environment. Government of New South Wales: Sydney.

Arthey, S. & Clarke, V. (1995). Suntanning and sun protection: A review of the psychological literature. Social Science and Medicine. 40 (2), p. 265-273.

Australian Bureau of Statistics. (1994). Travel to Work and School. Commonwealth of Australia: Canberra.

Baron, R., Byrne, D. and Suls, J. (1988). Exploring Social Psychology. Allyn and Bacon: Sydney.

Cosgrove, B. A. (1996). Focus groups report: Travel demand management. Perth: Department of Transport.

Ester, P. & Winett, R. (1981). Toward more effective strategies for environmental programs. Journal of Environmental Systems, 11(3), p. 201-221.

Flechtner, M. K. & Mayer, S. L. (1993). Air quality: Impacts of trip reduction programs on States and affected employers. Washington: Committee for the National Institute for the Environment.

Heller, F. (1993). Another Look at Action Research. Human Relations, 46 (10), 1235-1242.

Hill, D., Rassaby, J. and Gardner, G. (1984). Determinants of intention to take precautions against skin cancer. Community Health Studies, 8(33), p. 222-256.

Howze, E. H., & Redman, L. (1992). The uses of theory in health advocacy: Policies and programs. Health Education Quarterly. 19 (3), p. 369-381.

Kearney, A. & De Young, R. (1995). A knowledge based intervention for promoting car pooling. Environment and Behaviour. 27 (5), p. 650-677.

Kearney, A. (1994). Understanding global change: A cognitive perspective on communicating through stories. Journal of Environmental Systems, 11(3), p. 201-221.

Keys Young. (1994). A Benchmark Survey of the Environmental Knowledge, Skills, Attitudes and Behaviour of the People of New South Wales. EPA: Sydney.

Mathew, D. (1993). Where next? Transport policy and problems in Britain. Public Money and Management, January-March, p, 41-46.

McGeoch, R. (1995). Blue skies, nothing but blue skies. The Open Road, (July/August), p. 14-16.

McTaggart, R. (1991). Principles for Participatory Action Research. Adult Education Quarterly, 43 (3), 168-187.

Nottingham City Council. (1995). Go Green Campaign. Author: Nottingham.

Oppenheim, N. (1979). Car pooling: Problems and potentillas. Traffic Quarterly, 33(2), p. 253-262.

Pallonen, U., and Fava, J. (1992). Readiness for smoking change among middle aged Finnish men. Addictive Behaviours, 17, p. 415-423.

Portnoy, B., Anderson, D. and Erikson, M. (1989). Application of diffusion theory to health promotion research. Family and Community Health. 12 (3), p. 63-71.

Prendergast, J. (1990). On the road to clean air. Civil Engineering, August, p. 32-35.

Prochaska, J., and DiClemente, C. (1983). Stages and process of self-change of smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology, 51, p. 390-395.

Rajendra, J. (1995). Transportation and the environment - HOV experience in Connecticut. ITE Journal, February, p. 29-34.

Reason, P. (1993). Sitting between Appreciation and Disappointment: A Critique of the Special Edition of *Human Relations* on Action Research. Human Relations, 46 (10), 1253-1270.

Rogers, E. S. & Palmer-Erbs, V. (1994). Participatory Action Research: Implications for Research and Evaluation in Psychiatric Rehabilitation. Psychosocial Rehabilitation Journal, 18 (2), 3-12.

Rosenwald, G. C. (1988). Toward a Formative Psychology. Journal for the Theory of Social Behaviour, 18 (1), 1-32.

Smogbusters. (n.d). The Cars that Ate Perth. Conservation Council: Perth.

US Department of Transport:. (1990). Evaluation of Travel Demand Management: Measures to Relieve Congestion. Author: Washington.

Van Vaugt, M., Meertens, R., and Van Lange, P. (1995). Car versus public transportation? The role of social value orientations in a real-life social dilemma. Journal of Applied Social Psychology, 25(3), p. 258-278.

Whyte, W. F. (1991). Participatory Action Research. Newbury Park, USA: Sage Publications.