

APPLICATION OF PSYCHOLOGICAL PRINCIPLES TO PROMOTE TRAVEL BEHAVIOUR CHANGE

Rita Seethaler, PhD candidate, Department of Civil Engineering, Monash University

Dr. Geoff Rose, Director, Institute of Transport Studies, Department of Civil Engineering, Monash University.

ABSTRACT

Travel demand oriented policies aimed at increasing the sustainability of urban transport often face the problem of overcoming unsustainable behaviour patterns that are principally centred around the car and largely dominated by routine choices that do not take sustainability considerations into account. To overcome the barrier of habitual behaviour patterns, current Travel Behaviour Change campaigns are principally based on the provision of information about the effects of modal choices and the availability and benefits of modes other than the car.

However, current research in the domain of public health, energy consumption, waste management, etc. have shown that information-based campaigns, including the use of incentives, are by and large insufficient for stimulating behavioural change of lasting effect. In this context, social psychology offers a series of six specific persuasion techniques that are equally suitable for private sector marketing as for community based social marketing strategies and that are able to reach beyond the mere raising of awareness and knowledge (Cialdini, 2001).

Appealing to deeply seated human needs, the six persuasion principles of **Reciprocity, Consistency, Social Proof, Authority, Liking** and **Scarcity** can be translated into practical communication strategies that will increase the personal involvement of a target population and secure a lasting change in behavioural patterns.

In the context of the recent travel behaviour change policies implemented in different metropolitan areas of Australia, the present paper proposes a number of ways in which the six persuasion principles can be systematically introduced into the design of such policies in order to increase response by the target population and in order to secure a lasting reduction in vehicle kilometres travelled. For each of the persuasion principles, the underlying theoretical bases from social psychology are outlined and, for illustration purposes, parallels are drawn to empirical research on their application in other public policy domains, such as energy conservation, waste management or land care.

Presented at 26th Australasian Transport Research Forum

Wellington, New Zealand

October 1-3, 2003

1 INTRODUCTION

In the light of recent attempts to overcome the negative impacts of urban travel, a variety of policy measures aiming at travel behaviour change are tested and compared in many cities around the world. Since the mid nineties a number of metropolitan areas in Australia are also implementing and testing demand-side travel behaviour change policies, predominantly initiated by State Authorities and implemented by private consultants via workplaces, schools and local communities.

Although the different applications of community based TravelSmart programs using the IndiMark® method in Western Australia or the Living Neighbourhood® program in Southern Australia report similar results in terms of car trip reductions of 10% and more (Ampt et al. 2000; Brög et al. 1999; Brög et al. 2003; Rose et al. 2001), there are substantial differences in the intervention designs used by the different teams. Like in the community based applications, a similar heterogeneity in intervention designs can be observed in school- and work-based TravelSmart applications currently trialed in different Australian metropolitan areas, and given the short history of such policies a “standard” method is far from being established.

The present paper does not attempt to investigate the differences, advantages and disadvantages of the single methods. Attempts in this direction have been made elsewhere (Department for Transport 2002) and a refinement of policy evaluation tools is needed to appropriately fulfil this task. Instead, the theoretical aspects of behaviour change and persuasion are discussed from a social psychology point of view in order to better understand the challenges of the policymaker when addressing unsustainable travel habits. Based on this insight, a number of general techniques of persuasion are then presented, that commonly used in the private sector are now increasingly applied in community based social marketing as well, eg. in the domains of public health, waste management, energy and water, land care, etc.. From examples in these domains a number of recommendations are then derived as to how these principles of persuasion can be systematically integrated in the design of Travel Behaviour Change policies.

2 THE RATIONALE FOR TRAVEL BEHAVIOUR CHANGE POLICIES

In addition to its major contribution to economic benefit and the welfare of the general community, the transport sector also causes a number of negative impacts. For these negative effects modern economic welfare has coined the term of ‘negative externality’, because they are not reflected by the market prices and are therefore situated outside the cost and benefit considerations of the individual consumer (Coase 1960; Johansson 1991; Pigou 1932; Weimann 1990). The negative external effects are a common outcome of urban transport with many different dimensions as demonstrated in Figure 1 (World Health Organisation 1999), *“giving rise to ‘external costs’ which are not borne by transport users, but by persons not directly responsible for them or by society as a whole”* (Sommer et al. 1996).

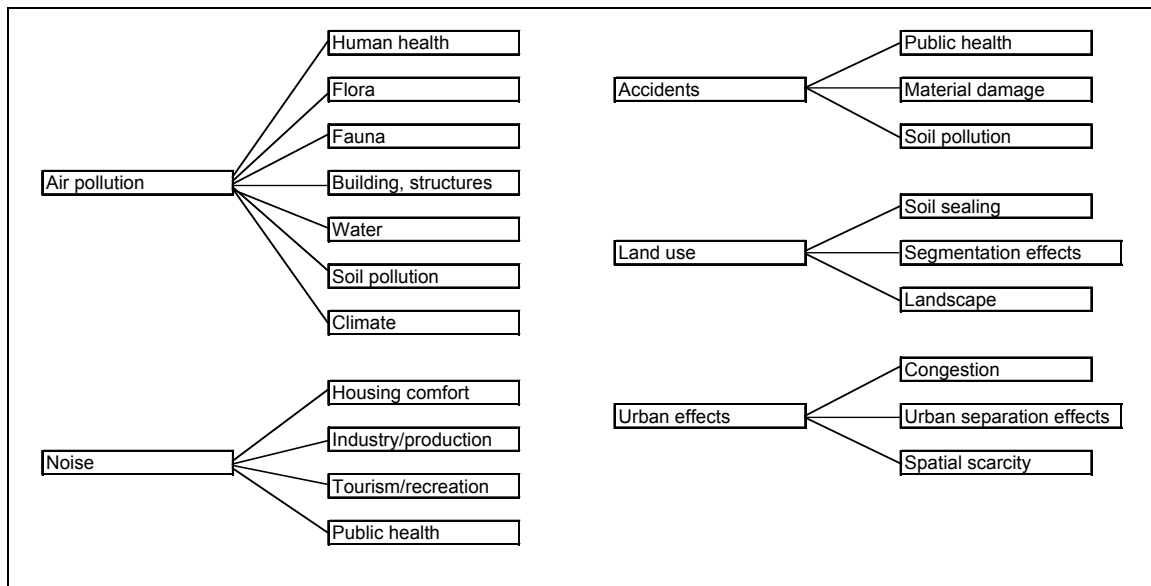


Figure 1 Domains of negative impacts of transportation

Source: WHO, 1999 (modified)

A recent study for the year 1995 estimates the external environmental costs of transport for 17 European countries to amount to some 530 billion Euro (approx. 7.8% of GDP) of which 302 billion Euro (approx. 4.4% GDP) is due to passenger cars, and to which additional congestion costs of some 33.5 billion Euro (approx. 0.5% of GDP) have to be added. (Infras/IWW 2000).

Recent figures for all environmental domains, all urban areas and all modes compared are not readily available for Australia. However, a conversion of the European data for passenger cars to costs per vehicle kilometre and a calibration to Australian conditions results in a total environmental cost of \$90 per 1000 vehicle kilometres. According to (Tsolakis et al. 2001)

“This value is of similar magnitude to the total environmental costs value for cars of \$67.70 per 1000 km estimated for Australia in 1990 (BTCE et al. 1994) for urban road networks (a significantly smaller cost was reported for Australia in 1990 for rural networks) – a value that roughly translates to about 10 cents per kilometre of travel or around \$1 per litre of petrol consumed (assuming an average of a litre of petrol per 10 kilometres travel), an amount that in current figures is over twice the amount of Government excise on petrol in Australia”.

A particular problem constitute the emissions of greenhouse gas by motorised transport which according to the Victorian Greenhouse Gas Inventory 1999 amount to 16% of annual CO₂-equivalent emissions (CO₂-e)¹ (Department of Natural Resources and Environment 2002a). Under a “business as usual” scenario these emissions are expected to continuously rise due to demographic developments, the trend to larger vehicles, the distribution of land use and increased economic activity (Bureau for Transport and Communications Economics 1995). Particular efforts are necessary in order to address the strong growth of CO₂-e emissions recorded between 1990 and 1999 (+12%) in the transport sector and in order to contribute to

¹ For different greenhouse gases that vary in their strength of trapping heat radiation the Global Warming Potential (GWP) coefficient indicates the extent of this variation compared to CO₂. The Global Warming Potential (GWP) provides a way to compare and combine emissions of different greenhouse gases and to calculate total emissions in terms of CO₂-equivalents; e.g. 100 tonnes of CO₂ and 1 tonne of CH₄ yield a total of 121 tonnes of CO₂-equivalent emissions (McRobert, J. (1997). "Greenhouse emissions and road transport." *Research Report ARR 291*, ARRB Transport Research Ltd., Vermont South, VIC.

the overall goal of emission savings in Victoria between 5 and 8.3 Megatonnes CO₂-e per annum over the first commitment period of the Kyoto Protocol (2008-2012)² (Department of Natural Resources and Environment 2002b).

Recent approaches on federal and state level are made to address these problems. For example in Victoria, the *“Melbourne Principles for Sustainable Cities”* (United Nations Environment Programme et al. 2002), the *“Metropolitan Strategy 2030”* (Department of Infrastructure 2002) and the *“Victorian Greenhouse Strategy”* (Department of Natural Resources and Environment 2002b) constitute the official framework for the goal of sustainable transport.

In addition to long term structural changes such as a more compact city and improved interconnected public transport, the active promotion of modal change in *Travel Behaviour Change Programs* through education, promotion and pricing is one of the Key Directions of the Metropolitan Strategy 2030 (Department of Infrastructure 2002)³. Travel behaviour change is also explicitly promoted by the Victorian Greenhouse Strategy that proposes *“targeting a reduction in car-based travel using campaigns such as TravelSmart and Green Transport Plans”* (Action 7.1 of the Victorian Greenhouse Strategy, (Department of Natural Resources and Environment 2002b).

In recent literature, Travel Behaviour Change Programs are defined as a *“public engagement campaign designed to enable individuals to become more aware of their travel options and where possible exercise choices which reduce use of the private motor vehicle”* (Rose et al. forthcoming). The authors further point to the fact that according to this definition a Travel Behaviour Change program should preferably include *“some elements of active engagement with the participants rather than relying on passive publicity/advertising alone which would usually form a key part of a marketing campaign”* (Rose et al. forthcoming), because empirical evidence has shown that a mere increase in knowledge due to advertisement alone is insufficient to promote sustainable behaviour (Hines et al. 1987; Hornik et al 1995). Travel Behaviour Change Programs are thus demand-side policy interventions pursuing the target of reducing car-based travel by shifting it to alternative modes such as public transit, walking and cycling or by linking and combining vehicle-based trips.

Similar to what is proposed in Victoria, in many countries around the world recent attempts in transport policy have been made to promote a change in travel behaviour towards more sustainable travel patterns. The scientific literature on transport policy proposes a mix of policy instruments, for which the global term “Travel Demand Management” is used. Although this term is used slightly different in the US, Europe and Australia, given the broad range of measures encompassed, the overarching definition used by (Steer Davies Gleave 2002) seems to be the most appropriate: *“Travel Demand Management is an intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced”*.

In Europe, an impressive number of cooperative research projects, funded by the European Commission and conducted by interested member countries, focus on the design, implementation and evaluation of campaigns to promote sustainable travel behaviour. Projects with direct relevance to the Travel Behaviour Change policies proposed by the Victorian Government have recently been completed as part of the

² Contribution of the transport sector to the net greenhouse gas emissions in Victoria in 1999: 18.2 Mt (16.1% of the State total). EPA (2002) Victorian Greenhouse Gas Inventory 1999.

³ Direction 8, Policy 8.8 “Promote the use of sustainable personal transport options”, Initiative 8.8.1 “Complete the pilot TravelSmart program, and independently review its outcomes” (Department of Infrastructure, 2002)

Fourth Framework Programme funded by the European Commission, Directorate General Energy and Transport (TREN) and have investigated either the shift to single modes (walking, cycling) or specific practises of community-based marketing to promote public transit (European Commission 2002) ⁴. Two additional projects ⁵ of a more integrative character, funded by the European Community under the Fifth Framework Programmes, are studying a variety of demand-oriented policies that are based on a combination of information, co-ordination and motivation campaigns. Also, these projects address a variety of different target groups with their particular relationship to transport, e.g. educational institutions, tourism operators and tourists, health institutions, site developers, temporary sites/events, mobility centres in communities to name a view (Müller 2002; Wilhelm et al. 2003). In parallel to the policy development and implementation, a monitoring and evaluation toolkit has been developed that allows project specific assessment as well as a comparison between projects (Müller 2001).

With this political rationale in mind, the following chapter explores the two principle challenges that Travel Behaviour Change policies need to overcome.

3 THE PRINCIPLE CHALLENGES OF TBC PROGRAMS

The rationale to change one's travel behaviour on an individual level may be hindered for three particular reasons, namely

- the presence of **external barriers**: for example, economic constraints, low quality of access to different alternative transport modes, long commuting distances, etc.
- the presence of **internal barriers**: for example, (mis-)perceptions of alternatives to the car, negative attitudes towards public transit use, missing awareness of benefits resulting from sustainable behaviour, etc., and finally,
- the **habitual nature of the decision process** underlying travel behaviour patterns.

External barriers can often be reduced with long-term structural and organisational changes only, e.g. with an improvement in public transit facilities (supply-side policies) or due to residential location choices of the households themselves. However, there are quite a large number of travel decisions in which external barriers are nearly absent and only the internal barriers for behavioural change are high.

For example, in-depth investigations in 1997 within the target population of TravelSmart in Western Australia have shown that for 46 % of trips, external barriers and constraints do exist that hinder the use of modes other than the car. For the rest,

⁴ See for example the Travel Behaviour Change related projects funded by the European Commission (http://www.europa.eu.int/comm/transport/extra/rep_urban.html)

ADONIS=Analysis and development of a new insight into the substitution of short car trips by cycling and walking;

INPHORMM=Promoting sustainable transport – the role of information, publicity and community education;

WALCING=How to enhance walking and cycling instead of shorter car trips and to make these modes safer;

MOMENTUM=Mobility management for the urban environment;

⁵ The two projects are: **MOST**, Mobility Management Strategies for the next decades; **TAPESTRY**, Travel Awareness Publicity and Education supporting a Sustainable Transport Strategy in Europe

some 20% of trips are already made with modes other than the car, whereas for 34% of trips it is mainly the internal barriers that prevent the use of alternatives to the car (Brög et al. 2003). To some extent, this picture is supported by independent sources from other household travel surveys. For example, data from the Victorian Activity and Travel Survey VATS 1994 reveal that 16% of car trips are no longer than 1 Km and 42% no longer than 3 Km. The first challenge of demand-side policies aiming at behaviour change is therefore the reduction of internal barriers that prevent people from considering alternative options to their current practice.

An internal barrier particularly difficult to overcome is *'the tragedy of the common pool'*. In 1968, the internationally renowned journal *Science* published the seminal paper of Garrett Hardin, a biologist at the University of California at Santa Barbara, entitled 'The tragedy of the commons' (Hardin 1968). This term describes a situation where a behaviour that makes sense from the individual point of view, when repeated by enough individuals, ultimately leads to disastrous consequences for the society as a whole (Gardner et al. 1996). The tragedy of the common pool is thus induced by three perceptual mechanisms of the individual consumer:

- The consumption of natural resources to which access is not restrained by any regulations or property rights lies in the individual actor's self-interest,
- Each user perceives little harm in doing so because the resource seems huge compared to the very little impact induced by the individual consumption. Therefore, the benefits from pro-environmental behaviour are not clearly understood or valued, and finally
- The other consumers are expected to behave as free riders that would also continue using the natural resources out of individual self-interest rather than acting under voluntary self-restriction.

For the above reasons there is generally low interest in the topic of sustainable behaviour, low personal involvement for the cause and low willingness to spend much thought about it. However, common pool resources such as clean air, water, natural resources and non-renewable energy, are not unlimited and the single negative impacts due to their use for consumption or production become a considerable burden when aggregated (Gärling et al. 1997; Komorita et al. 1994; Steg 1996).

With this problem in mind, the central idea of social marketing is to implement a public sector policy that aims at promoting behavioural change in different sectors, such as public health, waste management, management of scarce water resources or energy consumption and the reduction of emissions (McKenzie-Moor et al. 1999).

Applied to the transport sector, in contrast to supply-side policies that offer new goods and services of different types, demand-side policies aiming at behaviour change do not necessarily offer any tangible assets. Instead, the central rationale is to induce voluntary action and an altruistic stand in order to overcome a "tragedy of the common pool" type of situation. From such voluntary action immediate personal benefits for the individual may not always be present as a complementary advantage to the general welfare improvement of the community as a whole.

A further challenge of demand-side policies is related to the nature of the decision process itself on which daily travel behaviour is based. Svenson (1990) differentiates between the following four levels of decision-making:

- Level 1 Decision: In this situation no attractiveness representation is needed at the moment when the decision is made. This type of decision is a habitual process, where a situation is recognized as similar to a previous one and the

same choice is made again. This decision process is qualified as quick, automatic and unconscious – as “routines of performance of everyday activities” (Gärling 1992). At their origin, Level 1 decisions are also related to some values but the attractiveness representation is no longer activated each time to influence such decisions. It is now triggered through other cognitive processes such as similarity to previous situations or the imitating of some respected peer group’s choice. Daily travel routines are examples of Level 1 decisions, whereby predetermined strategies are regularly followed, e.g. by always taking the same route to work, by always wearing seat belts, etc.

- Level 2 Decisions: Decisions in which the attractiveness representation is used on one or a few attributes only, leading to stereotypical mappings of alternatives (e.g. the lowest cost option is always the best). In this category no trade-offs between conflicting attractiveness values are made, and decisions are rather based on general emotions or affects, whereby the single alternatives are rapidly associated with positive or negative emotional associations (e.g. my public transport ride on the week-end was a disaster last time, I won’t try it again).
- Level 3 Decisions: In these decisions, no automatic link between the value system of the decision maker and the attractiveness of alternatives is made. Instead, the individual engages in systematic thinking about the trade-offs between attractiveness levels of different attributes (e.g. saving money but accepting an increase in travel time). Level 3 type decisions are the precursor for Level 1 or 2 decision patterns.
- Level 4 Decisions: The individual is faced with a new, unfamiliar problem for which alternative solutions have to be created first. Once a set of possible alternatives is established, a comparison of several attributes and trade-offs between their attractiveness levels are systematically explored, as on Level 3.

Because of the high prevalence of Level 1 and Level 2 behaviour patterns in transport, people do not engage each time in elaborate decisions about alternative mode choice. At these levels, environmental considerations are rarely evoked and do not influence the mode choice.

As a consequence, the promoters of community based social marketing recommend that, in addition to physical and economic factors, social and psychological factors influencing the decision process of travel behaviour must be addressed explicitly. With respect to the decision levels, a policy campaign focusing on unsustainable Level 1 or Level 2 decisions must attempt to “unfreeze” the habit by introducing the new problem / objective of sustainability as a social norm and should assist the individual in transferring the decision up to Level 4, where systematic re-consideration of alternative options can take place (Dahlstrand et al. 1997). Although this process requires effortful thinking, it is the only way that new pro-environmental behaviour patterns can be found that eventually may become the new habit. Thus, as explained by (Fujii et al. 2003) “*a habit would be formed after repeated engagements in a behaviour*” (Gärling et al. 2001; Ronis et al. 1998; Verplanken et al. 1997) and ... “*unfrozen by repeated engagements in alternative behaviours*” (Dahlstrand et al. 1997; Ronis et al. 1998).

According to a widespread opinion amongst TravelSmart implementers, only small alterations are needed that do not require a significant change in life style, like for example the reduction of two car trips per fortnight (Ampt 1999; Brög et al. 2002). However, social psychologists involved in community based social marketing warn that, although the visible modal change appears to be rather unspectacular, it is the underlying shift in the decision making process and the reduction of internal, psychological barriers that requires the individual to change substantially. They

remark that information campaigns without participative involvement components are not strong enough to produce these effects (McKenzie-Moor 2002).

Various research projects in the domain of public health, energy consumption, waste management etc. have shown that information-based campaigns, including the use of incentives, are, by and large, insufficient for stimulating behavioral change of lasting effect. For example, the meta-analytical research conducted by (Hines et al. 1987) shows that only 10% of variation in environmental behaviour can be explained by environmental related knowledge, and similar results in the domain of recycling have shown a somewhat closer relationship between knowledge and behaviour (29% of variance) but are still far from providing convincing evidence about the link between knowledge and pro-environmental behaviour (Hornik et al. 1995). (Tertoolen et al. 1998) observe even a negative impact of the simultaneous provision of environmental and economic information on pro-environmental travel behaviour, indicating the presence of reactance and cognitive dissonance effects triggered by a Travel Behaviour Change campaign itself. Moreover, even if attitudes towards sustainable transport modes such as walking, cycling and public transport are positive (Hodgson et al. 1997) and the desire to use such options is present, it appears that it is not the attitudes that need changing but social norms and efficacy beliefs (Jopson 2000). In a very recent example in New Zealand, an empirical investigation of the correlation between knowledge and awareness of environmental problems, environmental concerns and behaviour found that environmental knowledge and concerns did correlate to self-reported (relatively unspecified) financial contributions to environmental organizations but did not correlate to commuting behaviour and related emissions. According to the authors of this research, knowledge about and concern for the environment failed to translate into sustainable travel choice decisions (Thomas et al. forthcoming).

Based on this evidence, community based social marketing of pro-environmental behaviour as implemented in Travel Behaviour Change Programmes has to pay special attention to internal and external barriers, and should preferably work with participatory methods at various stages of a campaign (Gardner et al. 1996), in order to engage the target population in reconsidering habitual behaviour that needs to be changed in a sustainable direction.

4 TRAVEL BEHAVIOUR CHANGE AND ASPECTS OF SOCIAL PSYCHOLOGY

4.1 THE DETERMINANTS OF BEHAVIOUR CHANGE

Engaging people in reconsidering decisions with regards to habitual behaviour patterns requires an understanding of the underlying psychological processes that are involved when people are confronted with a persuasive communication, such as the request to participate in a Travel Behaviour Change program. With respect to receiving the necessary attention and penetrating the current belief structure of a target population, social psychology offers an impressive body of theoretical advances of what the driving factors of behaviour change might be. Based on social psychological literature spanning over the last four decades with regards to persuasion and attitude as well as behaviour change, the following tables attempt to present an overview of the different elements and theories. To structure this rich body of information, the communication and persuasion process is organized along the following stages as proposed by (McGuire 1968):

Attention → comprehension (communication + processing) → yielding → retention → action
--

In the **phase of message comprehension** (Figure 2), there are first the variables of the communication process itself, such as characteristics of the receptor, the source, the message (form and content), and the audience. During this stage, the different cognitive processing modes in which the receptor of a message does engage are of special importance. Eagly and Chaiken (1984) propose a distinction into three separate modes that may occur simultaneously and interact with each other (Eagly et al., 1993) namely

- the **cognitive response approach** engaging the receptor into issue-relevant systematic thinking (also described as “data driven” thinking),
- the **attributional reasoning approach**, in which the receptor tries to explain the message with causal interpretations relating alternatively to the communicator, to social norms or environmental conditions (also described as “theory driven” thinking), and
- the **heuristic processing mode**, whereby the recipient reacts according to simple schemas or decision rules that are triggered by distal⁶ persuasive cues of the message.

⁶ The term “distal” frequently used in social psychology means the opposite of proximal. The term “cue” signifies a signal that guides (or “cues”) behaviour (based on Reber, A., and Reber, E. (2001). *The Penguin Dictionary of Psychology*, Penguin Books, London, UK..

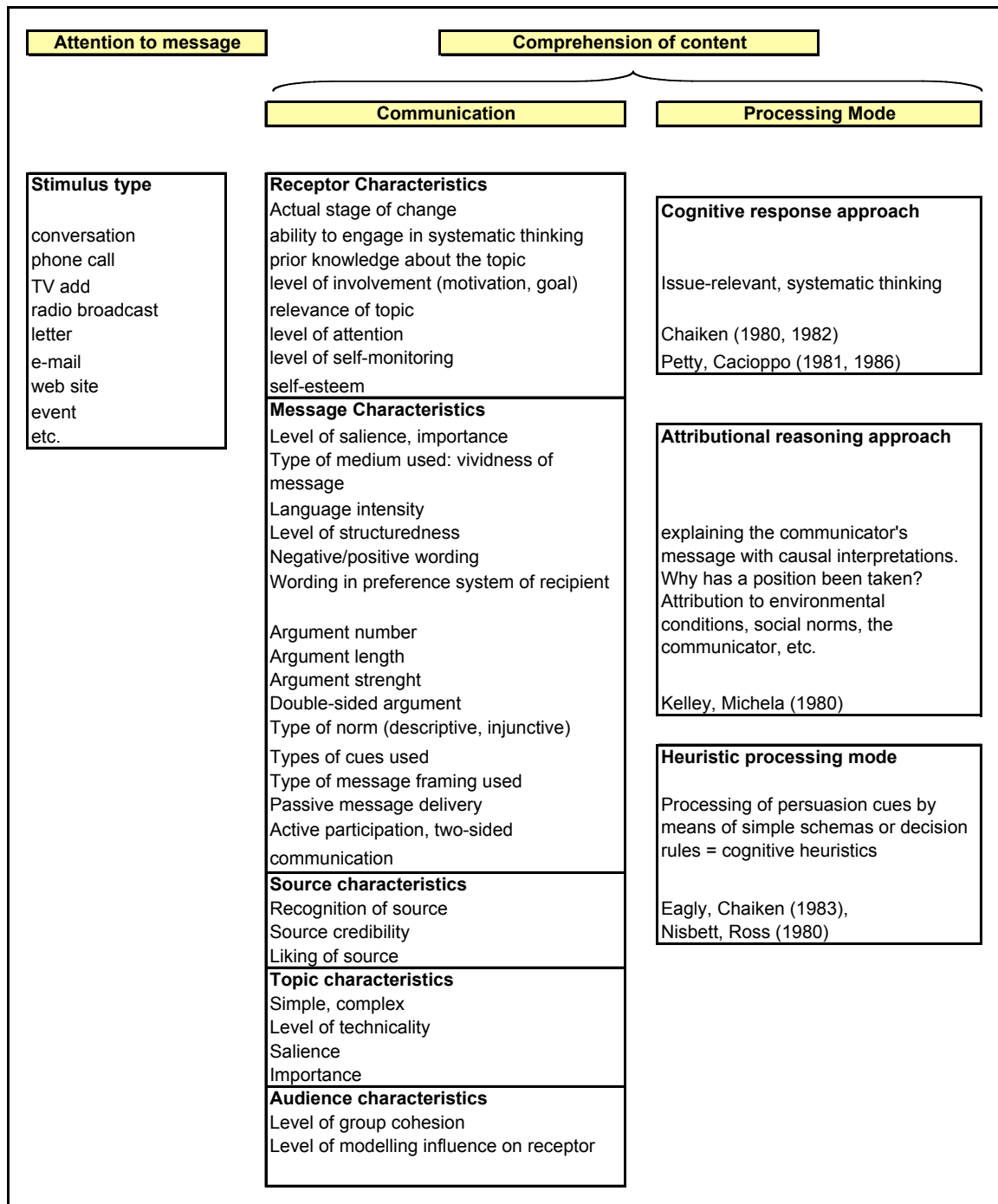


Figure 2 Elements relevant to the mechanism of persuasion

Note: For each theory of cognitive processing only a selection of the most prominent authors is presented in the table, e.g. (Chaiken 1980; Chaiken 1982; Chaiken et al. 1983; Petty et al. 1981), (Kelley et al. 1980) (Nisbett et al. 1980).

For the next phase of message **yielding and retention** (Figure 3), social psychology proposes a number of complementary theories that describe the manner in which the persuasive message is accepted or rejected and how it does or does not lead to attitudinal change and the formation of intentions and modified behaviour patterns.

The single theories are positioned at the level of the most closely corresponding cognitive processing modes, although this presentation is a somewhat arbitrary simplification. Firstly, the cognitive processing modes are not strictly separated categories but are rather evolving on a continuum (Eagly et al. 1984), and secondly,

under real conditions they often occur in parallel whereby different elements of the same communication process are thought about in different ways.

	Yielding	Retention	Action
	Accepting / rejecting of what has been understood to be the message	Attitudinal change, formation of intention	behavior change
Cognitive response approach			
	Theory of Planned Behavior Transtheoretical Model Social Judgement Theory Elaboration Likelihood Model of Persuasion Self-efficacy Theory Integration of internal and external determinants Forewarning and Inoculation Theory	Ajzen, Fishbein (1980), Ajzen (1991) Prochaska (1983, 1994), Sutton (1996), Prochaska, DiClemente (1983) Sherif C W et al. (1965), Greenberg et al. (1986), Levine et al. (1993) Petty, Cacioppo (1986) Bandura (1977) Guagnano, Stern, Dietz (1995) Petty, Cialdini (1979), Petty, Cacioppo (1979), McGuire (1965) Kahneman, Tversky (1979)	
	Prospect Theory Attribution Theory / fundamental attribution error, attribution bias Theory of Self-Perception Social Identity Theory	Weiner (1979, 1986, 1995) Bem (1972), Green, Cialdini (1997) Hoggs, Abrahams (1988), Hogg (1992)	
Attributional reasoning approach			
	Reinforcement Theory (conditioning, incentives) Theory of Reactance Theory of Cognitive Dissonance/Consistency Theory of Social Norm Focus Theory of Normative Conduct Modeling Theory Social Learning Theory Six principles of persuasion	Lott (1972), Lewicky (1985), Green, Cialdini (1997) Brehm (1966, 1976) Brehm&Brehm (1981) Festinger (1957), Scher, Cooper (1989), Fazio, Cooper (1984), Fazio (1990) Kerr (1995), Schultz (1999), Turner (1991) Cialdini, Reno, Kallgren (1990) Bandura (1973) Mies, Carey (1997), Bandura (1977) Cialdini (1993, 2001)	
Heuristic processing mode			

Figure 3 Theories relevant to the mechanisms of persuasion

Note: For each theory only a selection of the most prominent authors is presented in the table, e.g. (Ajzen 1991; Ajzen et al. 1980) (Bandura 1977) (Bem 1972) , (Brehm 1966; Brehm et al. 1981; Wicklund et al. 1976) , (Cialdini 1993; Cialdini 2001b), (Cialdini et al. 1998; Cialdini et al. 1990) , (Kahneman et al. 1979) (Prochaska et al. 1983) (Guagnano et al. 1995) (Cialdini et al. 1975; McGuire 1964; McGuire et al. 1965; Petty et al. 1986; Petty et al. 1979a; Petty et al. 1979b), (Cooper et al. 1984; Fazio 1990a) (Festinger 1957) (Scher et al. 1989) (Sherif C W et al. 1965), (Sutton 1996).

Given the impressive number of theoretical positions with regards to persuasive communication, it is impossible in to scrutinize the entire community based TravelSmart campaign for every single aspect in this paper.

As an example, taking the initial contact phone call of a community based TravelSmart initiative it can be demonstrated that a selection of theoretical propositions may be used to structure this particular piece of communication, in order to match the message closely to the recipient and thereby facilitating the recruitment at the very start of the intervention.

Trans-theoretical Theory

The trans-theoretical theory describes the different stages of behaviour change distinguishing the following phases: pre-contemplation, contemplation, preparation, action, maintenance (Fergusson et al. 1999).

During the phone call with the householder, it is important to assess at which stage of change the person actually finds themselves with regards to the persuasive message. A person who is in a pre-contemplation stage and has never considered a change in a given behaviour must be addressed in a different way than a person in a contemplation phase already considering change or a person in the preparation phase currently preparing conditions in order to make behaviour change happen (Fergusson et al. 1999).

Cognitive Processing Mode

During the phone conversation, it is important to recognise in which cognitive processing mode the receptor of the message proceeds. Topics of high personal involvement, where details are well understood, will be processed more likely in a central processing mode involving systematic thinking about the message arguments. Topics of low personal involvement that are not relevant to the recipient, and where details are not well known, will be more likely processed in a peripheral thinking mode. In the former case, proximal argument characteristics like argument strength and validity are important factors of the persuasion process, whereas in the latter case distal cues like argument number, likeability of the communicator, expected reaction from the audience, etc. are the more important influencing factors (Eagly et al. 1984).

Cognitive Dissonance and Reactance

A message which is directly asking for a behavioural change without investigating the needs, barriers and conditions of the recipient risks to be rejected for two reasons, which make a later acceptance difficult. If the target behaviour is not recognized as an injunctive social norm⁷ (a norm of "what ought to be done") but rather as a unjustified, unfair external constraint to current behaviour, the recipient of the persuasive message is likely to respond with reactance and refuses to respond positively to the message content (Brehm et al. 1981). In a second case, the target behaviour might be recognized as an injunctive norm, but the recipient notices a discrepancy between his/her own current behaviour and the norm, which is leading to a feeling of cognitive dissonance. To overcome this negative feeling, the individual can either opt for a change in his/her behaviour to bring it in line with the injunctive norm or he/she can downplay the strength and importance of the norm and keep his/her current behaviour pattern (Fazio 1990b; Festinger 1957).

Attribution Theory

When testing the validity of a persuasive message, the recipient considers different possible inferences or causal attributions based on "mini-theories" from previous experience. In the optimum case, the individual concludes that the content of the message is reflecting reality (external or entity attribution) instead of merely reflecting the biased viewpoint of the communicator. Thus, the message has to be crafted in a way that allows the recipient to assess and confirm the validity of its content, e.g. for example to come to the conclusion that an environmental problem does exist in

⁷ An injunctive norm has two main characteristics: a) it refers to rules or beliefs of morally approved and disapproved conduct, that is, it specifies what ought to be done, and b) it links the behaviour to promised social sanctions (see also Cialdini, R. B., Reno, R. R., and Kallgren, C. A. (1990). "A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places." *Journal of Personality and Social Psychology*, 58, 1015-1026.

reality and that behavioural adaptation is justified and necessary (Eagly et al. 1984; Kelley 1967; Kelley et al. 1980). With regards to his/her own position, the recipient can then decide to act accordingly and thereby learns to perceive him/herself as a person that is sensitive to and in favour of sustainability (Bem 1972; Cialdini et al. 1998). In addition to this “pro-sustainable” self-perception process, by asking a participant to get publicly involved in resolving a community based problem, the communicator can raise the self-perception of “involved citizenship” and “local expertise” in the recipient of the message.

Considering the internal barriers to pro-environmental behaviour in combination with psychological aspects of behaviour change, the following intermediate conclusions may be drawn: Daily transport matters are a relevant topic, either in the context of habitual, planned or spontaneous decisions. At some stage of the decision process, travel time, costs, accessibility, comfort, safety and other contextual factors are directly considered and shape the individual travel choice (Ortúzar et al. 2001). In contrast, the environmental impacts of one’s own travel behaviour are rarely taken into consideration. Certainly, there is some general knowledge about negative environmental impacts of motorized transport. But quite typical for the dilemma of common pools, although the benefit to the community might be considerable, the expected immediate benefits at an individual level are largely outweighed by the individual costs of changing towards a more pro-environmental behaviour (Gardner et al. 1996) – or at least, so it seems.

In such a case, the target population is expected to show on average a generally low personal involvement for the topic of sustainable transport and to have a rather fragmented knowledge about related details. When addressed about the topic without prior conditioning, the respondents thus are expected to engage in a peripheral rather than a central thinking mode.

The TravelSmart intervention therefore faces the problem that the peripheral thinking mode is insufficient for the cognitive processing mode needed for a Level 4 decision. However, that level of processing would be needed in order to analyse and understand problems thoroughly, and in order to seek appropriate alternatives.

The first goal at the start of TravelSmart is therefore, to “meet” people at their peripheral processing level and with the help of heuristics to affect their propensity to agree in participating in the policy intervention. Once participating, the TravelSmart program will ultimately lead the participants to a more systematic cognitive thinking process facilitated by an interactive communication process throughout the rest of the intervention. At that initial stage, the participants also have to be convinced of the validity of a newly established social norm (the necessity of sustainable transport patterns), which has to be accepted and adopted as new guiding rule.

In this situation, social psychology and communication science offer a number of tactics to the policy designer of TravelSmart, and similar social marketing interventions, that help to facilitate the yielding to the policy request. Although, since the late 1960’s, an impressive number of different taxonomies and strategy lists of various lengths have been brought forward⁸, the following chapter focuses on one particular selection of six principles of persuasion.

4.2 THE SIX PRINCIPLES OF PERSUASION

As suggested in Figure 4, the theoretical propositions regarding attitude and behaviour change share an interface with persuasion theories, indicating that the

⁸ For example Marwell & Schmitt’s (1967) taxonomy of 16 and Levine & Wheelless (1990) list of 53 compliance tactics.

processing mode of a recipient should be matched by the design of the persuasive request (Eagly et al. 1984; Petty et al. 1986; Petty et al. 1981). Thus, in addition to the attractiveness level of inherent attributes of a requested activity, a number of other psychological factors play a role in determining a person's propensity to agree to a request. In the social psychological literature six persuasion principles are reported that are regularly used as "heuristic rules" assisting people in their decision to yield or not to a request (Booth-Butterfield 2002; Cialdini 1993; Cialdini 2001b; Groves et al. 1992; Hobbs 2003; McKenzie-Moor et al. 1999; Rhoads 2002). These persuasion principles are of particular use in a situation of low personal involvement, where information is processed in a peripheral way because the individual has no special interest to engage in effortful thinking.

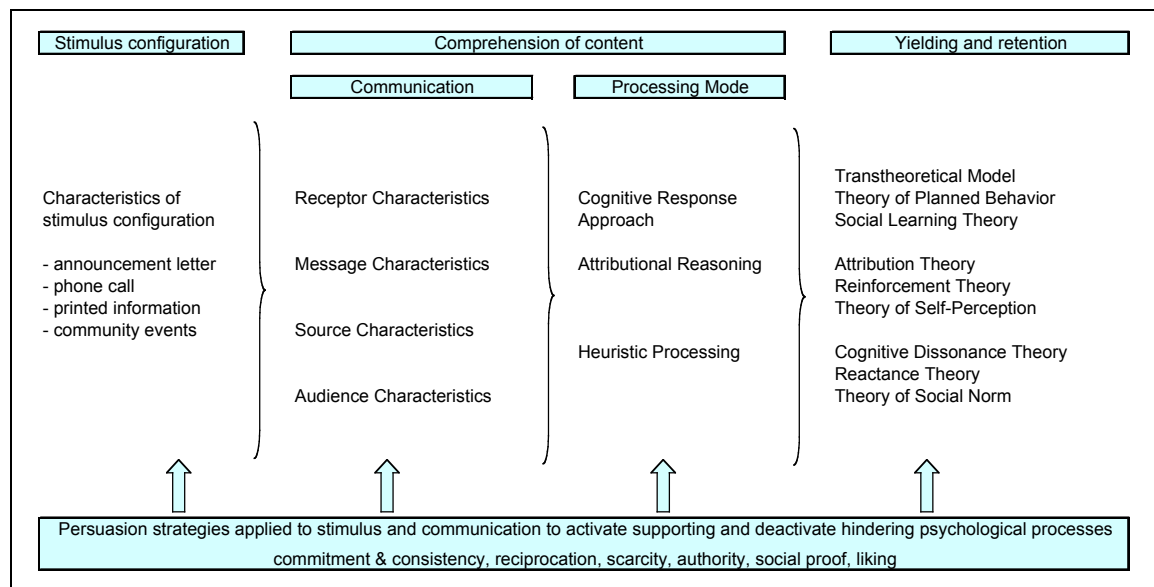


Figure 4 Applying the six principles of persuasion at different stages of a communication process

The following section presents the mechanism of each of the six principles, using examples from different areas, some of which are related to general common pool dilemma problems, voluntary engagement and altruistically motivated activities. The description of each of the principles ends with a possible application for the community-based TravelSmart design, currently being tested in the metropolitan area of Melbourne in various pilot projects.

Reciprocation: The principle of reciprocation is an injunctive⁹ norm (a norm of "what ought to be done") based on the deeply seated human need to establish strong social networks with perpetual and multiple forms of exchange (Gouldner 1960). It requires that an individual should repay in kind what another person has given to him. Violations of that norm trigger social sanctions, such as social exclusion or some other form of punishment for free-rider behaviour. According to Groves et al. (1992) "... people thus feel obligated to respond to positive behaviour received (e.g., gifts, favours, services, concessions) with positive behaviour in return". However, the authors point out that according to the theory of reactance (Brehm 1966) compliance

⁹ An injunctive norm has two main characteristics: a) it refers to rules or beliefs of morally approved and disapproved conduct, that is, it specifies what ought to be done, and b) it links the behaviour to promised social sanctions (see also Cialdini, R. B., Reno, R. R., and Kallgren, C. A. (1990). "A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places." *Journal of Personality and Social Psychology*, 58, 1015-1026.

is inhibited when the earlier behaviour received is not viewed as a genuine favour but rather as a bribe. Thus, according to empirical evidence the strategy requires that an incentive is given UPFRONT and UNCONDITIONAL, leaving the perception of a genuine favour and the voluntary character of successive decisions intact.

The reciprocation principle actually combines two norms: the obligation to receive, that is non-refusal of a gift, and the obligation to return a favour. For this reason, the mechanism of reciprocation is also effective from the very start of an interpersonal exchange. That is precisely the reason why this strategy is used when addressing a target population for the first time. For example many fund-raising institutions or conflict mediators adopt a “*benefactor-before-beggar*” strategy beginning the process with an upfront service or concession to the person being addressed (Cialdini 2001b).

A policy intervention aiming at changing peoples behaviour should include a service or gift of value to the target population to be handed out first, before the target population is asked to participate and engage in effortful tasks. For the community-based TravelSmart campaign, a local community guide could be placed at the very start of the intervention. Containing a lot of detailed information about local retailers, services, leisure activities and locations, this would be a valuable gift provided unconditionally and upfront. However, such a community guide would have to be presented in the appropriate way in order to prevent the recipients from mistaking it for “junk mail” (e.g. by listing medical services and other community services before the retailers).

Finally, for respondents who claim that external barriers prevent them from participating in TravelSmart, an additional form of reciprocation tactic could be used in the form of a concession: The initial (high) request to participate in TravelSmart would be lowered to an “easier” option of pro-environmental behaviour, for example the donation of a modest sum to a tree planting initiative to increase the carbon sinks from reforestation, as listed in the strategies of the Victorian Greenhouse Strategy and implemented by the non-governmental organisation *Greenfleet* commissioned by the Victorian Government (Action 8.3 of the Victorian Greenhouse Strategy) (Department of Natural Resources and Environment 2002b).

Commitment and consistency: The principle of commitment is narrowly linked to the desire to be, or at least appear to be, consistent. This urge to appear consistent is very strong because there are positive values of intellectual capacity, stability, logical reasoning and honesty attached to it (Festinger 1957). Also, the experience of the first commitment to a position may induce a change in self-perception (Bem 1972), which is confirmed by further action consistent with the commitment. Thus, once a freely chosen position has been taken by an individual, a tendency to act in line with the commitment will guide further actions. This tendency is even stronger when a person’s values are identified first and the communicator then is able to point out that the request is consistent with these values. The recipient of the message then has the opportunity to “own” the reason for accepting the request (Cialdini 2001a).

Hence, before the mechanism of consistency is activated, an initial commitment has to be generated in the target person. This combined commitment and consistency strategy known to social psychology thus operates the following way:

- A commitment strategy induces a statement or an action that will later lead the respondent into further compliance in order to be consistent.
- Even if the first commitment is very small, bigger requests later will still be accepted because of the consistency requirement.

For example, in a survey on voluntary community service, one of the questions asked the residents what their reaction would be if asked to participate as a volunteer in a three hour door-to-door fundraising action for the American Cancer Society. In this hypothetical context, a large number of respondents confirmed their willingness to volunteer because they did not want to appear as uncharitable. A few weeks later, when the American Cancer Society finally did recruit volunteers amongst the same target population, this small initial commitment created a huge positive response in the test group compared to the control group that had not undergone the first survey (Sherman 1980).

It is important to recognise that the first commitment has already an effect on how people perceive themselves. According to (Freedman et al. 1966) *“What may occur is a change in the person’s feeling about getting involved or taking action. Once he has agreed to a request, his attitude may change, he may become, in his own eyes the kind of person who does this sort of thing, who agrees to requests made by strangers, who takes action on things he believes in, who cooperates with good causes.”*

Also, this commitment-consistency mechanism have been reported to be self enforcing, especially when the commitments are written (Pardini et al. 1983-84; Werner et al. 1995) or made in public (McKenzie-Moor et al. 1999; Pallak et al. 1980) and have proven to be more effective than a superficial compliance to “carrot and stick” policies (incentives and disincentives) that are operating without commitment. Thus, in a policy intervention promoting the conservation of electricity and natural gas, Pallak et al. (1980) reported a much stronger increase in energy savings when a commitment was made publicly (e.g. by having one’s name published in the local newspaper) rather than privately. Interestingly, empirical evidence also reveals that the initial commitment does not have to be closely related to the exact nature of the final request (e.g. environmentally friendly travel behaviour), but that it is sufficient to relate it to a similar area of concern (pro-environmental behaviour in general or in an area other than transport) (Freedman et al. 1966).

For the TravelSmart being pilot tested in Victoria, the strategy of using a small initial commitment to induce further action consistent with the request has been used only marginally. A multitude of options are available, ranging from initial opinion surveys confirming the necessity of recycling, water saving, reduction of the use of plastic bags etc. to the signature of petitions to support specific pro-environmental communal policies.

Social proof: The principle of social proof states that beliefs, attitudes and actions of similar others are used as standards for one’s own beliefs, attitudes and behaviour (Festinger 1954). Also, the more uncertain a situation is, the higher is the propensity to engage in this process of social comparison and to search for information on how similar others are acting in a similar situation (Latané et al. 1970). According to this heuristic process of social validation, the willingness to comply with a request is increased when supported by the belief or evidence that similar peers comply with it as well.

For example, an experiment conducted in the domain of door-to-door fundraising for charity reported that the probability of soliciting donations was increased substantially when a list was presented of all the people living in the same area that had already made a contribution (Cialdini 2001a).

A very recent example of nature conservation demonstrates that social proof can operate in the unintended direction when applied wrongly. Because the Petrified Forest National Park in Arizona had been added to the list of America’s 10 most endangered national parks, park officials sought to run a campaign against the theft

of petrified wood pieces by the park's visitors. Thus, signage was installed that was intended to induce visitors to refrain from theft, reading:

"Your heritage is being vandalized every day by theft losses of petrified wood of 14 tons a year, mostly a small piece at a time"

However, this message seemed to increase theft substantially, because the visitors learned that the negative behaviour was in fact performed by many other visitors, as well – social proof from similar others (Cialdini et al. forthcoming). Later controlled experiments by a team of social psychologists from Arizona State University demonstrated that the descriptive norm that "many past visitors have preserved the environment by not taking away any petrified wood" was able to correct the unintended intervention outcome by establishing social proof in the "right" direction (Cialdini et al. forthcoming). For travel behaviour change initiatives, a reduction in uncertainty about modal options and wrong perceptions that people have (a view that is consistent with the initiators of IndiMark®), the promotion of modal alternatives to the car by similar peers or within peer-groups, and the support from many different community based stakeholder groups and associations, are some examples of how to use the principle of social proof.

Liking: The principle of liking states that people are increasingly inclined to follow a request brought forward by someone they like. Factors that enhance liking have found to be similarity of attitude (Byrne 1979), background (Stotland et al. 1961), physical attractiveness (Benson et al. 1976), dress (Suedfeld et al. 1971) and finally the use of praise (Drachman et al. 1978) and cooperation (Aronson et al. 1987). A request that is brought forward using one or more of these features in combination is more likely to generate compliance, especially when the heuristic processing mode is the dominant thinking mode of the message recipient.

In private sector marketing, the "Tupperware party" is a setting par excellence combining the different features mentioned above. The host of the party inviting all her friends - people of similar attitude who like each other, and the sale of the product is linked to a positive event, the party (Frenzen et al. 1990). Similar examples are the marketing strategy of connecting products with the Olympic Games or with national sports heroes.

The setting of the "Tupperware party" has been successfully applied for the promotion of pro-environmental behaviour, for example in the domain of energy savings. Such sessions, where groups of neighbours meet at a friend's home for a demonstration of technical energy saving forms by a professional, proved to be especially encouraging for women who initially believed that weatherization of their home was too technical to accomplish on their own (Gardner et al. 1996). Recent Australian examples in the domain of land care have proven to successfully use the "Tupperware Party" model for on-site demonstrations of land care, whereby a farmer invites professional peers to a demonstration by an official advisor on his property (Goulburn Broken Catchment Management Authority 2002; Jelinek 2003). With that evidence in mind, a TravelSmart intervention should carefully select facilitators that are highly esteemed or liked by the target population and attempt to induce the Level 4 thinking process in a peer group setting (Green Transport Plan for the neighbourhood, for the Church group, etc.).

Authority: The principle of authority states that when making a decision it is a common strategy to seek expert advice from an acknowledged source, for example medical, legal, financial or any other professional expertise (Bushman 1984), or to comply with the rules of a properly constituted authority (Groves et al. 1992). Interestingly, the external appearance of authority represented by specific symbols such as a uniform, a professional title, etc. is often sufficient to establish expert appearance (Bickman 1974; Milgram 1974). Hence, the probability of compliance is

increased for a request brought forward by a source whose authority is perceived to be legitimate. The credibility of the source is thus an important feature of the persuasive communication (Eagly et al. 1975), as was demonstrated in an experiment promoting energy conservation. Two groups of households of the study area received the same pamphlet on energy conservation either in an envelope of the State Regulatory Agency or in an envelope of the local utility. The response to the request of the State Regulatory Agency that was known to be the more credible source from prior research, proved to be more effective than the request from the local utility (Craig et al. 1978).

In TravelSmart it is of capital importance to involve mobility councillors that are familiar with the local conditions and that are able to efficiently support the individual in finding new solutions. A creative version of the authority principle is the home-visits of bus drivers (as applied in the IndiMark® program), who explain the local public transport options to the participants.

Scarcity: The principle of scarcity reflects the fact that as opportunities become more scarce they are perceived as more valuable (Mazis 1975; Worchel et al. 1975). This perception is based on the experience that valuable things are normally rare and that under these conditions hesitating to make a choice may result in a loss of future opportunities. In addition, the prospect theory of Kahneman et al. (1979) states that risk perception is non-linear and exponentially increases with perceived severity of outcome. For these reasons, social psychology recommends the use of negative message framing for the promotion of pro-environmental behaviour (Davis 1995; McKenzie-Moor 2002), and to emphasise losses which occur as a result of inaction rather than savings as a result of taking action.

For example, Yates (1982) was able to demonstrate in a study on energy conservation that a positive message frame was less efficient than a negative one. The response to the program was much stronger in those households who were told “how much money they would lose without the insulation” than in those households who were informed about possible savings. This strategy might also be adopted for community based TravelSmart, for example on an individual level by demonstrating the loss in money and time spent on travelling and the loss in opportunities for physical activity when travel patterns remain unchanged. On a community level, the loss in neighbourhood quality and a pollution and noise free environment would be the negative message framing.

5 CONCLUSION

Travel behaviour change policies are faced with the two challenges of introducing a social norm for sustainable behaviour and of “unfreezing” unsustainable behaviour patterns in order to neutralize the “dilemma of the common pool”. Reviewing a number of concepts from social psychology, the six principles of persuasion seem to offer a framework, which appears highly relevant in the context of Travel Behaviour Change.

In a situation of low personal involvement where the dominating thinking mode is heuristic, the six principles of **Reciprocation**, **Commitment/Consistency**, **Social Proof**, **Liking**, **Authority** and **Scarcity** may be systematically translated into practical tactics of a policy intervention in order to enhance the effect of its persuasive power. Also, although this is not the principal focus of this paper, in a multi-cultural society like the metropolitan area of Melbourne, it will be interesting to see how different ethnicities respond to specific persuasion elements of a

TravelSmart intervention. Relatively unexplored, this topic gains increased attention in community-based social sector marketing (Nisbett 2003; Wosinska et al. 2001).

In general, the use of the principles of persuasion is in the long run only successful when used in an ethically acceptable manner. That means that there has to be genuine expertise to deploy the authority principle, a true will in finding similar interests and common goals on which partnerships can be established, and last but not least, an initial starting point of reciprocation must contain a genuine “good deal” for the receiver. Like for any policy evaluation, it is therefore a basic prerequisite to properly identify the costs and benefits of a policy to different stakeholders, in order to avoid keeping the target populations of a policy in doubt. Violating the rules of fairness by using the six persuasion principles in an unethical way may only lead to short-term success. Once a scam is discovered, people will lose trust, interest and confidence and will no longer be motivated to comply with a request to change behaviour.

6 REFERENCES

- Ajzen, I. (1991). "The theory of planned behavior." *Organizational behavior and human decision processes*, 50, 179-211.
- Ajzen, I., and Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*, Prentice-Hall, Englewood Cliffs, NJ.
- Ampt, E. (1999). "From Travel Blending to Living Neighbourhoods - A vision for the future." *Australasian Transport Research Forum ATRF*, 23(Part 2), 579-589.
- Ampt, E., and Rose, G. "Behavioural impacts of the "Travel Blending®" Programme." *International Association for Travel Behavior Research (IATBR) Conference, July 2-7, 2000*, Gold Coast, Queensland, ITS-WP-2000.
- Aronson, E. D., Bridgeman, D. L., and Geffner, R. (1987). "Inter-dependent interactions and pro-social behavior." *Journal of Research and Development in Educations*, 12, 16-27.
- Bandura, A. (1977). *Social Learning Theory*, Prentice Hall, Englewood Cliffs, NJ.
- Bem, D. J. (1972). "Self-Perception theory." *Advances in experimental social psychology*, 6, 1-62.
- Benson, P. L., Karabenic, S. A., and Lerner, R. M. (1976). "Pretty pleases: The effect of physical attractiveness on race, sex, and receiving help." *Journal of Experimental Psychology*, 12, 409-15.
- Bickman, L. (1974). "The social power of a uniform." *Journal of Applied Social Psychology*, 4, 47-61.
- Booth-Butterfield, S. (2002). "Steve's Primer on Practical Influence." Booth-Butterfield, S.
- Brehm, J. (1966). *A theory of psychological reactance*, Academic Press, New York.
- Brehm, S. S., and Brehm, J. W. (1981). *Psychological reactance: A theory of freedom and control*, Academic Press, New York.
- Brög, W., Erl, E., Funke, S., and James, B. (1999). "Potential for increased public transport, cycling and walking trips." *23rd Australasian Transport Research Forum*, 23(1), 287-301.
- Brög, W., Erl, E., and Mense, N. "Individualised Marketing. Changing travel behaviour for a better environment." *OECD Workshop: Environmentally Sustainable Transport*, Berlin, Germany.
- Brög, W., and Grey-Smith, H. "Individualisiertes Marketing - Der homöopatische Weg zur Förderung einer nachhaltigen Mobilität." *Soft Policy Measures in Transport Policy; Instruments, Applications and Effects*, Berlin, Germany.
- BTCE, B. f. T., and EPA. (1994). "Victorian Transport Externality Study; 1. The Costing and Costs of Transport Externalities in Selected Countries: A Review." Environmental Protection Authority, Victoria, Melbourne.
- Bureau for Transport and Communications Economics, B. (1995). *Greenhouse gas emissions from Australian transport, long-term projections*, Australian Government Publishing Service, Canberra.
- Bushman, B. J. (1984). "Perceived symbols of authority and their influence on compliance." *Journal of Applied Social Psychology*, 14, 501-508.
- Byrne, D. (1979). *The attraction paradigm*, Academic Press, New York.
- Chaiken, S. (1980). "Heuristic versus systematic information processing and the use of source versus message cues in persuasion." *Journal of Personality and Social Psychology*, 39(752-766).
- Chaiken, S. "The heuristic/systematic processing distinction in persuasion." *Symposium on Automatic Processing*, Nashville IN.

- Chaiken, S., and Eagly, A. H. (1983). "Communication modality as a determinant of persuasion: The role of communicator salience." *Journal of Personality and Social Psychology*, 45, 241-256.
- Cialdini, R. B. (1993). *Influence: Science and practice.*, Harper Collins, New York.
- Cialdini, R. B. (2001a). "Harnessing the science of persuasion." *Harvard Business Review*, 79(15), 71-80.
- Cialdini, R. B. (2001b). *Influence: Science and practice*, Allyn & Bacon, Needham Heights, MA.
- Cialdini, R. B., Barrett, D. W., Bator, R., Demaine, L. J., Sagarin, B. J., Kelton, L. V. R., and Winter, P. L. (forthcoming). "Activating and aligning social norms for persuasive impact."
- Cialdini, R. B., Green, B. L., Rhoads, K., and Bator, R. (1998). "Undermining the undermining effect of reward on sustained interest." *Journal of Applied Social Psychology*, 28(3), 249-263.
- Cialdini, R. B., Levy, A., and Petty, R. E. (1975). "Elastic shifts of opinion: determinants of direction and durability." *Journal of Personality and Social Psychology*, 34(4), 663-672.
- Cialdini, R. B., Reno, R. R., and Kallgren, C. A. (1990). "A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places." *Journal of Personality and Social Psychology*, 58, 1015-1026.
- Coase, R. (1960). "The problem of social cost." *Journal of Law and Economics*, 3, 1-44.
- Cooper, J., and Fazio, R. (1984). "A new look at dissonance theory." *Advances in experimental social psychology*, 17, 229-266.
- Craig, C. S., and McCann, J. M. (1978). "Assessing communication effects on energy conservation." *Journal of Consumer Research*, 5, 82-88.
- Dahlstrand, U., and Biel, A. (1997). "Pro-environmental habit: Propensity levels in behavioral change." *Journal of Applied Social Psychology*, 27(558-601).
- Davis, J. J. (1995). "The effects of message framing on response to environmental communications." *Journalism and Mass Communication Quarterly*, 72, 285-299.
- Department for Transport, U. (2002). "A review of the effectiveness of personalised Journey Planning Techniques." Department for Transport, UK.
- Department of Infrastructure, D. (2002). "Metropolitan Strategy 2030." Department of Infrastructure.
- Department of Natural Resources and Environment, D. (2002a). "Victorian Greenhouse Gas Inventory 1999." Government of Victoria.
- Department of Natural Resources and Environment, D. (2002b). "Victorian Greenhouse Strategy." Department of Natural Resources and Environment.
- Drachman, D., deCarufel, A., and Insko, C. A. (1978). "The extra credit effect in interpersonal attraction." *Journal of Experimental Social Psychology*, 14, 458-67.
- Eagly, A. H., and Chaiken, S. (1975). "An attributional analysis of the effect of communicator characteristics on opinion change: The case of communicator attractiveness." *Journal of Personality and Social Psychology*, 32, 136-144.
- Eagly, A. H., and Chaiken, S. (1984). "Cognitive Theories of Persuasion." *Advances in experimental social psychology*, 17, 267-359.
- Eagly, A.H., and Chaiken, S. (1993). "The psychology of attitudes." Harcourt Brace Jovanovich College Publishers. Fort Worth TX
- European Commission, (2002). "Transport Research Programme Knowledge Centre." The European Commission.
- Fazio, R. (1990a). "Multiple processes by which attitudes guide behavior: the mode model as an integrative framework." *Advances in experimental social psychology*, 23, 75-109.

- Fazio, R. (1990b). "Multiple processes by which attitudes guide behavior: the mode model as an integrative framework." *Advances in experimental social psychology*, 23(75-109).
- Fergusson, M., Davis, A., and Skinner, I. (1999). "Delivering changes in travel behaviour: Lessons from health promotion." International for European Environmental Policy, London.
- Festinger, L. (1954). "A theory of social comparison processes." *Human Relations*, 7, 117-40.
- Festinger, L. (1957). *A theory of cognitive dissonance*, Stanford University Press, Stanford, CA.
- Freedman, J. L., and Fraser, S. C. (1966). "Compliance without pressure: The foot-in-the-door technique." *Journal of Personality and Social Psychology*, 4, 195-203.
- Frenzen, J., and Davis, H. (1990). "Purchasing behaviour in embedded markets." *Journal of Consumer Research*, 17(1), 1-12.
- Fujii, S., and Kitamura, R. (2003). "What does a one-month free bus ticket do to habitual drivers? An experimental analysis of habit and attitude change." *Transportation*, 30, 81-95.
- Gardner, G. T., and Stern, P. C. (1996). *Environmental problems and human behavior*, Allyn and Bacon, Boston.
- Gärling, T. (1992). "The importance of routines for the performance of everyday activities." *Scandinavian Journal of Psychology*, 19(41-80).
- Gärling, T., Fujii, S., and Boe, O. (2001). "Empirical tests of a model of determinants of script-based driving choice." *Transportation Research Part F*, 4, 89-102.
- Gärling, T., and Sandberg, L. (1997). "A commons-dilemma approach to households' intention to change their travel behaviour." *Understanding Travel Behaviour in an Era of Change*, P. Stopher and M. Lee-Gosselin, eds., Pergamon / Elsevier Science Ltd., Oxford, UK.
- Goulburn Broken Catchment Management Authority, G. (2002). "Annual Report 2001/2002." Goulburn Broken Catchment Management Authority, Shepparton, Australia.
- Gouldner, A. W. (1960). "The norm of reciprocity: A preliminary statement." *American Sociological Review*, 25, 161-78.
- Groves, R. M., Cialdini, R. B., and Couper, M. P. (1992). "Understanding the decision to participate in a survey." *Public Opinion Quarterly*, 56(4), 475-495.
- Guagnano, G. A., Stern, P. C., and Dietz, T. (1995). "Influences on attitude-behavior relationships. A natural experiment with curbside recycling." *Environment and Behavior*, 27(5), 699-808.
- Hardin, G. (1968). "The tragedy of the commons." *Science*, 162, 1243-1248.
- Hines, J. M., Hungerford, H. R., and Tomera, A. N. (1987). "Analysis and synthesis of research on responsible environmental behaviour: A meta-analysis." *Journal of Environmental Education*, 18(2), 1-8.
- Hobbs, T. (2003). "Influence website."
- Hodgson, F., May, T., and Tight, M. (1997). "Evaluation of the MIST travel awareness campaign." *Traffic Engineering and Control*, 655-659.
- Hornik, J., Cherian, J., Madansky, M., and Narayana, C. (1995). "Determinants of recycling behavior: A synthesis of research results." *Journal of Socio-Economics*, 24(3), 105-127.
- Infras/IWW. (2000). *External Costs of Transports - Accidents, Environmental and Congestion Costs in Western Europe*, Union Internationale des Chemins de Fer UIR, Brussels.
- Jelinek, A. (2003). "Raising the bar for natural resources in periurban areas." Goulburn Broken Catchment Management Authority, Shepparton, Australia.
- Johansson, P.-O. (1991). *An introduction to modern welfare economics*, University Press, Cambridge.

- Jopson, A. F. (2000). "Can psychology help to reduce car use?" Institute for Transport Studies, University Leeds, Leeds, UK.
- Kahneman, D., and Tversky, A. (1979). "Prospect Theory: An analysis of decision under risk." *Econometrica*, 4 and 47, 362-377 and 263-291.
- Kelley, H. H. (1967). *Attribution theory in social psychology*, University of Nebraska Press, Lincoln, NE.
- Kelley, H. H., and Michela, J. L. (1980). "Attribution theory and research." *Annual Review of Psychology*, 31, 457-501.
- Komorita, S. S., and Parks, C. D. (1994). *Social Dilemmas*, Brown and Benchmark., Madison, WI.
- Latané, B., and Darley, J. M. (1970). *The unresponsive bystander: why doesn't he help?*, Appleton-Century-Crofts, New York.
- Mazis, M. B. (1975). "Antipollution measures and psychological reactance theory: a field experiment." *Journal of Personality and Social Psychology*, 31, 654-66.
- McGuire, W. J. (1964). "Inducing resistance to persuasion. Some contemporary approaches." *Advances in experimental social psychology*, 1, 191-229.
- McGuire, W. J. (1968). "Personality and attitude change: An information-processing theory." Psychological foundations of attitudes, A. G. Greenwald, T. C. Brock, and T. M. Ostrom, eds., Academic Press, New York.
- McGuire, W. J., and S, M. (1965). "Anticipatory belief lowering following forewarning of a persuasive attack." *Journal of Personality and Social Psychology*, 2(471-479).
- McKenzie-Moor, D. (2002). "Guide to community-based social marketing." McKenzie-Mohr.
- McKenzie-Moor, D., and Smith, W. (1999). *Fostering sustainable behavior: An introduction to community-based social marketing*, New Society Publishers, Gabriola Islands, B.C.
- McRobert, J. (1997). "Greenhouse emissions and road transport." *Research Report ARR 291*, ARRB Transport Research Ltd., Vermont South, VIC.
- Milgram, S. (1974). *Obedience to authority*, Harper & Row, New York.
- Müller, G. "Quality Assurance in Mobility Management: Regarding Structure, Processes and Results." *ECOMM 2001*, Rome.
- Müller, G. "The role of mobility management in urban transport policy - results of the MOST project." *ACCESS Convergence*, Barcelona, 26-27 November 2002.
- Nisbett, R. (2003). *The geography of thought. How Asians and Westerners think differently ... and why.*, The Free Press/ Simon & Schuster Inc., New York, NY.
- Nisbett, R., and Ross, L. (1980). *Human inferences: Strategies and shortcomings of social judgment*, Prentice-Hall, Englewood Cliffs, NJ.
- Ortúzar, J. d. D., and Willumsen, L. G. (2001). *Modelling Transport*, J Wiley, Chichester New York.
- Pallak, M. S., Cook, D. A., and Sullivan, J. J. (1980). "Commitment and energy conservation." *Applied social psychology annual*, L. Bickman, ed., Sage, Beverly Hills, CA, 235-253.
- Pardini, A. U., and Katzev, R. D. (1983-84). "The effects of strength of commitment on newspaper recycling." *Journal of Environmental Systems*, 13, 245-254.
- Petty, R. E., and Cacioppo, I. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*, Springer New York Inc., New York.
- Petty, R. E., and Cacioppo, J. T. (1979a). "The effects of forewarning of persuasive intent and involvement on cognitive responses and persuasion." *Personality and Social Psychology Bulletin*, 5, 173-176.
- Petty, R. E., and Cacioppo, J. T. (1979b). "Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses." *Journal of Personality and Social Psychology*, 37, 1915-1926.

- Petty, R. E., and Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches.*, Wm. C. Brown, 1981, Dubuque.
- Pigou, A. C. (1932). *The economics of welfare*, Macmillan, New York.
- Prochaska, J. O., and DiClemente, C. C. (1983). "Stages and processes of self-change of smoking: toward an integrative model of change." *Journal of Consulting and Clinical Psychology*, 51(3), 390-395.
- Reber, A., and Reber, E. (2001). *The Penguin Dictionary of Psychology*, Penguin Books, London, UK.
- Rhoads, K. L. V. (2002). "Working psychology."
- Ronis, D. L., F, Y. J., and Kritsch, J. P. (1998). "Attitudes, decisions, and habits as determinants of repeated behaviour." Attitude structure and function, A. R. Pratkanis, S. J. Beckler, and A. G. Greenwald, eds., Erlbaum, Hillsdale, JN, 213-239.
- Rose, G., and Ampt, E. (2001). "Travel Blending®: An Australian travel awareness initiative." *Transportation Research Part D*, 6(2), 95-110.
- Rose, G., and Ampt, E. (forthcoming). "Travel Behaviour Change through individual engagement." Handbook of Transport and Environment, K. J. Button and D. Hensher, eds., Pergamon Press/Elsevier, Amsterdam, NL, 95-110.
- Scher, S. J., and Cooper, J. (1989). "The motivational asis of dissonance: The singular role of behavioral consequences." *Journal of Personality and Social Psychology*, 56, 899-906.
- Sherif C W, Serif M, and R, N. (1965). *Attitude and attitude change: The social judgment-involvement approach*, Saunders, Philadelphia.
- Sherman, S. J. (1980). "On the self-erasing nature of errors of prediction." *Journal of Personality and Social Psychology*, 39, 211-21.
- Sommer, R., and Neuenschwander, R. (1996). "Monetarization of the external health costs attributable to transport. Consolidated report." ECOPLAN, on behalf of the Bureau for Transport Studies, GVF-Report Nr. 272, Federal Department of Environment, Transport, Energy and Communications, Bern, Switzerland.
- Steer Davies Gleave, S. (2002). *Travel Demand Management: A Resource Book*, Austroads, AP-G67/02, Melbourne.
- Steg, L. (1996). "Gedragsverandering ter vermindering van het autogebruik (engl. Behaviour change for reducing car use)," Doctoral Thesis, Uijksuniversiteit Groningen, Groningen.
- Stotland, E., and Patchen, M. (1961). "Identification and change in prejudice and authoritarianism." *Journal of Abnormal and Social Psychology*, 62, 250-56.
- Suedfeld, P., Bochner, S., and Matas, C. (1971). "Petitioner's attire and petition signin by peace demonstrations: a field experiment." *Journal of Applied Social Psychology*, 1, 278-83.
- Sutton, S. (1996). "Can 'stages of change' provide guidance in the treatment of addictions? A critical examination of Prochaska and DiClemente's model." Psychotherapy, psychological treatments and the addictions, G. Edwards and C. Dare, eds., Cambridge University Press, Cambridge.
- Svenson, O. (1990). "Some propositions for the classification of decision situations." Contemporary issues in decision making, Borscherding, Larichev, and Messick, eds., Elsevier Science Publishers, Oxford.
- Tertoolen, G., Van Kreveld, D., and Verstraten, B. (1998). "Psychological resistance against attempts to reduce private car use." *Transportation Research Part A*, 32(3), 171-181.
- Thomas, J. A., Walton, D., and Dravitzky, V. K. (forthcoming). "The relationship between emissions knowledge, environmental concern and behaviour." Optus International Consultants, Central Laboratories, Wellington, NZ.
- Tsolakis, D., Lester, C., and Seethaler, R. (2001). "Valuing Environmental and Other Externalities." ARRB CR 1556, Melbourne.

- United Nations Environment Programme, U., Environment Protection Authority Victoria, and Initiatives, I. C. f. L. E. (2002). *Melbourne Principles for Sustainable Cities*, International Environmental Technology Centre, UNEP, Melbourne.
- Verplanken, B., Aarts, H., and Van Knippenberg, A. (1997). "Habit, information acquisition, and the process of making travel mode choice." *European Journal of Social Psychology*, 27, 539-560.
- Weimann, J. (1990). *Umweltökonomik. Eine theorieorientierte Einführung. (engl. Environmental economics: a theory oriented introduction)*, Springer-Verlag, Berlin.
- Werner, C. M., Turner, J., Shipman, K., and Twitchell, F. S. (1995). "Commitment, behavior, and attitude change: An analysis of voluntary recycling. Special Issue: Treen psychology." *Journal of Environmental Psychology*, 15(197-208).
- Wicklund, R. A., and Brehm, J. (1976). *Perspectives on cognitive dissonance*, Erlbaum, Hillsdale, NJ.
- Wilhelm, A., and Posch, K.-H. "Mobility management - the further development of transport demand management (TDM) in Europe: Strategies for the next decades. Findings and recommendations from the largest European Mobility Management project MOST." *presented at 82nd TRB Annual Meeting*, Washington.
- Worchel, S., Lee, J., and Adewole, A. (1975). "Effects of supply and demand on ratings of object value." *Journal of Personality and Social Psychology*, 32, 906-14.
- World Health Organisation, W. (1999). "WHO Charter on transport, environment and health." WHO Ministerial Conference "Environment and Health".
- Wosinska, W., Cialdini, R. B., Barrett, D. W., and Reykowski, J. (2001). *The practice of social influence in multiple cultures*, Lawrence Erlbaum Associates, Inc., Mahwah, NJ.
- Yates, S. (1982). "Using prospect theory to create persuasive communications about solar water heaters and insulation. Unpublished doctoral dissertation.," University of California, Santa Cruz, CA.