

# A REVIEW OF MASS MEDIA CAMPAIGNS IN ROAD SAFETY

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**A Review Of Mass Media Campaigns in Road Safety**

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**Abstract:**

This report investigates the effectiveness of road safety public information campaigns conducted through the mass media. The differing roles of publicity in the fields of brand advertising and public health promotion are identified and discussed in the context of theories of behaviour change. A number of widely used micro level models of social persuasion are presented and the prior use of such models in the development of mass media campaigns is discussed. The discussion of successful public health campaigns conducted outside the field of road safety in Australia introduces the examination of key elements of mass media campaigns conducted in a public health setting. The type of appeal used (rational/emotional/fear), the use of supporting activities (such as enforcement or incentive) and the duration, intensity, timing and exposure of media placement are identified as key variables in the effectiveness of mass media campaigns. Two international meta-analyses examining the effectiveness of road safety mass media campaigns and a number of individual evaluations are used to assist in the identification of best practice in the field of road safety mass media campaigns. It is concluded that persuasive or emotional campaigns are more effective than rational or informational style campaigns. Furthermore, the use of theoretical models to guide campaign development, and the use of public relations and associated publicity, are also associated with more effective campaigns.

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**Key Words:**

Mass media, road safety, advertising.

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# Preface

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# SAMMANFATTNING

Kampanjer i massmediala riktade åt att förbättra trafikanters beteende är ett vanligt inslag i många trafiksäkerhetskampanjer. Den här rapporten studerar, från ett antal olika perspektiv, den omfattande internationella litteratur som behandlar trafiksäkerhetskampanjer i massmedia.

## TEORIER OM FÖRÄNDRING AV BETEENDE

Hälsokampanjer innefattar vanligtvis försök till att uppmana personer att förändra sitt beteende och av stor vikt för dessa kampanjer är sambandet mellan attityder och beteende. I litteraturen råder delade meningar om huruvida kampanjer i massmedia ändrar beteendet och därefter attityderna eller om attityden förändras och därefter beteendet. Vidare så är trafiksäkerhetskampanjer i massmedia ofta kombinerade med någon form av övervakning, vilket ytterligare försvårar sambandet mellan påverkansfaktorerna. För att klargöra de förändringar som sker i attityd och beteende (utan att ta hänsyn till i vilken ordning dessa processer sker) så har ett antal modeller granskats.

Teorierna fokuserar på att förändra kunskapsnivån, attityder och/eller beteende. De är ibland beskrivna som sociala påverkansmodeller, och de är särskilt användbara för kampanjer riktade mot trafiksäkerhet.

- Theory of Reasoned Action
- Theory of Planned Behaviour
- Health Belief Model
- Social Learning / Cognitive Theory
- Roger's Protection Motivation Theory
- Risk Communication/Fear Appeals
- Extended Parallel Process Model
- General Deterrence Theory

De studerade teorierna har använts på ett antal olika beteenden med varierande resultat. Olika teorier visade sig vara mer tillämpbara på vissa beteenden. Forskning har visat att det är effektivt att utforma kampanjerna med avseende på de bakomliggande teorierna eftersom det hjälper att behålla fokus på de faktorer som styr beteende, och därmed blir kampanjen troligtvis mer effektiv. Bland de studerade teorierna visade sig Roger's Protection Motivation Theory och Extended Parallel Process Model, där bägge använder sig av koncept som stimulerande av rädsla, bemästrande av respons och självkänsla, vara mest gångbara för trafiksäkerhetskampanjer. General Deterrence Theory visade sig också vara användbar med avseende på dess specifika tillämpningar inom trafiksäkerhetsområdet, bl.a. för övervakning. Vidare har kampanjer som använder sig av stimulerande av rädsla visat sig vara effektiva, men, mera arbete krävs för att operationalisera mått på rädsla så att optimala nivåer kan identifieras.

Kampanjer i massmedia inom andra områden än trafiksäkerhet har studerats, framförallt rökning och solning. Två kampanjer mot rökning studerades där den första använde sig av ett informerande angreppssätt. Det visade sig dock vid utvärderingen att den hade misslyckats med att få respondenterna att sluta röka. Respondenterna indikerade också att de föredrog kampanjer som emotionellt vädjade till deras rädsla och på så sätt försökte avskräcka dem. Den andra kampanjen använde sig av ett angreppssätt som stimulerade rädsla och vid utvärderingen visade det sig vara ett effektivt sätt att övertyga rökare att

sluta och för att de som redan hade slutat skulle förbli rökfria. En kampanj som försökte förbättra solningsbeteendet utvärderades också. Kampanjen visade sig vara effektiv i att förändra beteendet över en treårsperiod. I och med att kampanjen inte beskrev riskerna med solning så kan man hävda att de mekanismer i kampanjen som ledde till ett förändrat beteende var en ändring av normen för solbadande och förändringen uppnåddes med hjälp av förebilder.

Sammanfattningsvis är det tydligt att de olika teorierna är användbara för olika typer av beteenden och olika kampanjer. Variabler associerade med hälsoproblem såsom närhet, sannolikhet, allvarlighetsgrad och mottaglighet spelar alla en viktig roll. Vidare så kommer viktningen av variablerna att variera beroende på vilket beteende som berörs. Därför kommer framgången av applicerandet av teorin bero på hur väl den passar med kampanjens mål, som i sin tur skall härröra från en noggrann bedömning av det beteende som man söker påverka. Fler karakteristika av kampanjer i massmedia kommer att diskuteras i nästa stycke.

## **KARAKTERISTIKA AV KAMPANJER I MASSMEDIA**

Det finns en stor mängd frågor relaterade till den strategiska utformningen av kampanjer i massmedia, och dessa har betydelse för kampanjens kostnadseffektivitet. De olika delar som ingår spänner över det beteende och den målgrupp man söker påverka, budskap och kampanjutformning, koppling till tillgängliga medel för påverkan och lagstiftning, samt genomförande.

De frågor som rör den rättsliga statusen för beteendet man söker påverka, och all den övervakning associerad därtill, tillför ytterligare komplexitet till både utveckling och utvärdering av kampanjen. Målgruppen behöver också identifieras noga genom att ta hänsyn till alla inblandade faktorer, och inte enbart de rättsliga frågorna utan även på beteendets natur och hur det definieras. När väl beteendet har identifierats så kan kampanjens form och budskap börja utvecklas. En av de grundläggande frågorna vad gäller utformningen av kampanjen är val av media vilket kan omfatta TV, radio, tidningar, bioreklam och broschyrer. Generellt sett så har TV ansetts vara det mest slagkraftiga mediet.

En annan viktig fråga rör kampanjens verkställande vilket omfattar frågor som kampanjens längd, intensitet, timing och exponering. För kampanjkaraktistika så finns det två stora konceptuella frågor som kräver eftertanke vad gäller utformning av budskapet: innehåll och framställningssätt. Om där finns ett antal närbesläktade ämnen så skall de omfatta en genomgående slogan. Vidare så skall det inte presenteras alltför många budskap på en och samma gång. Budskapets innehåll måste också vara realistiskt och trovärdigt. Budskap som tillförde ny information visade sig ha stor effekt. Ett antal ytterligare faktorer som bör övervägas kan sammanfattas som budskapets framställningssätt vilket omfattar vem som är talesman (om det skall vara någon överhuvudtaget) och informerande kontra emotionell framställning. Ett emotionellt och negativt framställningssätt ansågs generellt vara lämpligare för trafiksäkerhetskampanjer. Stimulerande av rädsla har använts i stor omfattning med goda resultat.

Riktlinjer för hur kampanjen skall ledas täckte genomförande av allmänbildning, omfattande frågor som rör koordination, ansvar för beslutsfattande, forskningens roll, upprättande av prioriteringar och stöd från allmänheten.

## UTVÄRDERING AV KAMPANJER I MASSMEDIA.

En omfattande mängd internationell litteratur existerar som undersöker effektiviteten för trafiksäkerhetskampanjer i massmedia. Den här rapporten fokuserar på två metaanalyser som har genomförts under det senaste årtiondet (Delhomme, 1999; Elliot, 1993) och som sammanfattar relevant litteratur fram till 1997. De viktigaste resultaten från var och en av dessa studier är följande. Elliot (1993) utvärderade kampanjer som fokuserade på vissa typer av trafikantbeteende såsom rattfylleri, fotgängarsäkerhet och användning av säkerhetsbälte. När kampanjers effektivitet undersöktes, med hjälp av alla tillgängliga mått på effektivitet, visade det sig att kampanjer medförde en reduktion av 7,5 procent på det använda effektivitetsmättet. Emellertid, när effektivitetsmått som relaterar till en medvetenhet om kampanjen eller kampanjens budskap exkluderas från beräkningen så visar sig kampanjer i massmedia ha en reducerande effekt på 6 procent. I tillägg så finns det ett svagt inverterat samband mellan grundnivån på effektivitetsmättet och kampanjens genomslagskraft. Det vill säga, när grundnivån på effektivitetsmättet ökar så förväntas storleken på förändringen av effektivitetsmättet att minska.

Delhomme (1999) gick enbart igenom de utvärderingar av kampanjer i massmedia som undersökte kampanjernas effekt på olyckor relaterade till förarbeteende, säkerhetsutrustning i fordonet eller fordonet självt. Uppskattningsvis ger en trafiksäkerhetskampanj i massmedia en genomsnittlig reduktion av olyckor med 8,5 procent under kampanjens genomförande. Efter att kampanjen är avslutad förväntas olycksreduktionen att öka till 14,8 procent. Effekten av kampanjer i massmedia som var relaterade till alkohol eller hastighet var även isolerade.

Ett antal studier genomförda efter 1997 stöder de slutsatser som ovanstående studier kom fram till. I synnerhet så visar utvärdering av kampanjer i massmedia, genomförda i Australien och Nya Zeeland, att trafiksäkerhetskampanjer tillsammans med övervakning och lagstiftning leder till en betydande minskning av antalet personskadeolyckor och allvarlighetsgraden därav. Dessa slutsatser stöds även av studier genomförda i Nordamerika och Europa.

En viktig avgränsning i en stor del av den forskning som har gjorts är att ingen isolering av effekterna av kampanjen från andra bidragande aktiviteter har gjorts. Icke desto mindre så framgår det tydligt att omfattningen av en kampanjs påverkan på olycksfrekvens fastställs av den enskilda kampanjens utformning. Följande verkar vara av särskild vikt.

- Användandet av en bakomliggande teoretisk modell;
- Övervägandet av tidigare forskning, kvantitativ eller kvalitativ, angående de frågor som kampanjen berör;
- Samverkande faktorer till kampanjen såsom lagstiftning, övervakning och folkbildning;
- Det sätt med vilket kampanjen skall tilltala målgruppen och vilken/vilka media som skall användas för att sprida budskapet; och
- Intensitet, omfattning, timing och exponering av kampanjen.

## BÄSTA TILLÄMPNINGAR OCH REKOMMENDATIONER

Utvärderingen belyser tre viktiga delar som är associerade med förbättrad säkerhet som följd av trafiksäkerhetskampanjer. För det första, kampanjer med ett övertalande angreppssätt och de som använder emotionella snarare än rationella argument tenderar att vara mer effektiva. I kontrast så anses informationsbaserade och utbildande kampanjer vara mindre effektiva.

För det andra, användandet av tydligt utformade teoretiska modeller och kvalitativ eller kvantitativ forskning under kampanjens utveckling och genomförande har visat sig öka dess effektivitet. Teorier såsom Roger's Protection Motivation Theory och Extended Parallel Process Model är båda särskilt lämpliga för trafiksäkerhetskampanjer. Stimulerande av rädsla har även det använts i stor omfattning och är innefattat i de två teorierna. General Deterrence Theory är även det högst tillämpligt på trafiksäkerhet. Övriga frågor som bör övervägas noggrant är målgrupp, val av media, mediaplacering och budskapets karaktär. Samstämmiga slogans, ny information och realistiska, trovärdiga budskap är rekommenderade för att öka kampanjens genomslag. Riktlinjer för ett effektivt genomförande av kampanjen innefattar att utse en ansvarig organisation, ett begränsat antal budskap, utformning baserad på forskning och stöd från allmänheten.

För det tredje, användandet av PR och all form av oplanerad publicitet (t.ex. obetald exponering i media eller PR som relaterar till kampanjen) verkar vara av större vikt för kampanjens utfall än användandet av övervakning. Det har dock visat sig att kombinationen av PR och uppföljning/övervakning har gett särskilt goda resultat.

I tillägg så kom ett antal nämnvärda resultat fram vid utvärderingen av enskilda trafiksäkerhetskampanjer. I ett kort perspektiv så kan personskadeolyckor minskas genom att endast använda sig av publicitet. Vidare finns det inga visade interaktionseffekter mellan övervakning med hjälp av hastighetskameror och publicitet riktad mot personskadeolyckor. Detta tyder på att det inte finns något stöd för att övervakning och publicitet skulle samverka för att maximera effekten. Det bör även noteras att det finns motstridiga resultat om den optimala mängden publicitet. Avslutningsvis så är det viktigt att, vid undersökning av kampanjers utvärdering, överväga hela kampanjens karaktär när dess effektivitet skall bedömas och utvärderas. Detta innefattar kampanjens tidsram och dess åtföljande effekt. Vidare forskning behövs på långtidseffekterna av kampanjer i massmedia.

# EXECUTIVE SUMMARY

Mass media campaigns targeted at improving road user behaviour are a common element of many road safety campaigns. This report examines the large body of international literature relating to road safety mass media campaigns from a number of perspectives.

## THEORIES OF BEHAVIOUR CHANGE

Health advertising usually involves attempts to persuade an individual to change their behaviour. Central to health advertising is the issue of relationship between attitudes and behaviour. The literature is divided as to whether mass media campaigns change behaviour and then attitudes, or whether an individual's attitude changes and then their behaviour. Furthermore, road safety mass media campaigns often are linked to an enforcement component, further complicating the relationship among the potential elements of change. In order to conceptualise the changes that occur in behaviours and attitudes (regardless of the order in which these processes take place) a number of models of behaviour change were reviewed.

The theories focus on changing knowledge, attitudes and/or behaviours. They are sometimes described as social persuasion models, and are particularly applicable to the area of road safety mass media campaigns.

- Theory of Reasoned Action
- Theory of Planned Behaviour
- Health Belief Model
- Social Learning / Cognitive Theory
- Roger's Protection Motivation Theory
- Risk Communication/Fear Appeals
- Extended Parallel Process Model
- General Deterrence Theory

The theories reviewed have been applied to a range of behaviours with varying results. Different theories were found to be more applicable to particular behaviours. Research suggests that utilising theories to guide campaign development is effective because the theories help to maintain focus on determinants underlying the decisions to perform (or not perform) a behaviour, and hence the campaign is more likely to influence the behaviour. Among the theories reviewed, those with the greatest applicability to the development of road safety mass media campaigns were Rogers' Protection Motivation Theory and Extended Parallel Process Model, both of which utilise concepts such as fear arousal, coping responses and self-efficacy. General Deterrence Theory is also highly relevant, with its highly specific coverage of road safety elements, including enforcement. Furthermore, campaigns utilising fear appeals have also been shown to be more effective, however, more work needs to be done to operationalise measures of fear, in order to identify optimum levels of fear arousal.

Mass media campaigns in areas other than road safety were reviewed; specifically, in the areas of cigarette smoking and sun tanning behaviour. Two cigarette-smoking campaigns were reviewed. The first campaign utilised a more informational approach, yet when evaluated, it was found that the campaign failed to persuade respondents to quit. Respondents also indicated a preference for emotive style fear appeals. The second

campaign utilised a fear appeal approach, and was evaluated as being very effective, persuading both smokers to quit, and quitters to stay quit. A campaign to reduce sun-tanning behaviour was also evaluated. The campaign was evaluated as successful in achieving the desired behaviour change over a 3-year period. Given the campaign did not utilise a health threat, it could be argued that the mechanism of change from this campaign was a change in social norms associated with sun tanning through the use of role models.

In conclusion, it is clear that the theories are applicable to different types of behaviour and different types of campaigns. Variables associated with the health threat such as imminence, probability, severity and susceptibility all play an important role. Furthermore, the weighting of the variables in the model will also vary in regard to the target behaviour. Thus the success of the theory's application will depend on the match with the aims of the mass media campaign, which in turn should stem from thorough assessment of the targeted health risk behaviour. Further features of mass media campaigns will be discussed in the next section.

## **FEATURES OF MASS MEDIA CAMPAIGNS**

There is a wide range of issues related to the strategic design of mass media campaigns, which also have implications for cost effectiveness. The variety of elements involved includes the target behaviour and audience, message and campaign characteristics, links with enforcement and legislation, and institutional management.

The issues regarding the legal status of the target behaviour, and any associated enforcement, add further complexity to both the development and evaluation of mass media campaigns. The target group also needs to be carefully identified through consideration of the issues involved, including not only the legal status, but also the nature and definition of the behaviour. Once the target behaviour has been identified, the campaign and message characteristics can be developed. One of the most basic issues in considering campaign characteristics is the choice of appropriate media, which can include television, radio, press advertising, cinema advertising, and brochures. Television has generally been considered the most persuasive medium.

Further important variables relate to media placement, including issues such as duration of campaign, intensity, timing and exposure. In the category of message characteristics, there are two major conceptual areas requiring consideration in message development: specifically content and style. If there are a number of related messages, they should include a consistent slogan. Furthermore, there should not be too many different messages at any one time. Message content also needs to be realistic and credible. Messages that contain new information were associated with greater effects. Further variables for consideration can be described as message style, which includes variables such as the spokesperson (if any) used, and informational versus emotive styles. An emotive and negative approach was generally considered more appropriate in road safety advertising. Fear appeals have been widely used with good effect.

Campaign management guidelines covered the management of public education, covering issues of co-ordination, responsibility for decision-making, the role of research, priority setting and community support.

## EVALUATIONS OF ROAD SAFETY MASS MEDIA CAMPAIGNS

A large body of international literature exists that examines the effectiveness of road safety mass media campaigns. This report focuses on two meta-analyses conducted over the past decade (Delhomme, 1999; Elliott, 1993) that consolidate the relevant research conducted prior to 1997. The key results from each of these studies are as follows. Elliott (1993) reviewed those evaluations of mass media campaigns targeting key areas of road user behaviour such as drink-driving, pedestrian safety and seat-belt use. When examining the effect of such campaigns using all available measures of effect it was estimated that on average the mass media campaigns will generate a 7.5 percent reduction in the outcome measure of effect. However, when measures of effect relating to awareness of the campaign or campaign message are excluded from the estimation, the average effect of a mass media campaign is estimated to be 6 percent. In addition, there is a weak inverse relationship between the base level of the measure of effect and the impact of the campaign. That is, as the base level of the measure of effect increases, the magnitude of the change in the measure of effect is expected to fall.

Delhomme (1999) reviewed only those evaluations of mass media campaigns that examined the impact of campaigns on crashes with themes related to driver behaviour, safety devices within a vehicle, or the vehicle itself. It was estimated that on average a road safety mass media campaign will result in an 8.5 percent reduction in crashes during the operation of the campaign. Following campaign completion, the reduction in crashes is expected to increase on average to 14.8 percent. The effect of mass media campaigns with alcohol or speed related themes were also isolated.

A number of individual evaluations conducted since 1997 also add supportive evidence to the conclusions reached in the above studies. In particular, evaluations of mass media campaigns conducted in Australia and New Zealand indicate that road safety mass media campaigns coupled with enforcement and legislation lead to significant reductions in the frequency and severity of casualty crashes. This result is also supported by research conducted in North America and Europe.

A key limitation of much of the research is that it does not isolate the effect of mass media campaigns on the relevant measure of effect from the effect of other supporting activities. Nevertheless, it is apparent that the extent to which any individual mass media campaign affects crash frequency is determined by the characteristics of the individual campaign. It is suggested that the following characteristics are of particular importance.

- The use of an underlying theoretical model;
- The consideration of prior quantitative or qualitative research on the issue(s) addressed in the campaign;
- The use of campaign supports such as legislation, enforcement and public relations or associated publicity;
- The type of appeal approach adopted in the campaign and the media mix used to transmit the message; and
- The intensity, duration, timing and exposure of the campaign.

## **BEST PRACTICE AND RECOMMENDATIONS**

The evaluation research highlights three key elements of road safety mass media campaigns that are associated with improved road safety outcomes. First, campaigns with a persuasive orientation and those that use emotional rather than rational appeals tend to have a greater effect on the relevant measure of effect. In contrast, information based and educative campaigns have been associated with less effective campaigns.

Secondly, the use of explicit theoretical models and prior qualitative or quantitative research to inform the development of the campaign message and execution has been found to increase the effectiveness of campaigns. Theories such as Rogers' Protection Motivation Theory and the Extended Parallel Process Model are both particularly suited to road safety mass media campaigns. Fear appeals have also been widely used, and are incorporated into the two theories. General Deterrence Theory is also highly applicable to road safety. Further issues to be considered carefully include target group, media choice, media placement, and message characteristics. Consistent slogans, new information and realistic, credible messages are all recommended in order to increase campaign impact. Guidelines for effective campaign management include recommending a responsible key agency, a limited number of messages, development decisions based on research, and community support.

Thirdly, the use of public relations and any unintentional associated publicity (i.e. unpaid media activity or public relations relating to the campaign) appears to be more important to the outcome of the campaign than the use of enforcement. However, the combination of public relations and enforcement as supporting activities shows particularly large effects.

In addition, other noteworthy results emerged from evaluations of individual road safety mass media campaigns. In particular, in the short term the use of publicity alone can lead to casualty crash reductions. Further, there is no evidence of an interaction effect between speed camera enforcement and publicity on casualty crash frequency. This suggests that there is no case that enforcement and publicity should necessarily operate together to produce maximum effect. It is also noted that there is conflicting evidence on the optimum intensity of publicity. Finally, when examining evaluations of campaigns, it is necessary to consider the influence of all the campaign characteristics in assessing the impact of the campaign, also including the time frame of the campaign and the consequent impact. It is recommended that future research examine the longer-term effects of mass media campaigns.

# 1. INTRODUCTION

Mass media campaigns targeted at improving road user behaviour are a common element of many road safety campaigns. This report examines the large body of international literature relating to road safety mass media campaigns from a number of perspectives. Included in this report is a discussion of the theoretical models used to guide mass media campaign development. Evaluations of mass media campaigns in areas other than road safety are also outlined. Issues pertaining to the development of road safety mass media campaigns, and evaluations of road safety mass media campaigns are also covered. Finally, discussion points and conclusions from previous chapters are integrated to provide recommendations for the development of effective mass media campaigns.

## 1.1. METHODOLOGY

### 1.1.1. Campaign Types

The following report is concerned with mass media public campaigns on road safety. Due to a wide range of terminology used within the literature, a number of terms will be defined. The term “**mass media campaign**” will be used to describe public communication campaigns, or public education campaigns. The term refers to a form of advertising, specifically, paid media advertisements designed specifically for a target concept. Rice and Atkin (1994) defined such campaigns as “*purposeful attempts to either inform, persuade, or motivate behaviour changes in a large audience within a given time period.*”

The term “**public relations**” will be used to refer to any material, whether paid or unpaid, that is intentionally released and of a supportive nature to the concept(s) in the mass media campaign. This material may take a variety of forms, for example, newspaper articles, talk back radio, and/or press releases. Public relations are defined as “the practice of working to present a favourable image” (Delbridge & Bernard, 1998).

The term “**associated publicity**” will be used to refer to unintentional, unpaid material related to the mass media campaign and public relations. This material may cover the same or closely related topics and may take the same form also (e.g. talk back radio etc), however, is not supported by the organisation(s) that disseminated the public relations activities and mass media campaign. Publicity such as newspaper articles or TV interviews may also be a mix of associated publicity and public relations. Also, it may not always be possible to identify whether publicity is public relations or associated publicity.

The term “**publicity**” will be used to refer to a broad category that encompasses all the concepts discussed, including mass media campaigns, public relations, and associated publicity.

Importantly, the report focuses on the evaluations of mass media campaigns by using three sources of data with which to estimate the effectiveness on the overall behaviour change of road users.

1. Crash data
2. Overt behaviour (including objective measures of speed, alcohol consumption, and traffic offences)

3. Self-report data (including self-reported knowledge, risk apprehension and attitudes towards speeding and drink driving for example)

Whilst the report is primarily focussed on campaigns aired on television, in some instances radio and billboards may be incorporated in television campaigns as a secondary focus. The report does not include educational campaigns carried out in schools, or campaigns aimed to increase drivers' use of public transport. As the majority of campaigns are targeting drivers, the evaluations will focus on these road users. However, any evaluations targeting specific road users (i.e. pedestrians, truck drivers, cyclists, motorcyclists) will also be included.

### **1.1.2. Search terms and databases**

The following literature searches were set between publication years 1997-2002. The reason behind this was that the Delhomme (1999) report had already provided a comprehensive framework with which to discuss literature published prior to 1997.

Three major databases were used, namely Transport, PsychInfo and Sociofile. Transport was the primary database used to obtain road safety mass media campaigns. Overall the same key terms were used for each database, however, additional search terms were used in the PsychInfo and Sociofile databases in order to obtain literature from outside the road safety area. The key terms were primarily drawn from the Delhomme et al report. These terms were categorised into three groups. The databases retrieved only those articles that had at least one word from every group to appear anywhere in the citation. The search terms are shown below.

1) evaluation or assessment or impact or efficacy or efficiency or effective or analysis

2) campaign or media or mass media or advertising or publicity or public education or community education or promotion or behaviour modification or attitude change

3) driver or passenger or occupant or pedestrian or cyclist or motorcyclist or car or dashboard or seat-belt or child or speeding or drink-driving

Before these evaluations are detailed, current psychological theories on behaviour modification and attitude change are discussed. Outlining these theories, and then discussing mass media campaign evaluations, will provide a comprehensive framework with which to critically examine the efficacy of road safety mass media campaigns.

## **2. THEORIES OF BEHAVIOUR CHANGE**

### **2.1. TWO FORMS OF MASS MEDIA CAMPAIGNS**

Within the advertising domain, there are two distinct forms of advertisements: product and health advertising. According to Woolley, Dyson and Taylor (2001) product advertising usually persuades an individual to maintain a particular habit but to switch brands (e.g. continue to eat hamburgers but switch from brand A to brand B). Health advertising usually involves attempts to persuade an individual to change their behaviour (e.g. reduce exposure to the sun to minimise the risk of developing skin cancer), and is generally a more difficult aim to achieve. In some cases, the same concept can be advertised from both the product and health arena. For example, excessive speeding is a common behaviour targeted in road safety campaigns and speed appeal is used to advertise new cars.

For both types of advertising, there are different theories relating to the mechanisms through which they affect individuals. As the report is concerned with health advertising, only those theories pertaining to this form of advertising are reviewed.

### **2.2. RELATIONSHIP BETWEEN ATTITUDES AND BEHAVIOUR**

The OECD published a comprehensive report in 1994, which reviewed the role of attitude modification in road safety. The report also addressed theoretical issues pertaining to attitudes and behaviour and, similar to much of the literature, acknowledged how often the terms attitudes and behaviour are often poorly defined. Furthermore, there has been longstanding debate concerning the relationship between attitudes and behaviour within the social psychological literature (OECD, 1994). Regardless of how this is conceptualised, attitudes have long been recognised as having an important influence on driver performance, making this an important road safety issue (OECD, 1994).

Whilst the definition of an attitude varies, an attitude can be broadly defined as a “hypothetical mental structure which determines actions or prepares a person to act in a certain way” (OECD, 1994, p.14). It is beyond the scope of this report to critically discuss the attitude-behaviour relationship issue. Suffice to say that issues of attitude-behaviour relationships concern what attitudes are more important as determinants of behaviour, and how these attitudes may be measured and modified in future mass media campaigns and programmes. Importantly, there is a divide in the literature as to whether mass media campaigns change behaviour and then attitudes, or whether an individual’s attitude changes and then their behaviour. In addition, road safety mass media campaigns often involve an enforcement component, so the issue of the attitude-behaviour relationship is further complicated; the effect that a mass media campaign has on attitudes and behaviour when the campaign is coupled with an enforcement component is essential when considering the efficacy of the campaign.

In order to conceptualise the changes that occur in behaviours and attitudes (regardless of the order in which these processes take place) a number of models of behaviour change have been developed. The next section details models of behaviour change and their application to specific areas of public health research.

### 2.3. THEORETICAL BACKGROUND TO MASS MEDIA CAMPAIGNS

There has been increasing use of health promotion and education programs, however, this can often be without appropriate scripting and theoretical development (Davis & Moffit, 1982; Nelson & Moffit, 1988; Suchman, 1969). Effective programs require understanding of the epidemiology of the problem, including factors that predispose, enable and reinforce the target behaviour (Nelson & Moffit, 1988). Green et al (1980) defined three types of behavioural antecedents:

- **Predisposing factors** provide motivation for behaviour (knowledge, attitudes, beliefs, values).
- **Enabling factors** allow a motivation to be realised (skills).
- **Reinforcing factors** provide a continuing reward for a behaviour (incentives).

The use of ineffective or unproven strategies in mass media campaigns can result in undesirable outcomes, for example, unwelcome health consequences, reduced self-efficacy, resistance to education programs, wasted public concern and diminished professional credibility.

There is a wide range of theories that have been utilised in the development of mass media campaigns. There are macro-level theories that postulate that social circumstance plays an influential role in behaviour change. They attempt to account for essential influences within the socio-cultural environment. The theories include:

- Social Marketing
- Diffusion
- Community Empowerment

Micro level theories commonly have a basis in social psychology and focus on changing knowledge, attitudes and/or behaviours. These theories have been described as “knowledge-attitudes-behaviours” (KAB) or social persuasion models. The theories include:

- Bentler and Speckart Model
- Cognitive Dissonance Theory
- Elaboration Likelihood Model
- Inoculation
- Reinforcement Theory
- Stages of Change Model
- Subjective Expected Utility Theory
- The Persuasive Health Message Framework
- The Theory of Trying
- The Transtheoretical Model

Covering the entire range of theories is outside the scope of this report. The following micro level theories will be reviewed in this report. The theories have been widely used with a wide range of topics, and are particularly applicable in the area of road safety mass media.

- Theory of Reasoned Action
- Theory of Planned Behaviour
- Health Belief Model
- Social Learning / Cognitive Theory
- Roger's Protection Motivation Theory
- Fear Appeals
- Extended Parallel Process Model
- General Deterrence Theory

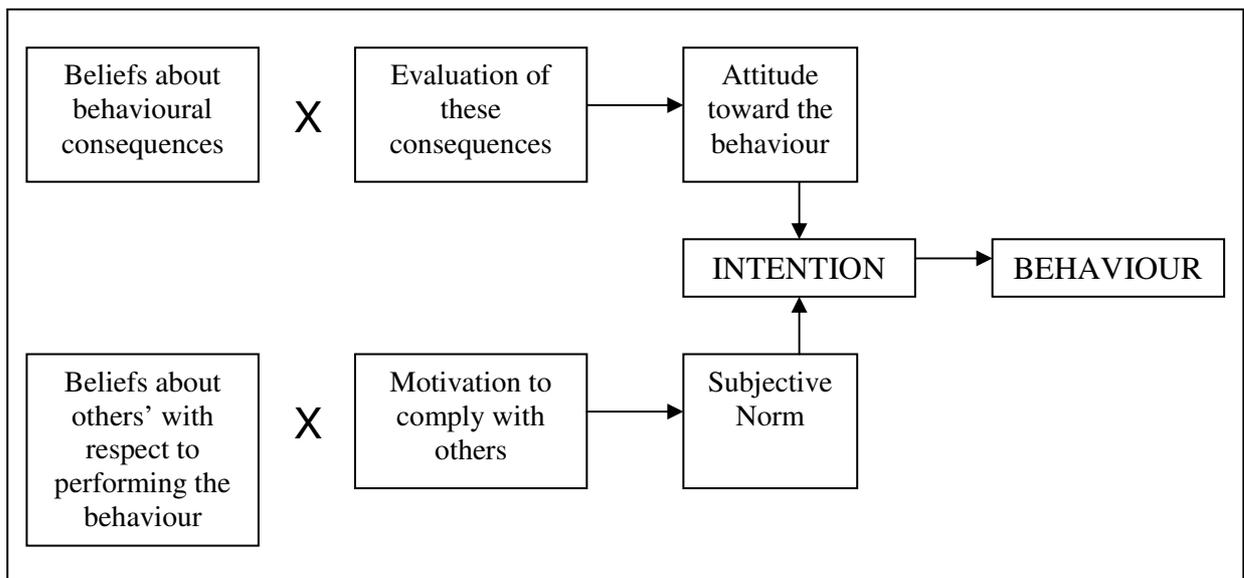
## 2.4. THEORY OF REASONED ACTION

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) proposed that a person's behavioural intention determines the probability of performing a specific behaviour. Behavioural intentions are based on a weighted set of beliefs about the consequences of behaving in that way.

The model was designed to provide a framework for understanding the relationship between attitudes, beliefs, intentions and behaviour. The model assumes that people are logical and consistent in the way they process information and make decisions and furthermore, that, attitudes and social norms are the sole determinants of intention. There are two major inputs into the model (see Figure 1):

- attitudes** towards the behaviour, and
- subjective norms**.

Beliefs about behaviour consequences and the evaluation of these consequences influence attitudes towards the behaviour. Normative beliefs (beliefs about others with respect to performing the behaviour) and the motivation to comply with those normative beliefs predict subjective norms.



**Figure 1. Theory of Reasoned Action (adapted from Fishbein and Ajzen, 1975)**

This model can be applied to an example of seat belt use. Attitudes would relate to seat belt use and the results of seat belt use. Subjective norms would consist of an individual's

perception of what significant others believe and do in regard to seat belt use. When a campaign is being developed, assessment of likely attitudes and normative beliefs can result in an appropriately focussed program. For example, the behaviour of most individual's might be more determined by their attitude, for example "I like wearing my seatbelt because it makes me feel more secure", than their normative beliefs, for example "My children think I should wear a seatbelt" (Nelson & Moffit, 1988).

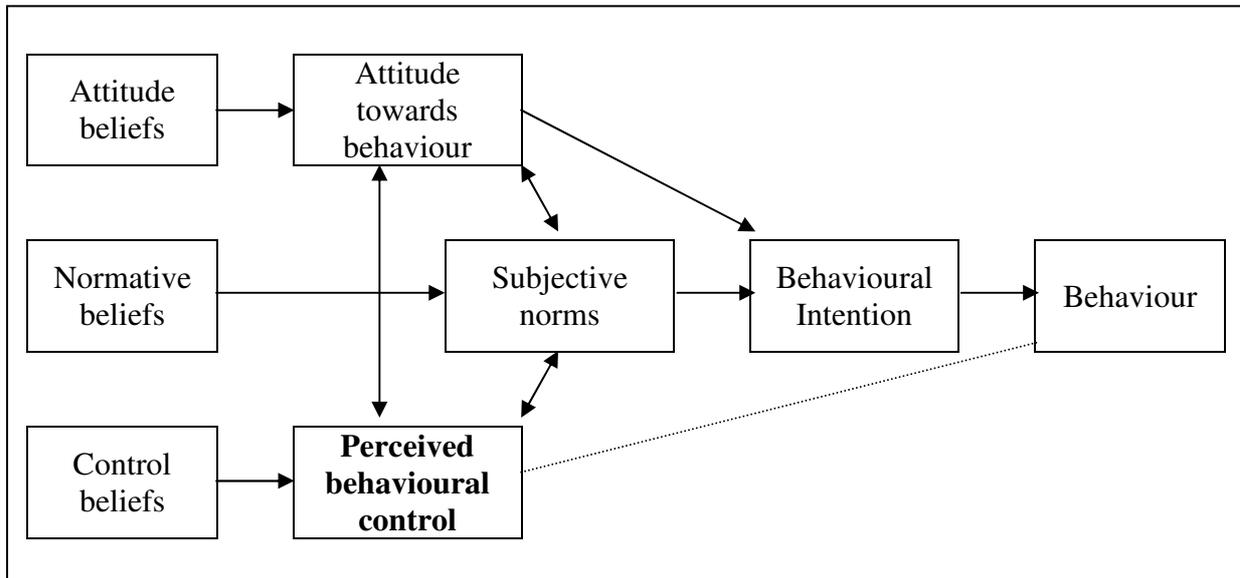
Fishbein and Ajzen (1975) suggested that TRA also be used to suggest specific message construction. The salient beliefs (this refers to both attitudes and normative beliefs) relating to the variable need to be targeted by the message in order to change attitudes and subjective norms, and then subsequently, behavioural intentions and behaviour. The application of TRA would need to include efforts to influence the individual's intentions to use a seat belt in two ways. Firstly, determining the most important attitudes about seatbelts, and secondly, identifying and utilizing significant others (e.g. family, peers, or co-workers) whose attitudes, behaviours, and expectations reinforce seatbelt use and help motivate the individual to comply (Nelson & Moffit, 1988). O'Connor (1990) however, stresses that the link between attitude and behaviour varies in strength depending on the expected likelihood of an outcome and the extent to which the attitude is focused on some specific action to be performed. Fishbein and Ajzen (1981) reported that the total set of salient beliefs would need to be changed in order to change the attitude or subjective norm and consequently the behaviour. If only one belief changed, there would be a decreased likelihood of behavioural change.

Lapinski and Witte (1998) suggested that the model provides clear direction for research questions, and has been applied to a number of consumer and health decisions with greater predictive validity for more specific behaviours and time frames. Specific areas of application have included health risk messages about tap water, sexual practices and AIDS related behaviours, childbearing intentions, testicular cancer prevention, exercise in schoolchildren, alcoholism, cigarette smoking, and many others (as cited in Conner & Sparks, 1996; Lapinski & Witte, 1998).

In conclusion, it is suggested that TRA can be used as part of a specific assessment process leading to message construction. TRA suggests that all salient beliefs must be changed to result in successful behaviour change. The model, however, doesn't discuss the potential conflict between contradictory beliefs and influences. For example, significant others may have varying attitudes towards seatbelt use, which may end up contributing to a neutral attitude due to the conflict of weighing up the different influences. Furthermore the model does not address issues such as emotional response to the consequences, nor self-efficacy in regard to the behaviours. Emotional responses to health risks such as AIDS and cancer prevention are highly relevant to the consequent actions the individual takes. Furthermore, the individual needs to have sufficient self-efficacy to be able to complete any required behaviours. The model was designed for traditional health and illness related behaviours, and has been widely applied to such behaviours. In regard to road safety, the model does not include variables such as law enforcement, and the perception of that enforcement. Thus, the model is of limited applicability in road safety.

## 2.5. THEORY OF PLANNED BEHAVIOUR

The Theory of Planned Behaviour (TPB) is the same as the TRA, but with the addition of an extra variable, Perceived Behavioural Control (Ajzen, 1985). Perceived Behavioural Control refers to the degree of control an individual perceives himself or herself to have over the performance of the behaviour. This concept is similar to Bandura's concept of self-efficacy (Conner & Sparks, 1996). See Figure 2 for a diagram of the model.



**Figure 2. Theory of Planned Behaviour (adapted from Ajzen, 1991)**

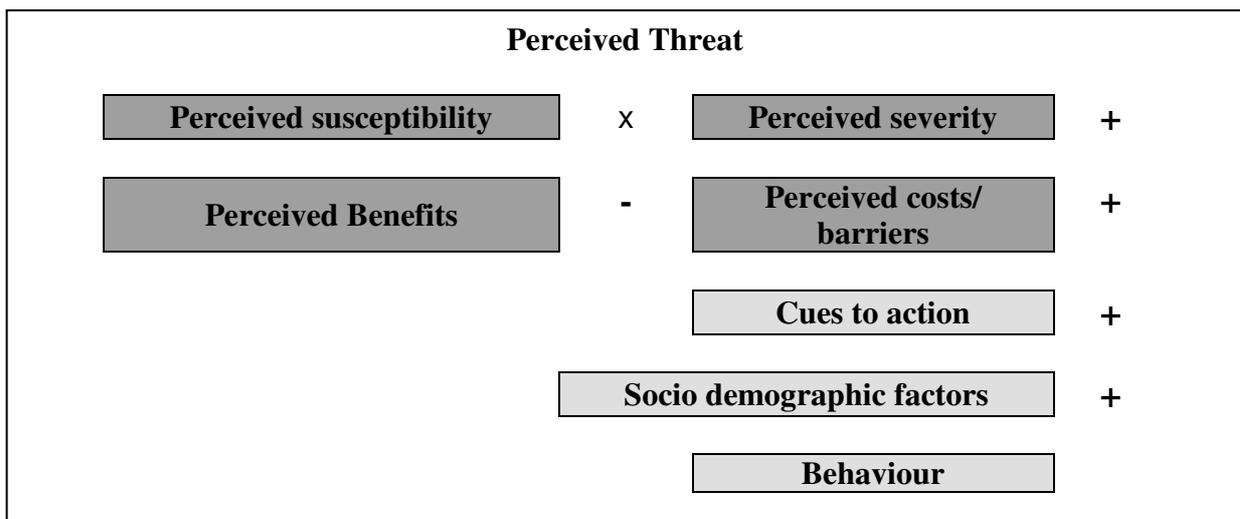
Thus, according to TPB, individuals are likely to follow a particular health action if they believe the behaviour will lead to outcomes that they value, if people whose views they value endorse the behaviour, and if they believe they have the necessary capabilities and opportunities to perform the behaviour. This makes the model applicable for use where the individual has little control over whether a violation occurs or not. The model has been described as too elaborate (Fazio, 1986; Fischhoff, Goitein, & Shapira, 1982) to be able to realistically describe individual decision-making processes. TBP has been extensively applied to a range of health behaviours (Ajzen, 1991), including smoking, alcohol consumption, sexual behaviours, health screening attendance, exercise, food choice, and breast/testicle self-examination (as cited in Conner & Sparks, 1996). The additional component of perceived behavioural control in TPB appeared to significantly improve the prediction of intentions compared to TRA for behaviours such as smoking and alcohol consumption, but not for other behaviours such as health screening attendance (see Conner & Sparks, 1996).

TPB has improved on the TRA with the addition of Perceived Behaviour Control, however the improvement is not consistent with all behaviours. Most of the limitations suggested for TRA, including lack of variables such as enforcement and emotion, apply to TPB. The model has also been criticized for being too elaborate, however has also been applied to a wide range of health behaviours. Consistent with the summary of TRA, TPB is also not considered a highly applicable model of behaviour change in the area of road safety.

## 2.6. HEALTH BELIEF MODEL

The Health Belief Model (HBM) is a health behavioural change model developed by Becker (1974) and Rosenstock (1974). It has been widely used to guide campaign design and implementation (Lapinski & Witte, 1998). According to the model (see Figure 3), preventive health behaviour is influenced by five factors:

1. perceived susceptibility to a health threat;
2. perceived severity of a health threat;
3. perceived costs/barriers to performing the recommended response;
4. perceived benefits of performing the recommended response; and
5. cues to action



**Figure 3. The Health Belief Model (adapted from Becker, 1974 and Rosenstock, 1974)**

The recommended behaviour will occur if people see themselves as susceptible to a particular health problem, perceive it as a serious problem, consider the benefits of action are effective and not unduly expensive or time consuming, and there is a trigger to prompt action. Cues to action can be either internal (symptoms of a condition such as bleeding) or external (such as a brochure on the hazards of smoking) and increases individual awareness of the threat. Using the seat belt example, drivers or passengers must feel threatened in order for seat belt use to occur. The threat perception is influenced by two beliefs: 1) the individual feels vulnerable or susceptible to a number of potential undesirable outcomes, e.g. injury, enforcement or peer pressure; and 2) the consequences of non-use are severe, e.g. impact of injury physically, emotionally and financially. A campaign based on HBM would need to facilitate awareness of the benefits and barriers to action and provide cues to action (Nelson & Moffit, 1988). For example, Robertson, O'Neill and Wixon (1972) recommended that messages emphasize comfort and convenience as the benefits of seat belt use.

Traditionally, HBM has been applied to public health issues such as infectious diseases and immunisation. O'Connor (1990) reported that the model had difficulties being substantiated by research, but also stated that there were methodological inadequacies in the research. The HBM has been tested as the basis for campaigns on a number of health behaviours including bicycle helmet use, vaccination for infectious diseases, adolescent

fertility control and risky sexual practices (as cited in Lapinski & Witte, 1998). Perceived barriers have been the strongest predictor of engagement in health-protective behaviours, followed by perceived susceptibility (Janz & Becker, 1984). They also reported that perceived severity was the weakest predictor across studies using HBM.

In conclusion, HBM has been widely used. It covers a wider range of variables than the previous two models. In particular, perceived barriers and susceptibility have both been shown to be useful predictors for health-protective behaviours. However, variables such as self-efficacy, motivation and experience are not fully utilised within the model. HBM would be more applicable to road safety than the previous models, as the perceived costs/barriers can incorporate variables such as enforcement.

## **2.7. SOCIAL LEARNING / COGNITIVE THEORY**

Bandura's (1977b) model is based on HBM, with the important addition of self-efficacy. Bandura (1989) defined self-efficacy as "people's beliefs that they can exert control over their motivation and behaviour and over their social environment" (p.128). The behavioural outcome is based on the extent to which the individual perceives they have the capacity to carry out the recommended behaviour and their confidence in actually doing so.

An individual's self-efficacy perceptions stem from four sources of information: performance accomplishments, physiological states, verbal persuasion and vicarious experience (Bandura, 1977a). Another important concept is "outcome expectations" which describes an individual's belief that a certain behaviour will lead to a certain outcome. These differ from efficacy expectations, which is an individual's belief about whether they can successfully complete the behaviour required to produce the outcomes.

Bandura's theory has been widely used in a variety of health-related campaigns including heart disease and AIDS prevention (as cited in Lapinski & Witte, 1998). Lapinski and Witte (1998), however, suggested that one element missing from the model is motivation. The model appears to assume that people with high levels of self-efficacy and outcome expectations consistent with the recommended response would be motivated to act. Nonetheless, self-efficacy has been addressed in numerous health communication campaigns and is a key variable.

In conclusion, Social Learning theory has developed from HBM, and is a more effective model. The addition of self-efficacy enables more effective application of the model to a variety of health related behaviours. The model could be usefully applied to the road safety field.

## **2.8. FEAR APPEALS**

In mass media campaigns, content that focuses on the potential risk, whether intentionally or unintentionally, has the potential to raise anxiety or fear in the audience (Lapinski & Witte, 1998).

Literature on risk communication has focused on the differences between layperson and expert risk perception (Douglas, 1985; Kishchuk, 1987; Slovic, 1987). Experts tend to view risk in a scientific, rational manner. Laypersons tend to evaluate risk in terms of familiarity, necessity, potential catastrophe, personal relevance or representativeness (Kishchuk, 1987; Slovic, 1987). When the level of risk is perceived as unacceptably high,

this tends to result in a fear response. Fear appeal literature outlines guidelines on health risk messages that motivate rather than inhibit behaviour change. Lapinski and Witte (1998) defined fear appeals as “persuasive messages that frighten an audience into adopting a recommended response”. Fear appeal messages typically have two parts. The first part emphasises the severity of the threat and the likelihood of occurrence. The second part of the message usually focuses on methods to avert or minimize the threat, and or increase perceived self-efficacy regarding the recommended response (Nelson & Moffit, 1988). The fear appeal can be thought of as the “cue to action” in the HBM. Research has shown fear appeals to be persuasive but only in certain conditions. Research on fear appeals regarding seat belt use has shown that a moderate level of fear arousal resulted in more frequent seat belt use (Loo, 1984).

There has been wide debate on the optimum level of fear to promote behaviour change. According to LaTour and Zhara (1988) models utilising fear arousal concepts cannot be convincingly validated, and hence an optimum level of fear arousal cannot be identified. Donovan, Henley and Slater (1995) suggests that this is due to the fact that there is no absolute measurement of fear. For example, one study’s descriptor of “high” fear arousal might be another’s “moderate” or “mild” level. This results in difficulties with validation and comparability between studies, and also may explain the frequently contradictory results. Such inconsistencies may be due to the lack of an efficacious solution, that is, a solution combining both response efficacy and self-efficacy. Furthermore, there may be varying degrees of intensity of fear during and after exposure to the message, as well as other emotions such as anxiety, which may not have been considered.

The criteria used to evaluate effectiveness across different studies also tend to vary, ranging from reported attitude change, reported intention to change, reported behaviour change and/or measurable behaviour change. Another variable for consideration is the severity of different fears. For example, fear of losing a licence for drink driving is not equivalent to the fear of dying in a car crash. In many fear arousal studies, the threat of death is used in the high fear condition, which Donovan argues is quite different to most other fears, further complicating any comparisons. Evaluations of road safety campaigns have also shown interaction effects between self-efficacy and fear levels (see Donovan et al., 1995). The perceived likelihood that the threat will occur, may also vary between the different fear levels (i.e. high, medium, low), resulting in a fear arousal response that is the result of a complex interaction between the perceived probability, susceptibility and severity of the threat.

In conclusion, fear appeals have been shown to be very effective in the area of road safety, notwithstanding the ongoing debate regarding the optimum level of fear arousal and the difficulties with operationalising such a concept. Furthermore, depending on the targeted age group and behaviour, optimum levels of fear will vary even further. The literature does, however, consistently state that health risk messages need to contain both a fear appeal (typically a health threat or negative consequences) and a recommended action in order to minimise the threat.

## **2.9. ROGERS’ PROTECTION MOTIVATION THEORY**

Bandura’s (1977b) Social Learning / Cognitive Theory was revised by Rogers (1975; 1983; Rogers & Mewborn, 1976) to become Rogers’ Protection Motivation Theory (see Figure 4). Rogers identified three crucial factors that determine acceptance or rejection of a fear appeal:

1. the magnitude of noxiousness of a depicted event,
2. the conditional probability that the event will occur provided no adaptive activity is performed, and
3. the effectiveness of the a coping response that might avert the noxious event ((Rogers & Mewborn, 1976), p.55)

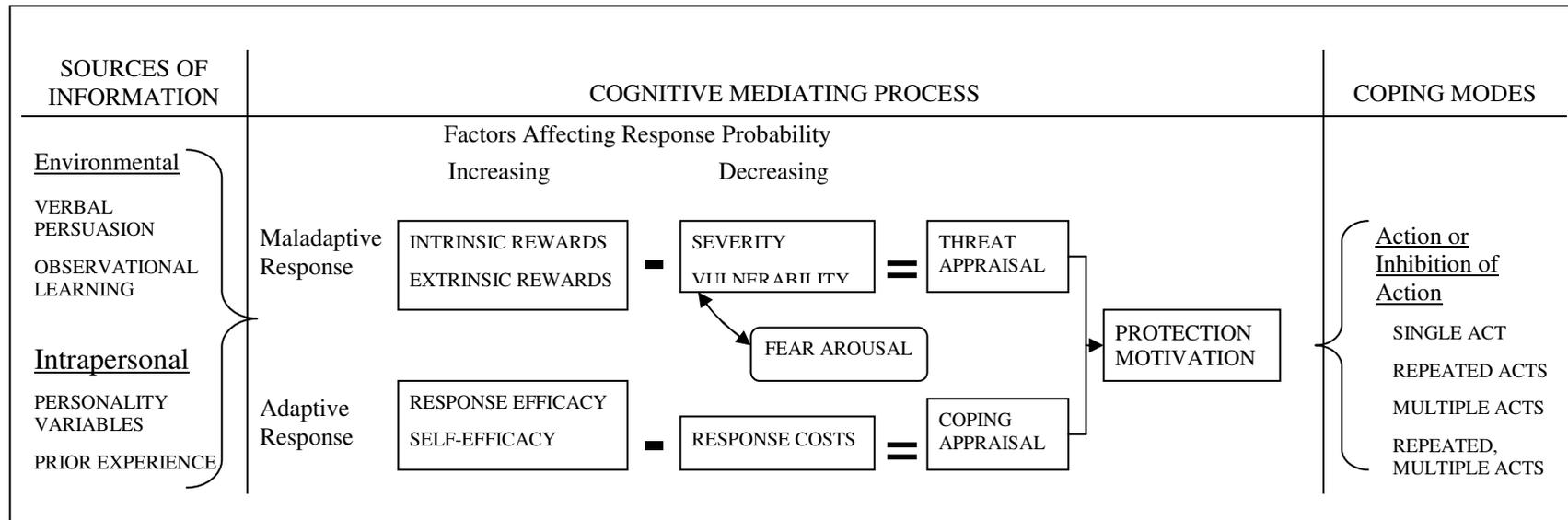
Fear arousal messages are most likely to be effective when the threat is perceived as serious, and the consequences likely to occur if there is no action taken, and unlikely to occur if the recommended action is taken. Both the response efficacy (how well the adaptive behaviour averts the threat) and self-efficacy (how well the individual is able, or perceives himself as able, to carry out the recommended behaviour) influence the efficacy of the coping response. The behaviour that results can be appropriate / adaptive or inappropriate / maladaptive. For example, if an individual correctly assesses a threat as serious, but has low self-efficacy, then maladaptive coping responses are more likely to result than the recommended behaviour. Alternatively, an individual who correctly assesses a threat and has high self-efficacy is more likely to undertake an adaptive coping response, specifically the recommended behaviour. Rogers proposed these two main inputs influence protection motivation, which in turn motivates behaviour:

1. an appraisal of the threat; and
2. an appraisal of one's ability to deal with the threat in the recommended manner.

According to Donovan et al. (1995), the model is receiving considerable attention from both public and commercial health marketers. They recommended incorporating a "benefits appraisal" (similar to HBM's benefits-costs) as a third input, operating either in parallel with the threat and coping appraisals or afterwards. A simple Protection Motivation Theory model was used in the NSW "Under 05 or Under Arrest" campaign (Bevin, 1987; cited in Woolley et al, 2001).

Another issue discussed by Woolley et al (2001) is that of imminence or immediacy of threat, which refers to the timeframe in which the threat is likely to occur. A fear appeal concerning an immediate threat will be more effective than one referring to a possible outcome in 20 years. LaTour and Zhara (1988) stated that the model is unable to be satisfactorily validated due to the difficulties with the measurement of fear. However, other research states that the model has been tested empirically with some success (Beck & Lund, 1981; Tanner, Day, & Crask, 1989) and according to Woolley et al (2001) offers the most useful specification of the stimulus conditions that effect persuasion.

In conclusion, notwithstanding the difficulties validating the model, the model deals well with the range of variables, including both coping responses and self-efficacy. The model would be well suited to application in the road safety mass media campaigns.



**Figure 4.**

**Rogers' Protection Motivation Theory (adapted from Witte, 1992)**



perceived severity regarding a threat, but a low level of perceived susceptibility. A classic example of this type of relationship is the perception of AIDS. Most people perceive it as very severe, and that they have a very low likelihood of catching it thus they are unlikely to appraise a high level of threat. It is also critical that messages promote strong perceptions of both self-efficacy and response efficacy, otherwise the message is likely to arouse a fear control response. Messages using the fear appeal approach have been used in areas such as skin cancer prevention, pregnancy prevention, radon awareness, tractor safety, nutrition programs and breast self-examination (as cited in Lapinski & Witte, 1998).

In conclusion, EPPM is a comprehensive model, particularly due to the inclusion of variables such as perceived severity, susceptibility and fear response. Adaptive and maladaptive coping responses are also included. The model was developed from HBM, but utilises aspects of fear appeal theory and coping responses with good effect. The model is highly relevant for the field of road safety.

## 2.11. GENERAL DETERRENCE THEORY

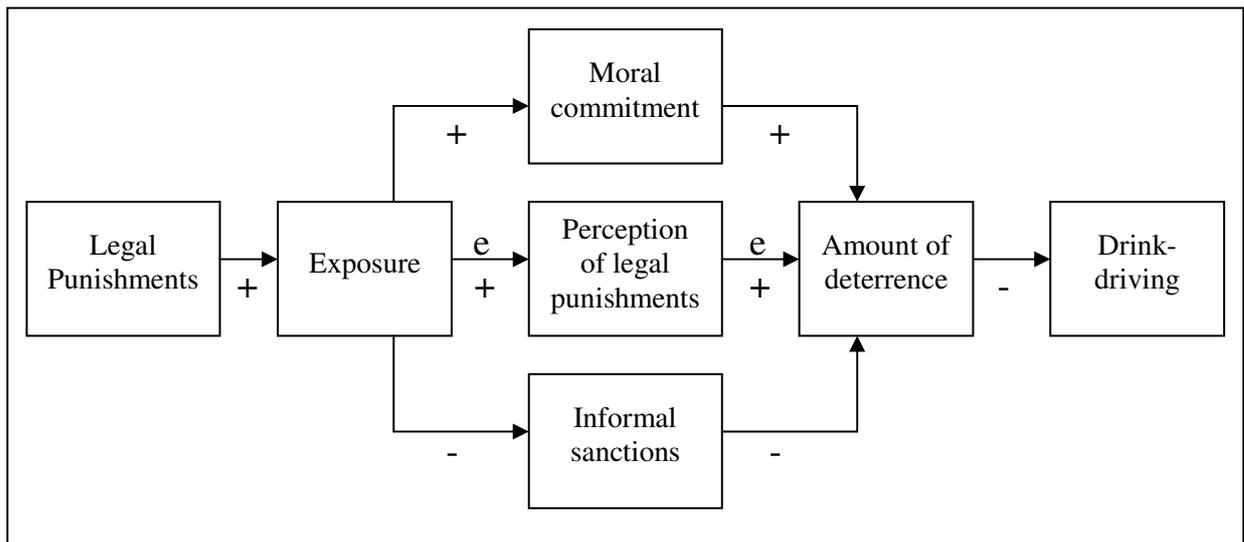
Definitions of deterrence have been widely debated and disputed in the literature. The definitions used here are specifically targeting concepts most relevant to the study of RBT (Random Breath Testing). There is a plethora of definitions of far greater complexity and scope than is available in this report. Homel (1988) distinguishes between *general deterrence*, which refers to the impact of the threat of legal punishments on the general public; and *specific deterrence*, which refers to the impact of legal punishments on those who have suffered them. In Homel's usage, *deterrence* refers to "the effects of legal sanctions on behaviour through the mechanism of fear of legal punishment".

General Deterrence Theory was developed in an effort to predict a deterrent effect of RBT as implemented in NSW, Australia (Homel, 1988). There are key propositions that undergird the model. Specifically, individuals must be exposed to law enforcement or receive information about law enforcement before they can be deterred. Furthermore, a process of evaluation gives meaning to experiences and cognitions such as exposure to law enforcement or perceptions of legal sanctions. There must also be investigation of the effects of official legal activity on non-legal sanctions that inhibit or encourage drinking and driving, in order to enable identification of the deterrent effects of legal activity.

The model proposes that people link official legal activities and illegal activities (such as drink-driving) through exposure to law enforcement (see Figure 6). The consequent perception of severe or even certain sanctions, results in attempts to avoid committing the offence. The behaviour of all types of persons can be described in terms of the deterrence model, including those with highly developed consciences regarding drink-driving and "high-risk" people such as problem drinkers or alcoholics.

The "non-legal sanctions" component highlights the importance of the physical and social environment. The individual is assumed to be subject to three types of social control mechanisms; guilt feelings from the internalisation of norms, threat of social stigma from informal sanctions, and the threat of physical and/or material deprivation. Material deprivation can be legal (loss of license etc.) or the costs and inconveniences associated with *not* driving after drinking (taxi costs, picking car up next day etc.), or the cost of an accident. There is a complex array of contradictory sanctions. Given this, the model proposes that an individual faces a *choice between losses*. The decision-making process is

influenced by the complex and possible interactive relationship between the perceived costs associated with non-legal sanctions and those associated with legal sanctions.



**Figure 6. General Deterrence Theory (adapted from Gibbs, 1975)**

As informal and formal sanctions frequently operate in opposite directions, it is not possible to predict deterrence unless the effects of legal sanctions on informal sanctions can be stipulated. In the case of RBT, the model proposes that legal actions reduce peer pressure to drink drive by providing a socially legitimate excuse for the range of behaviours associated with not drink-driving. For those with a prior conviction, the excuse is all the more cogent proportionate to the severity of punishment received. Equally, episodes where individuals have successfully drunk and driven without sanction also operate as a form of exposure to legal activity. Different forms of exposure to legal activity or differing interpretations of legal activity can result in differing evaluations of threatened or actual legal sanctions, even if there are no differences in *perceptions* of the legal threat.

The model is an extension of that proposed by Gibbs (1975). In Figure 6, the arrows indicate positive and negative causal relationships, and the small e's denote the process of evaluation. Social and demographic variables such as alcohol consumption, age and sex are also assumed to influence all components of the model.

In conclusion, General Deterrence Theory was developed specifically for the area of road safety. The model's limitations lie in the lack of explanation for the psychological aspects of behaviour, such as self-efficacy and motivation. The strengths of the model are the elements of enforcement, which are covered in comprehensive detail and include material elements of the system such as the costs (both time and money) associated with not drink-driving. The addition of social and demographic variables is also effective. The model has been less widely applied than other models, partially due to its very specific nature. Depending on the target behaviour (e.g. a behaviour linked with active enforcement) of a mass media campaign, the model could be very effectively applied in the area of road safety.

## 2.12. CONCLUSION: THEORIES

In conclusion, the theories reviewed have been applied to a range of behaviours with varying results. Furthermore, different theories are more applicable to particular behaviours. There has been a wide range of debate regarding the utility of many of the theories. A number of the commonly employed theories have been criticized in regard to their utility (Lapinski & Witte, 1998). Specifically, critiques have highlighted problems regarding (Hochbaum, Sorenson, & Lorig, 1992; Meyer & Dearing, 1996);

- a) the focus on the individual and the exclusion of social and environmental factors,
- b) the emphasis on the one-way flow of information, neglecting the interactive nature of communication,
- c) the lack of either political, administrative or fiscal feasibility, and
- d) limited applicability to unique populations.

Elliot (1993), however, suggested that studies using Social Cognitive Theory or TRA were more likely to be effective because the theories helped to maintain focus on determinants underlying the decisions to perform (or not perform) a behaviour. The more that is known about the influential factors (on behaviour, intentions or decisions) the greater likelihood the behaviour can be influenced.

The theories have been developed for, and applied to a wide range of behaviours. TRA was found to have wide application in traditional health behaviours, but has less utility in the road safety field, due to the lack of variables such as efficacy, emotional response and enforcement. TPB has improved on the TRA with the addition of Perceived Behaviour Control, however, still retains the same empirical problems in regard to application to road safety. HBM has also been widely used, and incorporates useful predictors such as perceived severity and susceptibility. Social Learning theory is a further development of HBM, with the addition of self-efficacy; the model could be usefully applied to the road safety field. Evaluating models utilising fear appeals uncovered a range of difficulties inherent in the measurement of fear, and the associated perceptions regarding the health threat, specifically, probability of occurrence, severity and susceptibility. Nonetheless, Rogers' Protection Motivation Theory is a complex yet useful model. It would be well suited to application in road safety, with the inclusion of fear arousal, coping responses and self-efficacy. EPPM is a further development of the HBM, with the inclusion of adaptive and maladaptive coping, perceived severity, susceptibility, and fear response. EPPM would also be suited to road safety campaigns. General Deterrence Theory was developed specifically for the area of road safety, which confers advantages in terms of comprehensive coverage of elements of enforcement; however, does not cover the more psychological aspects of behaviour. Thus, the theories have varying applicability to road safety. Theories that appear particularly suited to road safety are Roger's Protection Motivation and EPPM. General Deterrence Theory is also valuable however is more specific to the enforcement aspects of the behaviours rather than the psychological aspect of the behaviours. Woolley et al (2001) suggests understanding the behavioural component highlights the importance of social persuasion framework to guide research in road safety, with the added benefit of further guiding evaluation.

## 2.13. SPECIFIC MASS MEDIA CAMPAIGN EVALUATIONS

### 2.13.1. Cigarette smoking

#### *Evaluation of the excuses campaign*

In Australia, 50 people a day die from smoke-related health illness (NSMA, 2003). In 1996, the Victorian Quit Week Campaign focussed on encouraging adult smokers to quit. The “Excuses” campaign addressed the excuses that smokers give for being unable to quit, their perceived difficulties in quitting, dangers of everyday health effects caused by smoking, and where to go for help to quit (Morand & Mullins, 1998).

The television campaign shows a man on a couch listing the excuses why he cannot quit. For every excuse, such as, “It’s too late to quit”, “I’ll put on weight” or “It relaxes me”, a voice-over replies. The respective responses are: you can benefit from quitting even if you’ve been smoking for forty years, you won’t necessarily put on weight, cigarette smoking increases blood pressure and heart rate. As the excuses and responses continue, the man’s brave face subsides. For the radio advertisement, the excuses of weight, enjoyment, and relaxation are addressed in separate campaigns lasting 60 seconds. At the end of each campaign, the phone numbers for Quitline (a telephone help line providing advice on quitting) are given.

At the end of the excuses campaign, a telephone survey of 501 respondents from Melbourne and regional Victoria was undertaken. Results of the telephone survey showed that almost a third of respondents felt that they were closer to quitting compared to one month ago. The majority of respondents (89%) had seen some form of anti-smoking campaign during the year. Only 48% had seen the excuses campaign. Of those who had, the resulting action was often nothing (86%). Furthermore, only 28% of respondents felt encouraged to quit as a result of seeing the campaign and the results also indicated that the campaign did not persuade the respondents to try to quit. The survey results indicated that respondents viewed the campaign as credible and applicable, however it failed to make smokers feel uncomfortable about their smoking habits. Overall, the “Excuses” campaign was regarded as unsuccessful in encouraging smokers to quit.

Despite this lack of success in self-reported quitting behaviour, in the context of the current report, a highly relevant finding emerged. When respondents were asked what type of ad would make them more likely to quit, 26% of the responses referred to showing the impact of smoking on the smoker’s body. Importantly, ten per cent of respondents referred to the gory and graphic advertisements such as the sponge ad and *TAC ads*. The sponge ad depicts a sponge (representing a smoker’s lung) being squeezed to remove tar absorbed by an average smoker over one year. That respondents reported, unprompted, the existence of the TAC advertisements whilst being surveyed on the effects of a smoking campaign demonstrates the impact that TAC ads have had on Victorians. In a study of audience perceptions to the TAC ads, conducted by Harrison and Senserrick (1999), participants regarded the emotive style ads as the most effective compared to enforcement, instructive and enforcement/emotive style ads (see chapter 4 for a detailed description of this study).

#### *Every cigarette is doing you damage*

The National Tobacco Campaign’s first phase was launched on 7 June, 1997 and was aimed at smokers aged between 18-40 years (Wakefield, Freeman, & Boulter, 1999). The message, “Every cigarette is doing you damage”, was portrayed through television commercials which also showed the effects of smoking on the body, including lung tissue,

arteries and lung cells. Smokers were urged to seek help in quitting by contacting the Quitline. In 1997, an evaluation of the effects of the campaign was carried out in May (baseline survey) November (follow-up survey). Responses to the baseline and follow-up surveys were compared based on the sample of smokers and recent quitters (those who had quit in the past year) who were aged between 18-40 years. There were 1,192 respondents at baseline, and 2,981 at follow-up.

Respondents were asked whether anti-smoking advertising made them more or less likely to both quit and stay quit. For both questions, the results showed that advertising had no impact on whether respondents quit or stayed quit at baseline. However the follow-up respondents indicated that the campaign was more likely to help respondents to quit and stay quit. This indicated that following the advertising campaign smokers were more likely to respond to the advertising in that they were more likely to quit and stay quit.

Overall the campaign was successful in getting smokers to consider quitting and also to consider the message (that every cigarette is doing you damage) as new information about the health effects of smoking. The campaign was also successful in preventing recent quitters from relapsing as this subgroup reported that the campaign made them more likely to stay quit.

### **2.13.2. Sun Exposure**

#### ***Sun Smart Campaign***

Australia has the highest rate of melanoma in the world. Hill, White, Marks, and Borland (2002) argued that because exposure to sunlight sufficient to cause sunburn has been shown to be a major risk factor for cutaneous melanoma, and behavioural factors are related to the occurrence of sunburn, it is possible for individuals to exert control over the degree of risk of melanoma development. Hill et al., evaluated the effects a Sun Smart campaign had on changes in behaviour to sun exposure.

The Sun Smart campaign contrasted two women, whereby one was sunburnt and the other Sun Smart, but also attractive and elegant (Hill et al., 2002). The campaign was aired on television and radio and also shown on outdoor advertising. The campaign also utilised extensive support activities, including public relations, community support activities, and promotional activities providing discounted protection items (e.g. sunscreen, hats etc). In the time that the campaign was being aired, a telephone survey of Melbourne residents was conducted during the 1988, 1989, and 1990 summer periods (from the beginning of December to the end of February).

Results of the telephone surveys were assessed for changes in behaviour over time. Significant changes in behaviour over time and also in health beliefs concerning exposure to the sun and beliefs favourable to suntanning were found. Specifically, over the three year period respondents reported increased hat and sunscreen use (rather than an increase in amount of clothes worn) and also a decline in exposure to the sun during the highest risk period. The Sun Smart campaign was considered successful, in that it provided evidence to suggest that changes in behaviour (i.e. reduction in sunburn at a population level) occurred as a result of the campaign. Hill et al., reported that the campaign was “imaginative, well funded, and comprehensive” (p. 175), but a research design that could establish causality was required in the future.

### **2.13.3. Summary of Evaluations**

There is no clear understanding in the social psychological literature nor in the area of public health, of the relationship between attitudes and behaviour, especially when the campaign includes an enforcement component. Public health campaigns targeting cigarette smoking and sun exposure have shown that campaign that focuses on the damage caused by these particular behaviours are successful in changing self-reported behaviour.

## **2.14. CONCLUSIONS**

In conclusion, in regard to cigarette smoking, two different approaches were used. The first approach used in “Excuses” campaign addressed the excuses used for not quitting, the perceived difficulties, where to get help, and the dangers of everyday health effects. Technically, this campaign contained the necessary elements of both the health threat and the recommended action. Evaluation of the campaign, however, showed that the campaign did not persuade respondents to quit, and it failed to make smokers uncomfortable about their smoking habits. Furthermore, feedback also indicated a preference from respondents for more emotive style fear appeals. The second campaign “Every cigarette is doing you damage” utilised a fear appeal approach. The campaign showed relatively gory scenes of the damage to the body caused by smoking, along with the recommended action of quitting. The campaign was also described as providing new information about the nature of the health threat. The campaign was evaluated as being very effective, persuading both smokers to quit, and quitters to stay quit.

In line with the theories covered earlier in this chapter, both EPPM and Rogers’ Protection Motivation would suggest that the latter campaign instigated an adequate (yet not overwhelming) fear appeal. Some individuals with adequate response efficacy and self-efficacy were able to take the appropriate coping action and quit. The lack of immediacy associated with the health threat can be a difficulty in mass media campaigns for threats such as AIDS and cancer. Such a factor may have contributed to the relative lack of success of the “Excuses” campaign. Furthermore, the threat (everyday health effects from smoking) may have not aroused sufficient fear, possibly due to perceived lack of severity or susceptibility. Arguably, the more emotional and dramatic nature of the second campaign resulted in more people taking the recommended action of quitting.

The Sun Smart campaign was also evaluated as successful in achieving the desired behaviour change over a 3-year period. The campaign attempted to use two role models, to change the public perception of desirable social behaviour, in this case, from being sun-tanned, to not being sun-tanned. Notably, this campaign did not utilise a health threat or fear appeal. The campaign did however, utilise extensive support activities, including public relations, community support activities, and promotional activities utilising discounted protection items (e.g. sunscreen, hats etc). The evaluation did not separate the relative contribution of the different campaign activities, specifically; the effect of the television advertisement was not differentiated from the effects of the press advertising and promotional activities.

Knowledge pertaining to the campaign dynamics could be increased through the application of the earlier, simpler health theories such as TRA and TPB, which don’t rely on the presence of a health threat and coping skills, but place greater emphasis on behaviour change as influenced by subjective norms. Thus, it could be argued, that the

mechanism of change from this campaign was a change in social norms associated with sun tanning through the use of role models.

In conclusion, it is clear that the theories are applicable to different types of behaviours and different types of campaigns. Variables associated with the health threat such as imminence, probability, severity and susceptibility all play an important role. Furthermore, the weighting of the variables in the model will also vary in regard to the target behaviour. For example, in the Sun Smart campaign, changing subjective norms was an important part of decreasing sun-tanning behaviour. It can be argued that resisting sun tanning uses less coping skills, than for example, quitting smoking. In order to change cigarette smoking behaviour, relatively greater emphasis would need to be placed on the response efficacy, self-efficacy and coping skills of the respondent rather than the subjective norms. Thus the success of the theory's application will depend on the match with the aims of the mass media campaign, which in turn should stem from thorough assessment of the targeted health risk behaviour. Further features of mass media campaigns will be discussed in the next chapter.

### **3. FEATURES OF MASS MEDIA CAMPAIGNS**

The previous chapter contained an overview of the theories that can be used to guide the development of mass media campaigns. Two alternate areas of mass media campaigns were also outlined, specifically campaigns to reduce cigarette smoking and sun exposure. Within the literature, a number of issues are raised which concern methods with which mass media campaigns are developed. These issues stem from theories and mass media campaigns in both road safety and others areas. This chapter will review these issues.

#### **3.1. MASS MEDIA CAMPAIGN DESIGN**

There is a wide range of issues related to the strategic design of mass media campaigns, which also have implications for cost effectiveness. The variety of elements involved includes the target behaviour and audience, message and campaign characteristics, links with enforcement and legislation, and institutional management.

Identification of target behaviour has ramifications for many details of a mass media campaign. Many strategies and theories that are relevant for brand-focussed campaigns are less relevant for health behaviour campaigns. Further differentiation can be made between legal behaviours that carry health risks (e.g. sun exposure, smoking, unsafe sexual practices) and illegal health risk behaviours (e.g. speeding, non-use of bicycle helmets) that are linked with legislation and (sometimes) enforcement. Different strategies are required for different types of behaviours and their associated legal status. The issues regarding the legal status, and any associated enforcement add further complexity to both the development and evaluation of mass media campaigns. Furthermore, the complexity of the components within the models is increased. For example, subjective norms would not only relate to significant others' perception of the health risk and the recommended actions, but also regarding the legal ramifications of non-compliance. Rothengatter and Carbonell Vaya (1997) found that experiments using behavioural messages to modify speeding behaviour were more effective than those using attitudinal messages, regardless of media used.

The target group also needs to be carefully identified through consideration of the issues involved, including not only the legal status, but also the nature and definition of the behaviour. A well-defined behaviour is more appropriate for a short message (Cameron & Harrison, 1998). The most effective strategies and content vary for different age and/or gender groups (Donovan et al., 1995). Identification of the target behaviour leads to identification of the characteristics and circumstances most frequently associated with the behaviour, and hence, identification of the target group (Cameron & Harrison, 1998).

Once the target behaviour has been identified, the campaign and message characteristics can be developed. One of the most basic issues in considering campaign characteristics is the choice of appropriate media. Possible media includes television, radio, press advertising, cinema advertising, and brochures. Cameron and Harrison (1998) reported on the advantages and disadvantages of each type of media. They reported that television has generally been considered the most persuasive medium, due to the realistic depiction of human emotion and moving images. Radio can be particularly significant in areas with wide population distribution and remote areas. In-car immediacy is also an added advantage, along with the capacity to target specific regional areas. Press advertising allows for the portrayal of graphic images, and the provision of text. Outdoor advertising is confined to graphic images and key text. Cinema advertising is usually used as an

adjunct to television advertisement campaigns, often showing the same film clips. Brochures can include graphic images and text, with the advantage of being able to convey quite complex messages.

Further important variables relate to media placement, including issues such as duration of campaign, intensity, timing and exposure. These issues are also crucial in terms of cost effectiveness. The intensity of media placement needs to achieve sufficient intensity to be received and absorbed by the target audience (Cameron & Harrison, 1998). Snyder and Hamilton (2002) conducted a meta-analysis of 48 campaigns, and included length of campaign in their evaluation. They suggested that longer campaigns provide a longer period of time for people's behaviours to change, including those people that are slower to change. Yet they also allow longer for backsliding after initial compliance. Snyder and Hamilton found that campaigns lasting 1 year or less were more successful than campaigns of a longer duration, however they also stated that shorter campaigns may have achieved greater frequency of contact. As they were unable to code frequency of intensity of the campaigns, this was unable to be tested. Timing of media placement also plays a part in reaching the target audience. For example, a campaign targeting parents would need to play when parents are likely to be exposed to that media.

In the category of message characteristics, there are two major conceptual areas requiring consideration in message development: specifically content and style. Message content needs to be based in research to establish the specific characteristics of the target behaviour and target group (Cameron & Harrison, 1998). Establishing specific characteristics then allows identification of the target group's attitudes, perceptions and self-reported behaviours. The message needs to be tailored to the social and psychographic profiles of the target audience (Flynn et al., 1994; Maibach & Cotton, 1995; Palmgreen, Donohew, Lorch, & Harrington, 1995).

Cameron and Harrison (1998) also recommended that if there are a number of related messages, they should include a consistent slogan. Furthermore, there should not be too many different messages in any one time frame, in order to avoid confusion among the target audience. Message content also needs to be realistic and credible, portraying members of the target group. Snyder and Hamilton (2002) discussed the role of enforcement. They reported that campaigns that included messages about enforcement showed larger effect sizes than persuasive campaigns without enforcement messages. They also suggested that in the absence of enforcement, messages that contain new information were associated with greater effect sizes.

Further variables for consideration can be described as message style, which includes variables such as the spokesperson (if any) used, and informational versus emotive styles.

The spokesperson can be a role models, specifically, a real member of the target audience who has changed their behaviour. Snyder and Hamilton (2002) reported that they did not find that the use of role models made a significant contribution to effect size. In the absence of a role model, characteristics of the spokesperson are relevant for consideration. Those who are more persuasive are typically credible (Hass, 1981), attractive (Chaiken, 1979; Janis, 1983), and male (Robinson & McArthur, 1982). In the area of road safety, the use of a recognised "figurehead" can also add further credibility to messages (Cameron & Harrison, 1998).

Cameron and Harrison (1998) recommended relating the style of the message to the behaviour change strategy. The most effective method of emphasising the perceived consequences of unsafe behaviour is through informative-style materials. Stronger and more persuasive styles such as an emotive television advertisement (as used in Victoria and New Zealand) can be used in order to change the precursors to unsafe behaviour, or to achieve substantial reductions in road trauma. These would consist of public education materials with a high level of impact on the unsafe road behaviours. Such styles can also attempt to enhance the perceived consequences. In road safety this often consists of increasing the perceived the risk of enforcement.

Donovan et al (1995) stated that they believed the issue was not whether a campaign approach is too emotional or too negative, but rather whether the targeted motives are correct, and also whether the portrayed emotions are consistent with the target and credible. Donovan et al also reported on expert opinion, stating that a negative approach was generally considered more appropriate in road safety advertising. Emotional yet serious ads were also considered more effective than logical or humorous ads. The role of mild or strong fear, however, was a contentious issue. Overwhelmingly, drama ads were considered more effective than lecture style ads.

### **3.2. Campaign Management**

Cameron and Harrison (1998) provided a summary on the management of public education, covering issues of co-ordination, responsibility for decision-making, the role of research, priority setting and community support.

Co-ordination refers to the institutional relationships and management of public education in general. It is recommended that there is a key agency responsible for all advertising through the electronic media. It would also need to consult with all interested organisations, aiming to co-ordinate all of the related public education activities.

Responsibility for decision-making needs to rest with a senior officer at the key agency. Often decisions about materials for mass media campaigns have been made by committees or government Ministers, when they should be based on research with the group targeted by the advertisement. Independent research is essential in the development of mass media campaigns, when the costs of development and placement are high. Research also plays a role in tracking the reaction to the mass media campaign.

Priority setting is required to ensure there are limited themes and messages about a single topic available at one time. Without priority setting, the target audience may become confused. Community support can also be used to engender additional support for the elements of messages that the public may be more likely to react against.

## **4. EVALUATIONS OF ROAD SAFETY MASS MEDIA CAMPAIGNS**

A large body of international literature exists that examines the effect of road safety campaigns executed through the mass media on road safety. This chapter of the report aims to identify and discuss such evaluations and consider the implications that arise from them. Two large studies conducted during the past decade provide a comprehensive overview of the research relating to road safety campaigns conducted through the mass media prior to 1997. These studies are discussed below and used as a platform from which to examine other more recent research. In particular, numerous evaluations of the effect of Victorian TAC advertising are presented followed by a discussion of evaluations of individual mass media campaigns in New Zealand, North America and Europe. Finally some concluding remarks are offered.

### **4.1. META-ANALYSES**

#### **4.1.1. Elliott, 1993**

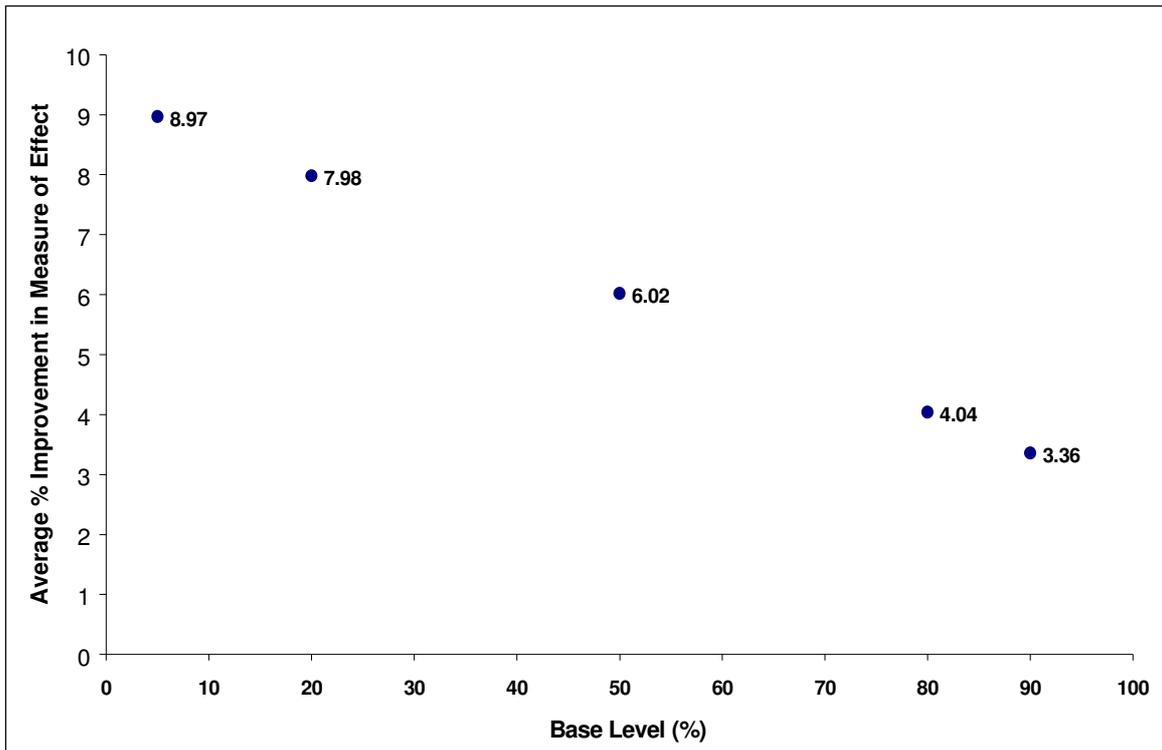
The first of the two key reviews of mass media and road safety was conducted by Elliott (1993) and examined eighty-seven individually evaluated road safety mass media campaigns using meta-analysis techniques. The study examined road safety campaigns targeting six key areas of road user behaviour: vehicle restraint usage, drink driving, bicycle helmet usage, motorcycle safety, pedestrian behaviour and speeding behaviour.

However, only those mass media road safety campaigns evaluated using outcome measures relating to awareness, knowledge of the issues, attitudes, motivations/intentions or behaviour were included in the study. Further requirements for inclusion in the study included that the outcome measure(s) be taken both before and during/after the campaign and that some information concerning the campaign itself, such as message, media and rationale, be provided.

The eighty-seven campaigns evaluated provided a total of one hundred and seventy-five individual outcome measures of effect that were categorised by reference to numerous variables relating to the campaign characteristics. Of the measures of effect included in the study, 43 percent related to Australian campaigns, 20 percent to campaigns from the USA and 17 percent to European campaigns. The remaining measures of effect were derived from campaigns conducted in New Zealand, Canada and other countries. In terms of the duration of campaigns, 68 percent of the outcome measures of effect related to campaigns lasting ten weeks or less and only 16 percent related to campaigns lasting twenty weeks or more. The majority of the measures of effect resulted from educative campaigns (67%) and 21 percent from persuasive campaigns. Prior qualitative or quantitative research was undertaken in campaigns resulting in 58 percent of the measures of effect although only a quarter of the measures resulted from campaigns based on a specific theoretical model of campaign development or effects. The majority of effects were derived from campaigns involving public relations, associated publicity, and or legislation as a support, whereas, enforcement played a less prominent role (34% of measures of effect). Finally, television was related to the most measures of effect as the type of media used (121), followed by radio (105) and newspapers/magazines (99). The majority of the measures of effect related to campaigns that ran continuously (91) and used more than one advertisement (125) throughout the life of the campaign.

## Results

Using the actual measures of effect derived from the road safety campaigns described above, Elliott used Glassian meta-analysis techniques to determine an average campaign effect. He determined that, on average, a road safety campaign conducted through the mass media will result in a 7.5 percent improvement in the relevant outcome measure of effect. Further to this general effect, a weak relationship was found between the base level of the outcome measure and the potential improvement to this level that could be generated by a mass media campaign. In particular, it was determined that as the base level of the measure of effect increased, the gains made by mass media campaigns reduced. The precise relationship is shown in Figure 7 below.



**Figure 7. Relationship between the base level of the measure of effect and the average improvement in that measure following a mass media road safety campaign.**

The level of improvement in the measure of effect was also found to be affected by the type of measure being used to evaluate a campaign. The effect of mass media campaigns was greatest when awareness of the campaign or campaign issue was examined. In contrast, the effect of mass media campaigns was smallest when casualty crash data was used to evaluate the campaign. The author suggests that the use of awareness as a measure of effect is not adequate to capture the impact of the campaign on knowledge, attitudes or behaviours. Rather such measures relate more directly to exposure which is most likely only the first of many possible steps leading to behaviour change. Given the particularly large effect sizes in these circumstances, evaluations relating solely to awareness of the campaign or campaign message were excluded from further analysis. This reduced the total number of measures of effect under examination from 176 to 157. These measures of effect related to knowledge, attitude/interests, motivations/intentions, self reported behaviour and observed behaviour.

The exclusion of nineteen measures of effect did not impact on the direction of the results with respect to the relationship between the base level of the measure and the average

improvement following a mass media campaign. That is, as the base level of the outcome measure increases, the expected improvement in the measure of effect is reduced. Elliott looked particularly at the difference in the effectiveness of campaigns when the base level of the measure of effect was less than and alternatively greater than 40 percent in the relevant campaign population. Australian campaigns were also examined separately. The analysis clearly demonstrates that the effect sizes were much greater when the starting point of the relevant measure of effect was less than 40 percent. However, some inconsistent results did emerge and will be discussed shortly.

The remaining one hundred and fifty-seven measures were used to estimate the average effect size of road safety mass media campaigns using Glassian meta-analysis techniques. It was determined that *on average a road safety mass media campaign will improve the relevant outcome measure of effect by 6 percent*. Further, conclusions were also drawn by the authors in relation to the influence of particular campaign characteristics on campaign effectiveness. In particular, persuasive rather than educative/informative approaches were found to be more effective. Similarly, emotionally based campaigns had a greater effect than those which were rationally based and persuasive campaigns were more likely than educative or information oriented campaigns to impact on the outcome measures of effect. However, the effect of persuasive campaigns was not significant when the base level was greater than 40 percent. In addition, campaigns based on negative appeals had a greater effect than those based on positive appeals when the base level was less than 40 percent. However, the reverse was true when the base level was greater than 40 percent.

Campaigns involving prior qualitative or quantitative research and those built around an identifiable theoretical model were found to be more successful than those in which these characteristics were not present. No information is available as to what type of theoretical models have been used successfully. Where the base level of the measure of effect was less than 40 percent, campaigns based on prior qualitative research were most effective. Campaigns based on prior quantitative research also impacted upon the outcome measures although the effect was less significant when the base level of the measures was less than 40 percent. Finally, the use of enforcement and public relations or associated publicity as supporting mechanisms was found to enhance the effect of mass media campaigns. The use of legislation alone had little impact on the outcome measures when not coupled with enforcement.

Further to the above analysis, Elliott used stepwise regression techniques to examine the combined effect of the base level of the outcome measure and other campaign characteristic variables. Significant results were identified for four distinct campaign characteristics: campaign supports, prior research, media weights and appeal emphasis. The major conclusions from this analysis are summarised below.

- A failure to incorporate public relations or associated publicity into road safety mass media campaigns is expected to reduce the impact on the relevant outcome variable by twice as much as a failure to legislate for behaviour change.
- The effect of legislation alone on outcome variables could not be isolated.
- Prior qualitative research used to inform mass media campaigns was found to increase the impact of campaigns although no effect of quantitative research could be identified.

- The only media type for which an effect could be identified was television. The authors suggest that this may be due to the generally high intensity of this medium.
- Of the various campaign appeal types, only those mass media campaigns based on emotional appeals were found to increase the effect size.

### ***Limitations***

Given the above results it is necessary to comment on some of the limitations of the evaluation. First, the necessarily strict requirements for the inclusion of evaluations in the review and meta-analysis led to a bias towards more scientifically rigorous evaluations and the exclusion of less well evaluated campaigns. This bias may have influenced the estimated effect sizes across all campaigns. On the other hand, the criteria for inclusion did not require that a comparison or control group be used in the evaluation. As the failure to use a control or comparison group allows for the influence of external factors to be incorrectly attributed to the relevant campaign, the estimated average effect size across all campaigns is likely to over or under represent the impact of the various campaign types to some extent. In addition, the meta-analysis was not able to consider the differing intensity levels of the campaigns included in the evaluation which would further impact on the overall estimate. Finally, the use of a standardised measure of effect leads to some difficulty in the interpretation of the results although it remains possible to draw some important conclusions from the analysis as discussed above.

#### **4.1.2. INRETS, 1999**

The second of the major reviews of evaluated road safety mass media campaigns was conducted by INRETS as part of the Gadget project and published in March 1999 (Delhomme, 1999). The focus of the review was distinctly European, however, attention was given to evaluated campaigns conducted outside of Europe, particularly in North America, Australia and New Zealand. In all, twenty-one countries were examined and 265 evaluations from seventeen countries published between 1980 and 1997 were included in the evaluation. The identification and selection of evaluations was conducted in a manner similar to that used in this report and discussed in section 1.1 above. For completeness it is noted that evaluations included in the review complied with the following selection criteria:

- The campaign under evaluation related to a road safety theme relating to drivers, safety devices in the vehicle or the vehicle itself
- At least one measure of effect was reported in the evaluation
- The campaign was conducted on a national, regional or local scale
- The evaluation was reported in some manner (includes unpublished reports)

The authors used the identified evaluations to conduct two distinct types of analysis. First, a qualitative and quantitative analysis was conducted detailing the characteristics of the body of evaluations. Of the 265 evaluations, the greatest number were conducted in the Netherlands (43). However, evaluated campaigns commencing in or prior to the early 1980s in the Netherlands were excluded to contain the number of campaigns from this country. Evaluated campaigns from the United States, Belgium, Canada, Australia and France also contributed significantly to the total number of evaluations, with each of these

countries adding between twenty-five and thirty-eight to the total number. The evaluated campaigns included in the review were drawn mostly from published reports (36.2%), followed by unpublished documents (31.7%) and scientific journals (18.5%).

In addition, the types of results presented in each of the evaluations varied between countries. In particular, evaluations conducted in the Netherlands, the United States, Australia and Canada presented the largest number of results using a before and during/after comparison. In contrast, French and Belgian campaigns were most often evaluated using one measurement only either during or after the campaign. This suggests that the campaign evaluations conducted in the first mentioned countries were more able to provide statistically valid results. The use of explicit theoretical frameworks and prior analysis in the campaign development was also examined. Approximately, 66 percent of the evaluated campaigns were based on prior analysis most frequently relating to behavioural or crash data. However, only 11.7 percent stated that the development of the campaign was based on an explicit theoretical framework. It is noted that the use of prior analysis or a theoretical framework to inform the campaign was associated with the presentation of the relevant measure of effect both before and during/after the campaign. Where no prior analysis or theoretical framework was used, it was more likely that the measure of effect was taken only once either during or after the campaign with no opportunity for comparison with pre-campaign conditions.

The three most frequently identified campaign themes were alcohol, seat-belt use and speeding. The majority of these campaigns (76.2%) were aimed at all drivers although some campaigns were targeted at specific groups of drivers, particularly younger drivers. The predominant medium used in the evaluated campaigns was television (67.5%). Billboards and radios were the next two most frequently used media. Further, these three media were the most likely to be used individually with no other supporting media. Smaller scale media such as cinema advertising and articles in the print media were rarely used as the sole media in a campaign. In addition to supporting media, the most common campaign supports were enforcement and educational programs. However, a significant proportion of the campaigns (26.4%), were not combined with any supporting activity. Approximately, 34 percent all the evaluated campaigns were combined with more than one supporting activity. Other campaign supports used included legislation, commitment with and without incentive, incentive alone and the use of feedback signs.

The median length of the evaluated road safety media campaigns was sixty days. However, there were significant variations from this with the shortest campaign lasting three days and the longest over seven years. The median length of the campaign did vary according to the campaign theme with alcohol related campaigns having the highest median length (90 days). Campaigns related to the use of seat-belts had a median length of 55.5 days and speeding related campaigns had a median length of 60 days. It is noted however, that the difference in the median campaign length of alcohol and speed related campaigns was not statistically significant. However, evaluated campaigns related to seat-belt use were found to be shorter in length with 95 percent confidence when compared to alcohol related campaigns. Irrespective of the campaign theme, the majority of the evaluated campaigns ran over one continuous period (71.7%) with the number of repeats unknown in 14.3 percent of the evaluations.

The second major analysis conducted by the authors was a meta-analysis. This technique was used to determine the average effect of road safety media campaigns on the frequency of crashes. Therefore, only those evaluations presenting the effect of the campaign on

crashes were used in the meta-analysis. This reduced the number of relevant campaign evaluations to sixty-six. A further sub-set of campaign evaluations was identified to ensure statistical reliability. As noted above, campaign evaluations were required to present at least one measure of effect in order to be included in the review. However, one measure of effect taking during or after the campaign is not sufficient to enable statistically reliable conclusions to be drawn as there is no opportunity for comparison with pre-campaign conditions. Similarly, where no comparison or control group is used, the effects attributable to the media campaign cannot be clearly identified. Therefore, only those campaigns taking at least one measure of effect before and during/after the campaign and using a treatment/control design were included in the meta-analysis. This restricted the number of evaluated campaigns to 35 studies from which 72 results were appropriate for use in the meta-analysis. Further, the analysis itself distinguishes the effects of road safety media campaigns during the period of the campaign and after its completion where possible.

### **Results**

*In examining all media campaign types it was found that a road safety media campaign will reduce crashes by an average of 8.5 percent during a campaign and 14.8 after the campaign is completed.* This compares to the earlier result of Elliott, who estimated a 7.5 percent reduction in the measure of effect generated by a mass media road safety campaign. However, it is noted that the target measure in this study is crashes only whereas all measures of effect were included in Elliott's research. Further, the distinction is made here between the immediate effect during a campaign and the effect of the campaign after its completion.

A number of more specific effects have also been estimated using meta-analysis techniques. In particular, the effect of media campaigns with alcohol or speed related themes have been isolated. Campaigns focusing on alcohol use were found to reduce crashes by an estimated 6.9 percent during the campaign and 30 percent after completion of the campaign. Campaigns addressing the issue of speed were found to reduce crashes by an average of 16.9 percent during the campaign. There were insufficient data to determine the effect of speed related campaigns after their completion. The effect of campaigns with all other themes was also estimated. On average such campaigns were found to reduce crashes by 8.1 percent during the campaign and 8.7 percent following completion.

The type of supporting activities used as part of a media campaign was also found to influence the overall level of crash effects. The effect of enforcement and legislation combined and the use of enforcement alone were estimated to result in crash reductions during the campaign of 16.8 percent and 6.9 percent respectively. The use of an explicit theoretical framework in campaign development led to larger crash reductions than when no framework was used. During a theoretically based campaign the frequency of crashes can be expected to fall by 20.1 percent on average. Similarly, following campaign completion the effect is expected to rise to a 23.4 percent reduction in crash frequency. The theoretical models and theories upon which the most successful campaigns were based include attribution theory, general and special deterrence theory, the organisational behaviour model and the structural model of compliance. The analysis of the effect of the use of television as a medium in mass media campaigns produced a surprising result. The use of television in a media campaign generated slightly lower crash reductions when compared to campaigns in which no television was used. The authors suggest that the research led selection of media for use in campaigns may contribute to this result. That is,

by choosing the most appropriate medium for a particular campaign the influence of television may not have been as great.

To further define the impact of media road safety campaigns, their effect on fatal and other personal injury crashes has been investigated separately. The effect of media campaigns on personal injury crashes both during and after completion (6.8% and 14.3% respectively) is estimated to be less than the effect of media campaigns on fatal crashes during the campaign (19.3%). No significant after effect could be identified with the available data for fatal crashes.

### ***Limitations***

Given the above results it is again necessary to state the limitations of the analysis. As in Elliott's review there was an over-representation of well designed and scientifically evaluated campaigns as these were more readily available. The authors noted that there was some difficulty in accessing unpublished documents in countries not participating in the GADGET project. These two factors combined may have led to an over or under representation of the effect of media campaigns on crashes. Nevertheless, a useful distinction was made in this review between the effect of a campaign during its operation and after campaign completion. There was however some difficulty in determining the length of the after period for all campaigns included in the review and thus calculating the distribution of after periods across all campaigns. In turn this led to some difficulty in the interpretation of the results. Finally, a useful extension of the analysis not considered in this review is the effect of the base level of crashes attributable to the target behaviour on the effectiveness of the campaign. The difficulty in obtaining such data may have prevented such analysis in this case.

### **4.1.3. Key Principles Emerging from the Two Meta-Analyses**

A number of key principles emerge from the two meta-analyses discussed above and are summarised below.

- The estimated impact of mass media road safety campaigns is likely to vary depending on the measure of effect used. Across all measures the effect has been estimated as a 7.5% reduction. When considering crash effects only, mass media road safety campaigns have been estimated to result in an 8.5 percent reduction during the campaign. The estimated cumulative reduction in crashes is 14.8 percent following campaign completion.
- In relation to crash reductions only, the influence of a mass media campaign is greater on fatalities than serious injuries.
- The use of an explicit theoretical model to inform the development of a media campaign is likely to result in greater reductions in the target variable whether this be casualty crashes or some other measure such as awareness. Similarly, the use of qualitative or quantitative research prior to the commencement of media campaigns is effective in increasing the reductions which result from them.
- The use of public relations and associated publicity or legislation and enforcement in conjunction with a mass media road safety campaign is effective in enhancing the impact of the campaign. The effect of legislation alone is not as substantial.

- Results relating to the most effective media are a little inconsistent. However, it is likely that factors such as the intensity of campaign and the theme and duration of the campaign may influence the effectiveness of the media used in the campaign. Therefore, the results relating to the medium used are not considered definitive.
- The effectiveness of positive and negative appeals varies according to the base level of the measure of effect. However, emotional and persuasive campaigns are more likely to be effective than educational/informative campaigns.
- It is noted that in both meta-analyses the effect of the media campaign was the variable under examination although it was not isolated from the effects of any supporting activities. This is a significant limitation of the research.

#### **4.2. TAC ROAD SAFETY ADVERTISING PROGRAM**

The Victorian Transport Accident Commission's (TAC) road safety program has been instrumental in the development of road safety advertising in Victoria. The program, commencing in the late 1980s, represented a fundamental shift away from the existing road safety advertising programs towards a more systematic approach. Funding for the program was dramatically increased, which in turn led to a greater public profile, improved quality of advertisements and an increasing role as a support mechanism for enforcement operations. The discussion that follows details the in-depth analysis of the TAC's program and highlights the principles for road safety mass media campaigns that can be derived from it.

In November 1989, Grey Advertising was approached by the Victorian Transport Accident Commission (TAC) to develop a campaign that would make road safety a cut-through social issue. The TAC's aim was to develop a style of advertising that had the potential to provoke all drivers to actively rethink their attitude toward drink-driving and speeding, regardless of age or sex. In addition, the campaign had to launch and communicate two new Police initiatives, the Random Breath Test (RBT) "Booze Buses" and Speed Cameras. Grey Advertising developed and implemented a communication strategy which had a media budget composed of 70% television, 14% press, 7% radio, 5% outdoor, 2% Sky Channel and 2% cinema advertising.

Grey Advertising has continued to act as TAC's advertising agency, developing advertisements with additional road safety themes to drink-driving and speeding. Television continues to be the major component of the TAC's media budget.

MUARC obtained comprehensive information about TAC campaigns from Grey Advertising for the period December 1989 to December 2001 and has published six reports which indicate, either directly or indirectly, the impact of the Victorian TAC advertising on crashes. Each television advertisement was launched under the banner of a general theme related to the road safety problem area targeted, and each had an associated slogan that was typically included at the end of the corresponding advertisements. Table 1 presents the themes and associated slogans of previous TAC advertisements.

**Table 1. TAC Advertisement Themes and Associated Slogans**

THEME	AREA COVERED		SLOGAN
	Metro	Rural	
Drink – Driving	✓	✓	“If you drink, then drive, you’re a bloody idiot.”
Speeding	✓	✓	“Don’t fool yourself, speed kills.”
Fatigue	✓	✓	“Wake up to yourself, fatigue kills.”
Seatbelts	✓	✓	“Belt up, or suffer the pain.”
Concentration	✓	✓	“It’s in your hands, concentrate or kill.”
Motorcycles	✓	✓	“Look bike. Hard to see, easy to kill.”
Country People		✓	“Country people die on country roads.”
Passengers	✓	✓	“If you don’t trust the driver don’t get in”
Youth	✓	✓	“Ask yourself, are they roadworthy?”
Older drivers	✓	✓	“Make sure you’re right to drive”
Speeding	✓	✓	“10 km/h will save lives.”
Speeding	✓	✓	“Wipe off 5 (or wipe out lives).”
Drink Driving	✓	✓	“Drink, Drive, Kill, Jail. If you drink, then drive, you’re a bloody idiot.”
Learners	✓	✓	“Ask yourself, Are you roadworthy.”
Learners	✓	✓	“You never stop learning.”
Speeding	✓	✓	“You speed, you pay. Speed Kills”
Drink Driving	✓	✓	“Stop yourself here, or we’ll stop you here. If you drink, then drive, you’re a bloody idiot.”
Speed	✓	✓	“For every 5 ks over the limit, your risk of crashing doubles. It’s never safe to speed.”
Fatigue	✓	✓	“A 15 minute powernap could save your life. Fatigue Kills”

### *Style of TAC advertisements*

From December 1989 to December 2001 there have been over 65 road safety campaigns developed by the TAC covering various themes, i.e. drink-driving, speeding, concentration, fatigue, seatbelts and others (motorcycles, older drivers, passengers, youth). For this evaluation the television advertisements have been classified into the following different styles, based on the perceptions of road safety researchers or marketing professionals.

- Emotive
- Emotive-Instructive
- Enforcement-related (an informative style)
- Instructive (generally learner driver messages up to year 2000)
- Emotive and Enforcement (these advertisements have both emotive and informative style components).

#### 4.2.1. Impacts of TAC Advertising on Crashes

As stated above, MUARC has published six reports which indicate, either directly or indirectly, the impact of TAC advertising on casualty crashes in Victoria. In addition, a related paper was prepared by a member of staff of the Monash University Department of Econometrics, who had worked in close collaboration with MUARC staff. Five of the reports/papers had specific components related to the advertising, whereas two reports included the advertising with a range of factors being considered to explain trends in serious casualty crashes. Each of these reports will now be discussed in turn.

**Report 1: *Crash-based evaluation of the speed camera program in Victoria 1990-1991. Phase 1: General effects. Phase 2: Effects of program mechanisms*** (Cameron, Cavallo, & Gilbert, 1992)

New slant radar speed cameras were progressively introduced in Victoria commencing with four in December 1989 and building to 54 by January 1991. The program included the high-exposure TAC publicity campaign "Don't fool yourself - speed kills" launched in April 1990. The number of Traffic Infringement Notices (TINs) issued per month for offences detected by the speed cameras rose to levels averaging 16,100 during the second half of 1990 and 43,100 during 1991.

The study evaluated the effect of the program on changes in "low alcohol hour"<sup>1</sup> casualty crashes and their severity during four periods from December 1989 to December 1991 in which there were different combinations of levels of publicity and camera activity. The evaluation included a phase from April to June 1990 when there were negligible levels of camera use (after an intense 9 day burst at the beginning of April) but the television publicity continued at a high level following the launch at Easter. During this period the study showed statistically significant reductions in casualty crashes and their injury severity of 24% and 29%, respectively, in Melbourne during the low alcohol hours of the week, and a 21% reduction in the low alcohol hour casualty crashes in rural towns. These reductions were measured relative to crash experience in NSW during the same period, and after taking into account the differential changes in unemployment rates (which were found to affect travel patterns) and crash seasonality and trends in each State.

A second stage of the evaluation linked the monthly levels of TAC television advertising (TARPs, or Target Audience Rating Points – a measure of audience reach) with the variations in casualty crashes in Melbourne during low alcohol hours in 1990-1991. The analysis found statistically significant relationships for all TAC publicity and for the speed-related publicity in particular (lower level of significance). This analysis took into account the monthly variations in speed camera operating hours and TINs issued, the two other program variables potentially having a large effect on crashes, as well as variations in Melbourne unemployment rates and crash seasonality and trend. The form of the relationship used to link the crashes with other variables was such that the coefficient of

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<sup>1</sup> The "low alcohol hours" of the week (ie. Monday-Thursday 6am to 6pm, Friday 6am to 4pm, Saturday 8am to 2pm, Sunday 10am to 4pm) are those periods when the percentage of drivers killed or admitted to hospital with a blood alcohol content exceeding 0.05%, was below 4%. The "high alcohol hours" are the converse of these periods, during which about 38% of driver serious casualties had blood alcohol content exceeding 0.05% (Harrison 1990).

television TARPs can be considered to estimate the “elasticity” of its effect on crashes, ie. the percentage change in crashes for a 1% increase in TARPs. For TAC advertising with any theme, the estimated elasticity was  $-0.0077$  with a standard error of 0.0031. For the TARPs with a speed-related theme, the estimated elasticity was  $-0.0040$  with a standard error of 0.0027.

**Report 2: *Evaluation of Transport Accident Commission road safety television advertising*** (Cameron, Haworth, Oxley, Newstead, & Le, 1993)

This study considered the effects of TAC’s television advertising up to December 1992. The second part of the study built on the above findings regarding the publicity component of the speed camera program. The first part attempted to measure the general effects of TAC’s advertising campaigns on Victoria’s road safety performance during the early 1990’s, but was unable to do this satisfactorily. The third part of the study attempted to evaluate the specific effects of the Concentrate or Kill television advertisements on the target audiences.

The second part initially used the same type of analysis of casualty crashes in Melbourne during low alcohol hours as used during the second stage of the speed camera program evaluation. It was found that a stronger relationship between speed-related TARPs and low alcohol hour crashes appeared to exist when the monthly TARPs with the “concentration” theme were added<sup>2</sup>. For the speeding and concentration TARPs combined, the estimated elasticity was  $-0.0152$  with a standard error of 0.0070.

A similar analysis was then carried out for high alcohol hour casualty crashes in Melbourne and in country Victoria separately. TAC advertising with drink-driving themes was measured by monthly TARPs and a function of TARPs (“Adstock”) which represents the awareness of current advertising and the retained awareness of past advertising (Broadbent, 1979). Based on studies of brand advertising, a “half-life” of five weeks was assumed for the retention of past advertising awareness when calculating the Adstock of TAC television advertising (this assumption was subsequently confirmed as reasonable in report 4).

The analysis of high alcohol hour casualty crashes took into account monthly variations in random breath tests, alcohol sales, unemployment rates, crash seasonality and trend, as well as drink-driving TARPs and Adstock. The stronger relationships were found when the advertising levels were measured by Adstock. The estimated elasticity of drink-driving Adstock in Melbourne was  $-0.0169$  with a standard error of 0.0044, and in country Victoria it was  $-0.0379$  with a standard error of 0.0067.

The final step of the second part of the study was an economic analysis to determine the points of diminishing returns of TAC television advertising with various themes. The analysis considered the fixed costs of developing the advertisements and supporting media activities, and the variable costs of media placement at different TARP levels. The benefits from reduced casualty crashes were valued in two ways: reduction in TAC injury compensation payments and reduction in total social costs. Based on the former method of valuing the benefits, it was estimated that an investment of 540 TARPs per month on

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<sup>2</sup> The principal concentration advertisement used during 1991 (“Country Kids”) included speeding images and reference to speed cameras, hence its message may have been interpreted as a speed-related by some viewers.

average in a combination of speeding and concentration advertising was economically justified before diminishing returns occurred. Regarding advertising with drink-driving themes, it was estimated that an investment of 800 TARPs per month was economically justified. It should be noted that the above findings may apply only to the styles, messages and other characteristics of TAC's advertising up to December 1992.

The third part of the study focused on two advertisements with the Concentrate or Kill theme. These advertisements aimed to encourage target groups of drivers, especially the young accompanied by their peers on country roads, to concentrate while driving. There was no direct enforcement activity associated with the advertising. The study identified a link between the Adstock of publicity with the concentration theme and levels of awareness of the need for drivers to concentrate. The analysis compared the crash rates of target and control groups before and after the introduction of each of the advertisements. There was no reliable evidence of reductions in the risk of serious casualty crashes involving the target groups of the advertisements after the commencement of the advertising campaigns. These findings could have resulted from the crash numbers being too small to show statistically significant reductions or from the effect of the advertisements being relatively small.

**Report 3: *Modelling of some major factors influencing road trauma trends in Victoria 1989-93*** (Newstead, Cameron, Gantzer, & Vulcan, 1995)

The aim of this study was to combine the results from a number of separate evaluation studies, including those described in reports 1 and 2 above, to quantify the effects of a number of major factors on road trauma over Victoria as a whole over the period 1989-93. The studies on which the work was based evaluated the effects of countermeasures and other factors which appeared to be responsible for the substantial reduction in road trauma since 1989. These include:

- Increased random breath testing, supported by mass media publicity
- New speed cameras, supported by mass media publicity
- Reduced economic activity
- Reduced alcohol sales
- Improvements to the road system through treatment of accident black spots

As evident from the factors listed above, TAC sponsored mass media publicity supporting both the speed camera and random breath testing programs was a major focus of the study. Econometric statistical models developed in the evaluation of the first two countermeasures, estimated from monthly crash data covering the period 1983-92, were re-estimated and consolidated to estimate the effects of each factor considered on serious casualty crashes during each of the years 1990-93 for the whole of Victoria. A method of model disaggregation was then developed and applied to estimate the contributions of random breath testing (RBT), speed camera operations (Traffic Infringement Notices issued), TAC road safety television publicity (measured by Adstock), unemployment rates and alcohol sales on road trauma levels in Victoria. Table 2 summarises the results of the analysis, giving the estimated percentage reduction in serious casualty crashes attributable to each factor considered over the years 1990-93.

**Table 2. Estimated reductions in serious casualty crashes attributable to various sources: Victoria, 1990-93**

	1990	1991	1992	1993
Modelled actual serious casualty crashes	6168	5342	5192	5183
(actual serious casualty crashes)	6156	5371	5156	5193
Expected* serious casualty crashes	8944	9325	9730	10218
Reduction in serious casualty crashes	31.1%	42.7%	46.6%	49.3%
Contribution of increased unemployment	0.8%	11.5%	14.4%	15.3%
Contribution of reduced alcohol sales	4.7%	7.1%	9.0%	11.5%
Contribution of speed camera operations (TINs)	7.9%	8.9%	9.0%	8.9%
<b>Contribution of speed and concentration publicity</b>	<b>6.2%</b>	<b>8.7%</b>	<b>8.7%</b>	<b>8.3%</b>
Contribution of Bus-based RBT	6.3%	6.5%	6.5%	6.8%
<b>Contribution of drink-driving publicity</b>	<b>7.5%</b>	<b>6.7%</b>	<b>7.3%</b>	<b>7.1%</b>
Contribution of accident blackspot treatments	1.5%	2.3%	3.0%	4.8%
Contribution of above road safety programs	26.3%	29.1%	30.1%	31.1%

\* Expected if the road safety initiatives and other factors had remained at 1988 levels

Highlighted in bold in Table 2 are the estimated reductions in casualty crashes in Victoria attributable to the themes of TAC road safety advertising considered. As shown in the table, publicity with speeding and concentration themes supporting the speed camera program was estimated to have reduced road trauma in Victoria between 6.2% and 8.7% over the period 1990-93. Similarly, publicity with a drink-driving theme supporting the random breath testing program was estimated to have reduced road trauma in Victoria by between 6.7% and 7.5% over the same period.

**Paper:** *Advertising wearout in the Transport Accident Commission road safety campaigns* (Fry, 1996)

Fry (1996) extended the econometric models developed in reports 2 and 3 to consider the possibility that the impact of the TAC television advertising with drink-driving and speeding themes may not be as great near the end of the period to December 1993 as it was initially. He did this by allowing the coefficient of Adstock in the econometric models to be a quadratic function which decreased with time initially (ie. reduction in crashes with increased advertising) and then levelled out or turned around. If the data indicated that a quadratic function was present, Fry defined this as suggestive of “wearout” of the advertising.

Four separate models were considered for serious casualty crashes in Melbourne and country Victoria, and during the “high” and “low alcohol hours” of the week, respectively. In all four models, the estimated quadratic function was suggestive of wearout, however only in the case of crashes during the low alcohol hours in country Victoria was this finding statistically significant (ie. unlikely to be due to chance variation in the crashes).

The author concluded that although some evidence of advertising wearout was found in the period up to December 1993, the evidence is weak. He suggested that it is likely that the large impact that the individual advertisements have, coupled with the strategy of rotating different creative executions, made it difficult to identify strong statistical evidence of wearout.

**Report 4: *Evaluation of the country random breath testing and publicity program in Victoria, 1993-1994*** (Cameron, Diamantopoulou, Mullan, Dyte, & Gantzer, 1997)

This study considered the effects on road trauma of a major program of increased random breath testing (RBT) and supporting mass-media drink-driving publicity conducted in country Victoria during November 1993 to December 1994.

The evaluation measured the effects of the program on serious casualty crashes in small areas of country Victoria influenced by RBT during periods of time when the enforcement was operating. The effects on road trauma of the enforcement when supported by different levels of drink-driving publicity awareness were also considered. However, the effects of drink-driving advertising per se were not actually measured, rather the effects of the enforcement *conditional* on the level of publicity awareness present at the time the RBT activity was operating were estimated.

The initial analysis of localised effects found evidence of reductions in “high alcohol hour” (HAH)<sup>1</sup> serious casualty crashes in regions influenced by certain styles of RBT operations and/or when certain levels of drink-driving publicity accompanied the enforcement. The circumstances when reductions occurred were when Police *cars alone* were operating, and especially when cars were operating at times of *medium drink-driving publicity* awareness (i.e. 200-800 Adstock units per week). The former situation resulted in a net 22% reduction ( $p=0.0116$ ), whilst the latter in a net 33% reduction ( $p=0.0024$ ).

There was little evidence of crash reductions during weeks when the RBT activity was accompanied by high levels (i.e. more than 800 Adstock units) of awareness of drink-driving publicity, or when combinations of cars and buses were operating together. In regions and weeks influenced by car and bus combinations, a net 148% increase in HAH serious casualty crashes occurred when *high publicity* awareness accompanied the enforcement ( $p=0.0115$ ).

These somewhat surprising findings were investigated in the next stage of the evaluation. The aim was to test the hypothesis that some drink-drivers faced with intense enforcement, heightened by intense publicity, changed their travel behaviour instead of their drinking behaviour, and used relatively unsafe minor roads with negative consequences for road safety. Evidence found to support this hypothesis included:

- A net 29% reduction in HAH serious casualty crashes occurred on minor roads when any style of RBT enforcement (i.e. car, bus or car/bus combination) was accompanied by *low levels of drink-driving publicity* awareness (i.e. less than 200 Adstock units). This reduction was not statistically significant ( $p=0.1889$ ).

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<sup>1</sup> The country high alcohol hours were defined as 6 p.m. Sunday to 6 a.m. Monday, 6 p.m. to 4 a.m. on Monday to Wednesday nights, 6 p.m. Thursday to 6 a.m. Friday, 6 p.m. Friday to 8 a.m. Saturday, and 4 p.m. Saturday to 10 a.m. Sunday (Gantzer, 1995). The remaining hours of the week were described as the country “low alcohol hours” (LAH).

- A net 81% increase in HAH serious casualty crashes occurred on minor roads when any style of RBT enforcement was accompanied by *high levels of drink-driving publicity awareness* ( $p=0.0202$ ).
- When *medium levels of drink-driving publicity awareness* were operating, a net 33% reduction ( $p=0.0445$ ) occurred for HAH serious casualty crashes on minor roads in regions and weeks when *cars alone* were in operation.
- A net *increase* of 311% ( $p=0.0043$ ) occurred at times of *high levels of drink-driving publicity awareness* for HAH serious casualty crashes on *minor roads* in regions and weeks when *buses* or *car/bus combinations* were present. This increase was estimated to represent an additional 19 crashes occurring under these circumstances.

In response, the Victoria Police in conjunction with the TAC, launched a new strategy in October 1997 targeted at drivers who think they can drink-drive by avoiding the conspicuous booze buses usually operating on major roads. Every police car was supplied with breath-testing equipment so that almost any driver stopped for any offence could be breath-tested. Two new TAC television advertisements were also launched at the same time alerting the community to this type of enforcement.

**Report 5: *Further modelling of some major factors influencing road trauma trends in Victoria: 1990-96*** (Newstead, Cameron, & Narayan, 1998)

This study was based on previous work that has estimated the contribution of some major factors in reducing road trauma in Victoria over the period 1990-1993, described in report 3 above. This project has made use of the statistical analysis methods developed to extend these estimates to 1996, examining the same major factors considered in the original study. The percentage change in road trauma levels, as measured by serious casualty crash numbers, attributable to each factor has been estimated for each year over the period 1990-1996.

Models linking variations in serious casualty crashes to various factors were computed using monthly crash data from the years 1983 to 1996. Subsequently, the contributions of random breath testing (RBT), speed camera tickets issued (TINs), levels of TAC road safety television publicity, unemployment rates and alcohol sales to the reduction in the number of serious casualty crashes were estimated for the period 1990-96. Table 3 summarises the estimated percentage reductions in road trauma across Victoria attributable each of the factors considered, in the same manner as Table 2 above.

One difference between this work and the original work described in report 3 is that the random breath testing program and supporting publicity with a drink-driving theme have been measured together as a drink-driving program. Formation of a program measure was necessary because of the high degree of co-linearity between the two components of the drink-driving program in the modelling procedure. Co-linearity problems meant that an accurate level of association between each variable and serious casualty crash numbers could not be obtained with both factors in the model, with one or the other factor representing the combined influence of both factors.

**Table 3. Estimated reductions in serious casualty crashes attributable to major factors: Victoria, 1990-96**

	1990	1991	1992	1993	1994	1995	1996
Modelled serious casualty crashes	6136	5211	5025	4950	5233	5432	5475
(actual serious casualty crashes)	6219	5371	5111	5192	5184	5286	5196
Expected* serious casualty crashes	8371	8585	8770	9099	9345	9480	9572
Reduction in serious casualty crashes	26.7%	39.3%	42.7%	45.6%	44.0%	42.7%	42.8%
Contribution of unemployment rate	1.9%	12.1%	14.8%	15.6%	13.5%	10.4%	10.3%
Contribution of alcohol sales	3.0%	5.5%	7.0%	8.9%	7.9%	8.8%	9.6%
Contribution of speed cameras TINs	9.6%	10.9%	11.1%	11.1%	11.2%	11.0%	11.2%
<b>Contribution of speed and concentration publicity</b>	<b>5.0%</b>	<b>7.0%</b>	<b>7.1%</b>	<b>6.7%</b>	<b>6.1%</b>	<b>6.5%</b>	<b>6.2%</b>
<b>Contribution of drink-driving program (RBT and publicity)</b>	<b>8.9%</b>	<b>9.4%</b>	<b>9.5%</b>	<b>9.9%</b>	<b>10.0%</b>	<b>10.0%</b>	<b>10.2%</b>
Contribution of accident blackspot treatments	1.6%	2.5%	3.2%	5.3%	6.2%	6.2%	5.6%
Contribution of all road safety programs	23.0%	26.9%	27.7%	29.3%	29.7%	29.8%	29.4%

\* *Expected if the road safety initiatives and other factors had remained at 1988 levels*

As for Table 1 above, the estimated influence of the TAC publicity campaigns on casualty crash frequency for themes supporting speed and drink-driving enforcement activity are shown in bold in Table 2. The estimated serious casualty crash reductions attributable to the speed and concentration publicity range between 5% and 7.1%, maintaining a relatively consistent level throughout the study period. These figures are similar to those estimated in the original work. Estimates of the serious casualty crash reductions attributable to the drink-driving program in Table 2 range from 8.9% to 10.2%. As mentioned, this is a measure of both the drink-driving publicity and the enforcement and hence is not comparable to the estimates in the original study. Furthermore, it is not possible to determine what proportion of the estimated effects of the program measure is attributable to the publicity alone. It is interesting to note, however, that the combined random breath testing and drink-driving publicity effects in Table 1 are of similar order of magnitude to the estimated program effect in Table 2.

**Report 6: *Evaluation of the Police enhanced enforcement program (1997)*** (Harrison & Pronk, 1998)

This study was less concerned with the effects of public education material and more concerned with the effect of enforcement activity on the perceived risk of detection for drink-driving and speeding. It did, however, collect information concerning the awareness of publicity during periods of speed- and drink-driving-related publicity.

Respondents completed telephone surveys after periods of publicity targeting speeding (in one time period) and drink-driving (in the other) which coincided (in two Police Districts) with increased enforcement targeting the appropriate offence. Respondents were asked, amongst other things, about their recollections of recent road safety publicity in each of the media used by the TAC.

Comparisons between the three survey waves (before, the speeding period, and the drink-driving period) suggested that there were no general changes in awareness of publicity, but that awareness of television publicity increased in the period associated with speeding publicity. The use of publicity targeting specific unsafe behaviours was not associated with increases in awareness of that publicity theme, however, but did appear to be associated with a decline in awareness of the other publicity theme. Thus, the focus on speeding publicity did not result in an increase in awareness of speed themes in publicity but did result in a reduction in self-reported awareness of drink-driving material. There is no clear explanation of this result. The use of free-recall techniques and embedding these items in a larger survey of road safety and enforcement issues may have had an impact on the results, but the mechanism by which this would occur is unclear.

**Report 7: *Evaluation of moving mode radar for speed enforcement in Victoria, 1995-1997*** (Diamantopoulou, Cameron, & Shtifelman, 1998)

Moving mode radar (also known as mobile radar) for speed enforcement was first introduced in Victoria in August 1994. At that time 18 mobile radar units were introduced for use by Police. During 1995, 30 new devices were purchased by the TAC – these became operational in late June. In 1996, a further 25 moving mode radar devices were purchased by the TAC, bringing the total used by Police in Victoria to 73. A TAC television advertisement pertaining to the mobile radar enforcement was launched in November 1996 and re-run during 1997.

The study occurred in two phases – the first was a preliminary evaluation which found an 11% decrease in casualty crashes during July-December 1995 in Victoria. This decrease, although not statistically significant, was indicative of a crash reduction warranting further research.

The second phase of the study extended the preliminary evaluation by analysing a further 18 months' moving mode radar enforcement data. Phase 2 focused on the effects on crashes during July 1995-June 1997. Since the mobile radar television advertisement was shown during this period, the interaction between the enforcement and publicity awareness (both specific mobile radar publicity and general speed-related publicity) was investigated. The evaluation found evidence of a four-day residual enforcement effect on casualty crashes in rural areas of Victoria during July 1995-June 1997, but the effect diminished five to seven days later. There was no evidence of crash reductions in outer metropolitan regions where mobile radar was also used.

Assuming a four-day residual effect, the strongest effects occurred when the enforcement was accompanied by *high awareness* levels (i.e. at least 250 Adstock units per week) of specific mobile radar publicity during November 1996-June 1997. The effects were strongest *one to four days after* the enforcement was present in rural regions. Under these circumstances, a net 28% reduction in casualty crashes was found ( $p=0.0744$ ). When *low awareness* levels of mobile radar publicity (i.e. below 250 Adstock units) accompanied the enforcement, crash reductions were not evident.

When the enforcement was accompanied by *high awareness* levels of general speed-related publicity (encompassing all speed themes including mobile radar), the strongest effects on crashes in rural Victoria during 1996/97 also occurred one to four days after the enforcement was present. The effects, however, were weaker than those produced when

the publicity was specific to the style of enforcement. Under these circumstances, a net 11% reduction in crashes was found, but this was not statistically significant.

The results of the second phase of the evaluation suggested that publicity supporting the mobile radar enforcement produces stronger effects when it is specific to the enforcement rather than when it encompasses all speed-related themes.

### ***Summary of impacts of TAC advertising on crashes***

A variety of published studies and research methods have considered the road safety benefits of TAC's advertising, both alone and in support of Police enforcement in Victoria. The methods have ranged from econometric models in which levels of television advertising have been included with other factors to explain road trauma trends, to estimates of enforcement effects in circumstances in which awareness of related advertising is high or low. The direct effects of advertising supporting the speed camera program, during the early months when camera activity was very low, have also been measured.

Collectively the published research confirms the conclusion of MUARC's early research in this area, namely that the TAC advertising with drink-driving and speeding themes supporting Police enforcement aimed at these behaviours has made an effective contribution to reducing road trauma. The extent of this contribution, especially in synergy with the enforcement efforts, was difficult to measure, notwithstanding the estimates provided in reports 2, 3 and 5. These reports have made a number of critical assumptions in providing the estimates.

#### **4.2.2. Re-Investigation of MUARC Research on TAC Advertising**

The early MUARC research has been questioned by White et al (2000) who re-analysed the data of Newstead et al (1995) (Report 3 above) to establish whether the claimed effects of the TAC publicity were real. White et al claimed that the research methods used in Newstead et al (1995) were representative of MUARC research on the TAC campaigns. It can be seen from the review of MUARC research described here that other techniques have also been used which were quasi-experimental in nature and did not rely on econometric modelling. White et al also ignored the research in Cameron et al (1993) – (Report 2 above), which was specifically focused on the effects of the TAC road safety advertising.

There are many issues in White et al (2000) which MUARC believes are wrong and misleading and the reader is referred to MUARC's comprehensive response for details (Cameron & Newstead, 2000). After careful consideration, MUARC reached the following conclusions:

1. Scientific evaluations conducted by MUARC have shown substantial reductions in road trauma in Victoria associated with increased random breath testing using "booze buses" and the new speed camera program, each supported by TAC advertising.
2. The statistical models of monthly casualty crashes as functions of enforcement, advertising and socio-economic factors, developed in Cameron et al (1993), are sound. They have been tested by MUARC and by White et al and have been found to be satisfactory. White et al's investigations have provided additional evidence of the relationship between the TAC speed-related advertising and crashes.

3. The estimates of the points of diminishing returns of levels of TAC drink-driving and speed-related advertising, originally provided in Cameron et al (1993) based on the statistical models in that report, are sound. The economic analysis of advertising levels, which was based on the coefficients of the advertising variables in the statistical models, has not been questioned.
4. White et al's re-analysis of the data used in Newstead et al (1995) is not relevant to Cameron et al (1993) because of important differences in their objectives, the types of crashes analysed, the time periods covered, the treatment of levels of speed-related advertising, the inclusion of car-based random breath testing, and the assumptions made and subsequently tested.
5. White et al's so-called parsimonious three-factor model of crash variations in Victoria was based on data dredging and cannot be considered to be a valid alternative to MUARC's models.
6. White et al's test of the quantitative relationships between crashes and the enforcement and advertising variables is not valid. It is not an adequate test of the presence or absence of quantitative relationships.

Cameron and Newstead (2000) pointed out that White et al's analysis had strengthened the evidence for the beneficial effect on crashes of TAC's speed-related advertising during 1990-93. White et al's analysis also provided support for the relationship between crash reductions and the number of speeding tickets issued as a result of speed camera detections, first identified by Cameron et al (1992). In a number of White et al's alternative statistical models, these two factors remained as statistically significant predictors of variations in monthly serious crashes in Melbourne.

#### **4.2.3. Interaction of TAC Advertising and Speed Camera Activity**

The Transport Accident Commission and the Victoria Police work together to ensure that advertising campaigns and enforcement programs are coordinated, often with enforcement and advertising programs targeting similar high-risk behaviours. The combined effect of enforcement and publicity may be simply additive, or potentially synergistic where the combined effect may be larger than expected given the effect of either program on its own.

A recently completed, but as yet unpublished, MUARC study aimed to understand how speed camera enforcement and speed-related publicity interact, specifically in relation to their effect on the risk of casualty crashes and the injury severity of the crash outcomes. The project also aimed to determine whether varying the levels of publicity and enforcement resulted in a change in perception of the level of speed enforcement and TAC advertising.

During 1999, the Victoria Police varied the levels of speed camera activity substantially in four Melbourne police districts according to a systematic plan. Camera hours were increased or reduced by 50% or 100% in respective districts for a month at a time, during two separate months when speed-related mass media advertising was present and during two months when it was absent. Other Melbourne police districts remained unchanged. Surveys of self-reported driving behaviour and perceived risk of being caught when speeding were conducted in the police districts at the end of each month of increased speed camera activity during 1999.

Monthly frequencies of casualty crashes, and their severe injury outcome, in each district during 1996-2000 were analysed using Generalised Linear Modelling and Logistic Regression, respectively, to test statistically the effects of the enforcement, publicity and their interaction. In these analyses, the enforcement was represented by five levels of speeding tickets emanating from camera activity, and the publicity was measured by Adstock (using a half-life of five weeks applied to weekly TARP levels) representing the retained awareness of past and current television advertising intensities.

This study of the interaction of speed-related TAC publicity and speed camera activity in Melbourne during 1996-2000 reached the following conclusions:

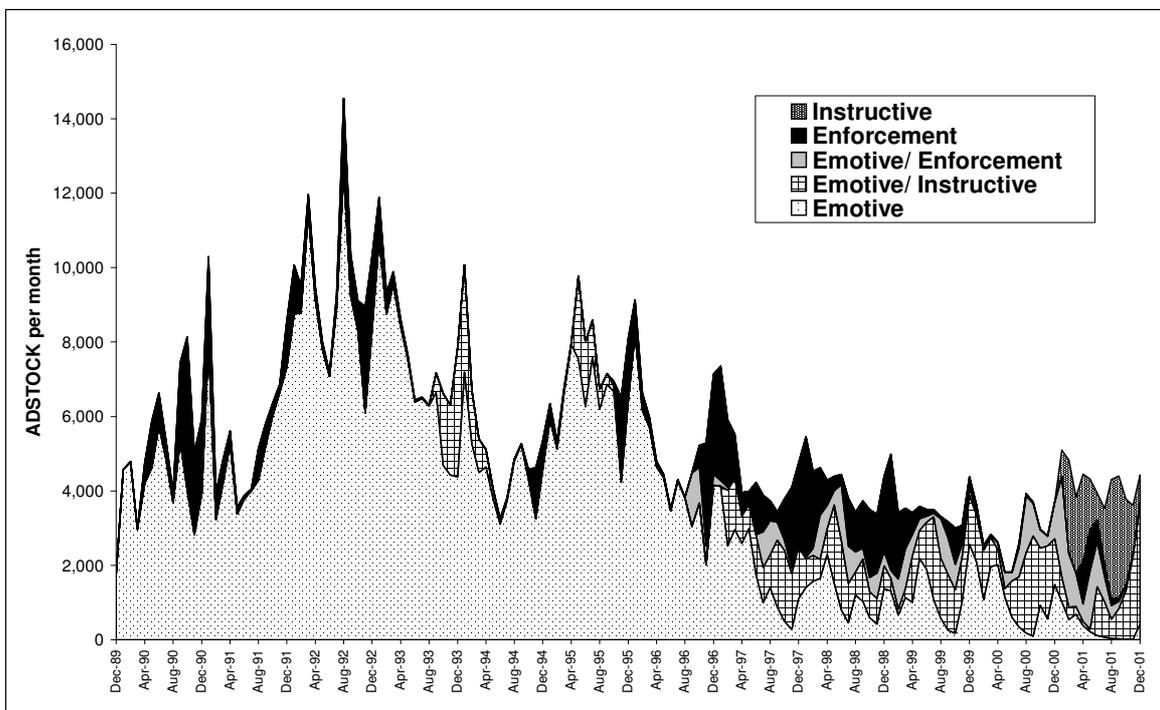
1. There was no evidence of an interaction in the effects of the enforcement and the publicity on casualty crash frequency.
2. High levels of awareness of TAC speed-related publicity with emotive styles produced casualty crash reductions in Melbourne during the months in which it occurred. Casualty crashes were reduced by 12-13% when awareness, measured by the Adstock of television advertising levels, of emotive-style speed-related publicity exceeded 500 Adstock units, compared with effects during lower levels of awareness of the publicity.
3. There was no evidence of an effect of the emotive-style speed-related publicity on the injury severity outcome of the casualty crashes.
4. Drivers' perceptions of the risk of detection when speeding was increased by high levels of awareness of the speed-related publicity, compared with the perception when the awareness was at medium levels.
5. The number of speeding tickets detected by speed cameras in Melbourne police districts influenced the casualty crash frequency in the same district during the following month. Casualty crashes were reduced following months with very high levels of speeding tickets and increased following months with very low levels of speeding tickets.
6. The risk of fatal outcome of the casualty crashes was also related to the number of speeding tickets detected in the district during the previous month. The fatality risk was reduced following months with very high levels of speeding tickets and increased following months with very low levels of speeding tickets.

The study also reached the following tentative conclusions:

7. There was an interaction effect on fatal casualty crash outcome when there were very high levels of speeding tickets in the previous month and high levels of awareness of enforcement-style speed-related publicity. The reduction in risk of fatal outcome was greater than expected from effects estimated when the enforcement and publicity operated alone at these levels.
8. There was no evidence that awareness of the speed-related publicity with enforcement styles contributed to casualty crash reductions during 1996-2000. This was not inconsistent with the apparent interaction of this type of publicity with the speed camera enforcement in terms of the effect on the severity outcome of casualty crashes (conclusion 7 above).

This research has questioned the strategic principles suggesting that speed camera enforcement and speed-related mass media publicity should operate together to produce maximum effect. It also questions the contribution of TAC's publicity with styles other than those based on an emotional message.

The mix of styles of TAC's speed-related advertising has changed since the earlier MUARC studies found effects. In line with TAC's road safety advertising generally (Figure 8), the use of almost exclusively emotive-style advertisements during the early 1990's has changed to include a greater proportion of those with enforcement-style and those combining emotion with enforcement or instructive elements. Thus the findings relating to predominantly emotive-style speed-related TAC advertising used during the early 1990's may be applicable only to the emotive-style advertisements used during more recent years, and not to advertisements with other styles. The results of this study suggest that this the case.



**Figure 8. Adstock of TAC television advertising in Melbourne, December 1989 to December 2001**

#### 4.2.4. Effects of TAC Advertising on Awareness

##### *Awareness surveys*

The TAC has commissioned Brian Sweeney and Associates to conduct Tracking Surveys of recall of the TAC road television advertising campaigns. Each tracking survey measures rates of spontaneous and prompted recall of each advertisement studied as well as details of what is recalled about the advertisements and awareness of the sponsor. Spontaneous recall refers to unprompted recall of the advertising campaign, i.e. the response to the questions “Recently there have been some commercials on television promoting road safety. Can you recall having seen one or more of these?” and “What was the road safety advertising you recall about?”

Continuous monthly estimates of awareness were sought from the Brian Sweeney surveys, however the surveys were irregular in timing. Because of this irregularity, it was necessary to estimate monthly advertising awareness from the TARPs.

### ***Adstock***

Television advertising placed in a given week does not necessarily produce its full effects in that week nor do its effects stop at the end of the week. Studies of advertising effects, principally of awareness of the main messages, have shown that there are delayed and carry-over effects.

The main objective in analysing awareness is to provide information on the response and decay of advertising effects as measured by intrusiveness and memorability. These concepts have been treated formally by Broadbent (1979) who developed the concept of Adstock (a function of TARPs) to describe the way that the audience's retained awareness is related to current and past levels of advertising.

### ***Definition of Half-life***

It had previously been thought that the contribution of advertising to each period was a constant fraction of the amount in the previous period. Broadbent stated that a single parameter cannot be chosen for all advertisements because there is evidence that the advertising for different brands decays at different rates. Broadbent recommended that a "half-life" of the advertisement be used as a standard parameter. This is the time by which the advertisement has had half its total effect, i.e. awareness has fallen to half its original value. Tracking studies were used to numerically estimate awareness. Broadbent (1979) found that five weeks is the most common estimate of half-life of brand advertising.

### ***Half-life of advertising awareness for drink-driving, speed and concentration themes, 1989-1997***

The awareness surveys conducted by Brian Sweeney and Associates for TAC have made it possible for MUARC to estimate Adstock functions of TAC's road safety television advertising. The estimated half-life has been considered to be a key parameter measuring the effect on awareness. The calculated Adstock (assuming five weeks half-life) from TAC television TARPS from November 1989 to December 2001, by theme and style of the advertisements, is shown in Appendix B. However, it should be noted that the half-lives, and the relationships between TARPs and awareness, seemed to vary over this period (see below).

In MUARC's initial evaluation of the TAC's "Drink-Driving" and "Concentration" road safety advertising themes (Cameron et al., 1993), the use of a half-life of five weeks in calculating Adstock was found to be acceptable for the period December 1989 to December 1992.

In a later evaluation (Cameron et al., 1997), half-lives of seven weeks for Melbourne and six weeks for country Victoria for the "Drink-Driving" theme were estimated. These estimates were based on the TAC's drink-driving advertisements covering the period November 1989 to December 1994.

The half-lives for the "Drink-Driving", "Speed" and "Concentration" themes were recalibrated for Melbourne and country Victoria using TAC advertising data up to December 1997 (Shtifelman, Cameron, & Diamantopoulou, 1998).

The half-life for “Drink-Driving” during 1995-1997 had decreased from seven weeks to three weeks in Melbourne, and from six weeks to two weeks in country Victoria compared to the earlier years 1989-1994. Recalibration of the half-life of the “Drink-Driving” theme for the entire period November 1989 to December 1997, suggested half-lives of four weeks and three weeks for Melbourne and country Victoria, respectively.

The half-life of the “Speed” theme for the period April 1990 to December 1997 was estimated as four weeks for Melbourne and five weeks for country Victoria, suggesting that the previous assumption of a five week half-life was accurate.

Using the advertising data to December 1997 and the (then) current methodology, the half-life of the “Concentration” theme was unable to be estimated, and a strong relationship between “Concentration” advertising and recall could not be established. This appeared to be because the awareness of “Concentration” advertising remained at substantial levels many months after advertising ceased.

In summary, the research suggests that the retention of awareness of TAC’s drink-driving advertising to December 1997 was not as long as it used to be. Earlier research found some evidence of reduced effectiveness (“wearout”) of TAC’s drink-driving and speeding advertising approaching the end of 1993, but the evidence was weak.

#### ***Trends in awareness base levels and advertising impacts***

A later paper by Broadbent (1984) defined an awareness model with a base level (ie, a lower limit, even after advertising ceases) as well as a rate of decay of awareness over time (measured by the half-life). In New Zealand, this model has been found to fit road safety advertising awareness levels better than the simpler model described previously.

When MUARC considered this new awareness model, it was decided to consider TAC’s emotive and enforcement style advertising separately (where appropriate) to investigate whether they differed in the strength of effect on awareness.

Drink-driving awareness (percentage recall) was regressed against the emotive<sup>2</sup>-style drink-driving Adstock and enforcement<sup>3</sup>-style drink-driving Adstock (assuming a five week half-life in each case) using a classical multiple linear regression model. This approach defined the relative contributions of emotive and enforcement styles to drink-driving advertising awareness.

The resulting equation also gives an estimate of the long-term advertising awareness (measured by the constant term in the regression equation). This long-term measure is also known as the base level. The slopes in the regression equation give the awareness index and define the strength of each style of Adstock. The form of the regression equation was:

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<sup>2</sup> In the regression equation, emotive-style refers to emotive, emotive-instructive and emotive/enforcement drink-driving Adstock to encompass all advertising that contains some emotive component.

<sup>3</sup> In the regression equation, enforcement-style refers to enforcement and emotive/enforcement drink-driving Adstock to encompass all advertising that contains some enforcement component. It was not possible to assign the emotive/enforcement advertising exclusively to either the emotive or enforcement category, nor was there sufficient advertising of this type to analyse its Adstock separately. It was also considered that such advertising may have a dual effect on awareness.

$Estimated\ awareness = base\ level + strength_E(emotive\ Adstock) + strength_F(enforcement\ Adstock)$

When this equation was fitted to advertising and awareness data from 1989 to December 1998, the estimate of drink-driving awareness for Melbourne was:

$$\% \text{ drink-drive awareness} = 26.5 + 4.26 (\text{emotive drink-drive Adstock}/100) + 3.99(\text{enforcement drink-drive Adstock}/100)$$

Thus, the long-term measure of drink-driving advertising awareness in Melbourne is estimated as 26.5%. Also, every 100 units of emotive drink-drive Adstock is estimated to result in a 4.26% increase in awareness, and every 100 units of enforcement drink-drive Adstock to result in a 3.99% increase in awareness.

Table 4 shows the results of fitting the regression model to awareness levels measured for Melbourne and rural Victoria. No advertising with concentration, fatigue or seatbelt themes has used enforcement-related styles. These regression models explained the variations in awareness better than the simple Adstock model used previously (which contained no base level term), especially in the case of the drink-driving, speeding and concentration themes, for which Table 4 indicates substantial base levels of awareness in the long term after advertising ceases. These substantial base levels appear to be characteristic of the TAC advertising program, at least for the more commonly used themes.

**Table 4. Estimates of awareness base level and awareness slope by theme, December 1989 to December 1998**

THEME	REGION	REGRESSION ESTIMATES		
		Base level of Awareness (%)	Index (slope) per 100 Adstock units (%)	
			Emotive	Enforcement
Drink-driving	Melbourne	26.5	4.26	3.99
	Rural	31.2	3.78	3.23
	Victoria			
Speeding	Melbourne	26.7	4.26	2.93
	Rural	22.2	4.10	4.62
	Victoria			
Concentration	Melbourne	13.5	2.84	n.a.
	Rural	13.0	3.19	n.a.
	Victoria			
Fatigue	Melbourne	9.0	6.57	n.a.
	Rural	9.1	8.39	n.a.
	Victoria			
Seatbelt	Melbourne	0.7	4.44	n.a.
	Rural	0.0	4.31	n.a.
	Victoria			

The same type of regression models fitted to separate periods during 1989 to 1998 indicated that there were significant trends in the base level awareness and strength of the drink-driving (Table 5) and speeding (Table 6) advertisements used in each period over the decade.

**Table 5. Estimates of emotive style and enforcement style DRINK-DRIVE advertising awareness for Melbourne**

Time Period	Style of drink-driving advertising	Regression estimates		R-squared Value
		Base level of awareness (%)	Index per 100 Adstock units (%)	
Dec'89-Dec'92	<b>Emotive</b>	<b>42.4</b>	<b>2.83</b>	<b>53%</b>
	<b>Enforcement</b>	<b>42.4</b>	<b>1.42</b>	
Jan'93-Dec'94	<b>Emotive</b>	<b>30.6</b>	<b>4.33</b>	<b>83%</b>
	<b>Enforcement</b>	<b>30.6</b>	<b>2.55</b>	
Jan'95-Dec'96	<b>Emotive</b>	<b>16.1</b>	<b>3.86</b>	<b>85%</b>
	<b>Enforcement</b>	<b>16.1</b>	<b>7.75</b>	
Jan'97-Dec'98	<b>Emotive</b>	<b>19.2</b>	<b>3.11</b>	<b>78%</b>
	<b>Enforcement</b>	<b>19.2</b>	<b>6.93</b>	

**Table 6. Estimates of emotive style and enforcement style SPEED advertising awareness for Melbourne**

Time Period	Style of speed-related advertising	Regression estimates		R-squared Value
		Base level of awareness (%)	Index per 100 Adstock units (%)	
Dec'89-Dec'92	<b>Emotive</b>	<b>35.3</b>	<b>2.87</b>	<b>51%</b>
	<b>Enforcement</b>	<b>35.3</b>	<b>7.52</b>	
Jan'93-Dec'94	<b>Emotive</b>	<b>13.9</b>	<b>5.33</b>	<b>96%</b>
	<b>Enforcement</b>	<b>13.9</b>	<b>3.75</b>	
Jan'95-Dec'96	<b>Emotive</b>	<b>27.0</b>	<b>6.30</b>	<b>66%</b>
	<b>Enforcement</b>	<b>27.0</b>	<b>2.22</b>	
Jan'97-Dec'98	<b>Emotive</b>	<b>19.8</b>	<b>5.96</b>	<b>78%</b>
	<b>Enforcement</b>	<b>19.8</b>	<b>2.78</b>	

#### 4.2.5. Perceptions of TAC Advertising

A MUARC project investigated audience perceptions of the television advertising component of the TAC road safety campaign (Harrison & Senserrick, 1999). Ninety volunteer drivers rated their reactions to the advertising in general and recalled their initial reactions to a selected set of past advertisements. Participants then viewed the set of advertisements and provided current responses.

This project aimed to investigate audience perceptions of TAC television advertisements, and to identify groups of advertisements perceived to be similar by the audience. These aims were met by analysing drivers' ratings of their emotional, cognitive, and behavioural responses to each advertisement. The key findings arising were:

1. Attitudes to the TAC approach were generally positive, suggesting a general acceptance of the approach in spite of the perception that the approach is tough, frightening, and emotional.

2. Six types of responses were identified. Two represented reactions to the positive and uncomfortable emotional content of the advertisements respectively. The remaining four were more cognitive in nature, representing reactions to the seriousness of the content, the simplicity of its delivery, content that included an element of irresponsibility, and the originality of the advertisement and its information content.
3. The likelihood of an advertisement resulting in a behaviour change was associated with its originality or information content and its ability to evoke uncomfortable emotions.
4. The cluster analysis suggested that emotional content in advertisements is an important perceptual dimension for drivers, with advertisements dividing into two groups - enforcement advertisements and emotive advertisements.
5. The advertisements included in the emotive group were generally perceived to be more serious, less pleasant, and more emotional than those in the enforcement group. They were also perceived to be more effective (in terms of self-reported behaviour change) and were generally more relevant and credible.

The authors recommended:

1. The continued development of the combined emotive/instructive style of advertisement was recommended as the data suggest that this combination is the most likely to prove effective.
2. The TAC should continue to maximise the credibility and relevance of their advertisements. This could be achieved by developing advertisements that are perceived to be emotional, informative, and serious.
3. It was suggested that the current level of emotive intensity is probably appropriate.
4. Additional research could target the use of the method developed here as part of the tracking program used by the TAC, and could aim to develop a better understanding of the underlying processes that link exposure to the TAC advertisements and behaviour change.

#### **4.2.6. The High Cost of TAC Advertising**

Despite the evidence of the effectiveness of TAC advertising discussed above there has been some discussion as to whether the large budgets consumed in the production of TAC television advertisements are necessary. To address this question Donovan, Jalleh and Henley (1999) conducted an assessment of the relative effectiveness of expensive TAC advertisements. The authors suggest that whilst TAC advertising has been successful in reducing casualty crashes, the use of less costly and perhaps less dramatic advertising may be more cost beneficial. Twelve advertisements previously screened in Australia and New Zealand were selected from a pool of 100 and covered the themes of speed, drink driving, fatigue and inattention. Of these four were TAC advertisements. The advertisements within each of the four themes were selected to ensure that the message content was as similar as possible within each category. The key difference within each theme was the style of execution.

As the actual cost of the advertisements were unknown estimates of their costs were obtained from a panel of people with experience in the area. Each of the TAC ads were estimated to cost in excess of \$200,000. The remaining ads were categorised as those costing less than \$50,000 and those costing between \$50,000 and \$80,000. The testing procedure was completed by approximately 1,000 respondents who reported on their intentions to follow the behaviour promoted in the advertisements as a driver. The respondents also reported on their intentions to influence the behaviour of drivers when they are passengers. The key results and conclusions are as follows:

1. The two advertisements generating the greatest impact on self-reported intentions as drivers and passengers were TAC advertisements costing an estimated \$200,000 and \$225,000. However, the most expensive TAC advertisement (\$275,000) was found to be no more effective than two significantly less costly advertisements relating to the same theme.
2. The high cost advertisements tended to be longer advertisements, increasing the media spend associated with these advertisements and this should be considered in determining the overall cost effectiveness of the advertisement.
3. There is evidence that the impact of advertisements on individuals as drivers and as passengers may differ. Therefore, in determining the most cost-effective approach, due consideration should be given to the intended audience and possible effects on passengers.
4. A very slight positive relationship between the production costs of advertisements and their impact on self-reported driver and passenger intentions has been identified.

The analysis and conclusions do not appear to offer conclusive evidence of the relationship between the production costs of an advertisement and its impact on self reported driver or passenger intentions. The analysis considered only twelve advertisements in a pre-test environment and it is not apparent that a systematic approach was adopted to examine the full cost effectiveness of the different styles of advertisements. Further, the analysis considered only self-reported intentions and was not able to measure actual changes in behaviour. In order to provide more conclusive evidence on the effect of production costs on advertisement effectiveness, a more thorough evaluation which considers the effect longer-term effects of different advertising styles and the costs associated with advertisements beyond the production phase would be required. Given the proven effectiveness of TAC advertisements, the above research does not provide sufficient evidence for a change in the style of execution to be considered.

### **4.3. EVALUATIONS OF ROAD SAFETY CAMPAIGNS ELSEWHERE IN AUSTRALASIA**

#### **4.3.1. Experience in New Zealand**

In 1994, as part of the New Zealand National Road Safety Plan, the Land Transport Safety Authority (LTSA) set a number of casualty reduction targets to be met by 2001. In particular, the target for road fatalities was set to 420 and the number of Police-reported injuries was to be reduced to 11,000 (LTSA, 1994). It is noted that during 1994/95 the annual total of road fatalities was 585. To assist in the achievement of these targets the Supplementary Road Safety Package (SRSP) was developed and implementation began in 1995/96. This package aimed to target the level of speeding and drink-driving on New Zealand roads through the use of publicity and enforcement and thus reduce the incidence of casualty crashes. The primary measures used in the package included the increased use and improved targeting of speed detection and breath testing devices, the introduction of new enforcement technologies and the use of on going publicity to support these new measures. Further, in 1996/1997, seatbelt use was added to the list of targeted behaviours and advertisements advocating higher adult usage rates and increased enforcement were developed. The use of this combination of measures and the themes, style, intensity and media mix generally followed the Victorian TAC approach (Vulcan & Cameron, 1996) described in section 4.2.

Since the implementation of the package a number of independent evaluations of its effects have been conducted. Relevant to this report is the evaluation conducted by Cameron and Vulcan (1998) after the package had been in operation for two years. The authors of this review found that total annual road deaths in the 1995/96 period fell by 20 (3.4%) from the previous year. In 1996/1997 road deaths fell further to 541 although this was above the target set for that year. In addition, Police reported injuries fell by 3.2 percent and 17.1 percent during the first two years of the package respectively. In order to determine the extent to which the SRSP influenced the casualty reductions, econometric analysis of the impact of the package was conducted. Relevant to this report is the impact of the publicity used on all casualty crashes. Unfortunately, such detailed analysis is not available so the precise contribution of the publicity used as part of the SRSP is unknown. Nevertheless, some analysis of the advertising efforts was conducted for each of the three themes of the package (speed, alcohol and seatbelt use).

The intensity of the advertising campaign was measured by the number of Target Audience Rating Points (TARPs) achieved over the duration of the campaign. During the first year of operation of the package (1995/96), advertising with drink driving themes increased to an average of 770 TARPs per month and advertising with speed related themes increased to an average of 370 TARPs per month. These new levels were substantial increases from the previous year's advertising, representing 12 and 35 fold increases respectively. During 1996/97, the intensity of advertising with drink driving themes fell slightly to an average of 678 TARPs per month and advertising with speed related themes fell to an average 208 TARPs per month. As no advertisements relating to seatbelt use were run during the first year of operation of the package the level of advertising in 1995/96 fell compared to the previous year. However, in the second year of operation the level of seatbelt related advertising increased to an average of 189 TARPs per month. In total the combined intensity of advertising with all themes exceeded the target of 800 TARPs per month set during the development of the package.

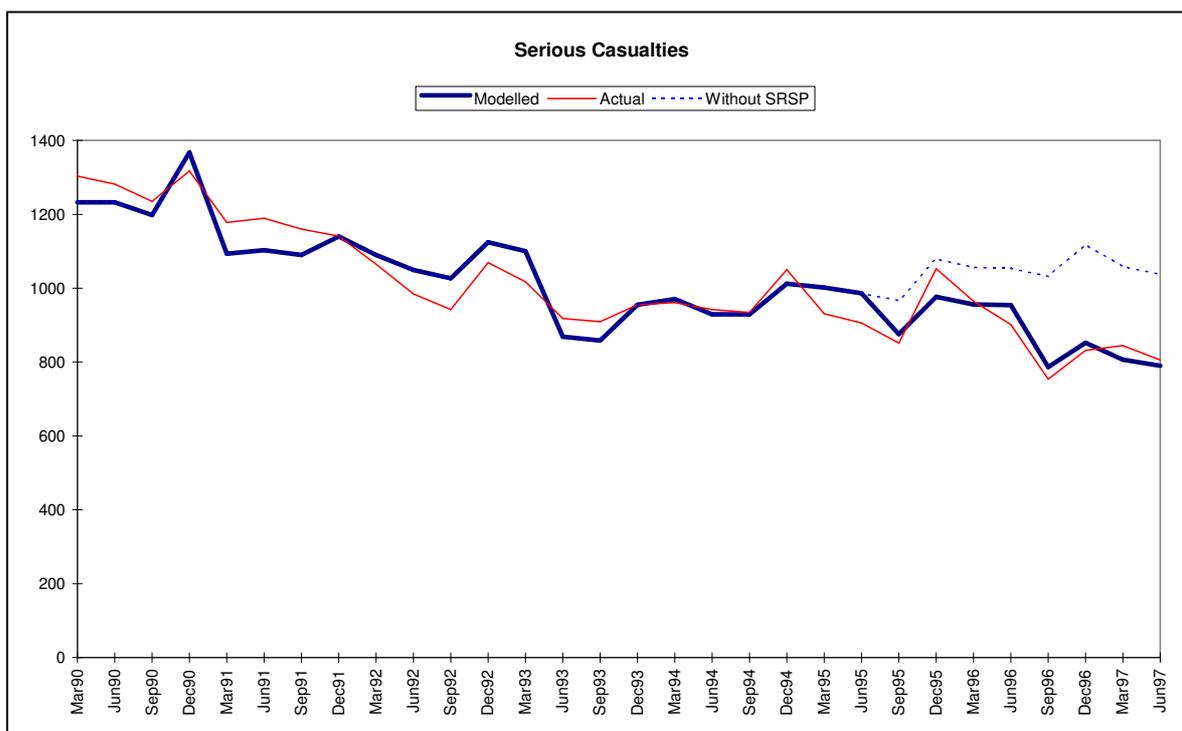
In addition to the measuring the intensity of the advertising campaigns, quarterly surveys of the community were conducted to determine three key measures of effect: spontaneous recall, spontaneous and prompted recall and the relevance to those who recalled the advertisement. This was completed for each of the three advertising themes separately over both the 1995/96 and 1996/97 periods. The key results for the best performing advertisements within each of themes are summarised in Table 7 below. It is noted that the target level for spontaneous recall of any LTSA advertisement was set to 70 percent across all sectors of the community and combining all themes. Similarly, the target for relevance to those who recalled the advertisement and spontaneous and prompted recall were also set to 70 percent across all themes.

**Table 7. Measures of effect for LTSA advertisements during the implementation of the SRSP**

<b>Theme</b>	<b>Measure (%)</b>	<b>1995/96</b>	<b>1996/97</b>
<i>Drink Driving</i>	<i>Spontaneous Recall</i>	38.0%	29.25%
	<i>Spontaneous &amp; Prompted Recall</i>	74.7%	53.0%
	<i>Relevance</i>	72.0%	62.3%
<i>Speeding</i>	<i>Spontaneous Recall</i>	30.3%	29.75%
	<i>Spontaneous &amp; Prompted Recall</i>	55.7%	66.5%
	<i>Relevance</i>	73.3%	75.0%
<i>Seatbelt Use</i>	<i>Spontaneous Recall</i>	n.a.	38.75%
	<i>Spontaneous &amp; Prompted Recall</i>	n.a.	69.5%
	<i>Relevance</i>	n.a.	69%
<i>All Themes</i>	<i>Spontaneous Recall</i>	68.0%	71.5%
	<i>Spontaneous &amp; Prompted Recall</i>	n.a.	93.5%
	<i>Relevance</i>	71%	63.25%

The results of the surveys conducted indicate that the level of spontaneous recall of LTSA advertisements by the public was relatively low when each theme was considered individually. However, when considered as a group spontaneous recall of LTSA advertisements with any theme was closer to the 70 percent target. The levels of spontaneous and prompted recall and relevance were close to 70 percent for each individual theme. Similarly, when the spontaneous and prompted recall and relevance measures were taken for all LTSA advertisements with any theme the recorded levels were close to the target levels and indeed exceeded them in some instances.

As discussed above, econometric analysis was conducted to isolate the impact of the SRSP itself on road trauma during the period of its operation. The models used in the analysis incorporated previous trends in road trauma and the impact of previous road safety initiatives such as the introduction of compulsory breath testing and the use of speed cameras. Further, the influence of seasonal factors and socio-economic variables such as new car registrations and levels of unemployment were considered and included in the models where appropriate. The key results of the analysis showed that the package was effective in reducing both serious casualties and fatalities during at least the first 2 years of its operation. It was found that the SRSP was associated with a 10% reduction in serious casualties during 1995/96 and 24% reduction during 1996/97, compared to the expected trend in casualties without the SRSP (Figure 9).



**Figure 9. Quarterly serious casualties in New Zealand compared to values estimated from a time series model, with and without the effect of the SRSP**

Despite the above positive results it is necessary to highlight that the contribution of the mass media campaign has not been isolated from the effects of increased enforcement. Nevertheless, in view of earlier research conducted by MUARC and others, it may be suggested that the mass media campaign played some role in generating the casualty reductions attributed to the SRSP. Again it is highlighted that the size of this influence is unknown.

#### 4.3.2. South Australia

##### *Speed Related Publicity*

During 1998-2001, the South Australian government conducted an experimental-design study of the effect of levels of speed-related publicity on speed behaviour in Adelaide (Woolley et al., 2001). Over a three-year period, there was a balanced matching of three levels of publicity (planned as zero, 450 and 900 television TARPs) and months of the year, replicated six times. On-road speeds were measured on workdays during daylight hours by automatic means, resulting in very large samples and consequently very reliable estimates of the speed parameters.

The television advertising during the period contained a range of executional styles and message content, and was based on well-established principles of deterrence against speeding, the consequences of crashing, and information about the relationship between speeding and crashing. It had non-emotive content and was designed to achieve immediate responses. Supporting radio material was also aired. The actual levels of television TARPs achieved during each wave over the period averaged 0, 537 and 925 TARPs, respectively. The speed-related advertising waves were at least two months apart (but other road safety advertising waves, specifically with drink-driving messages, usually intervened).

The South Australian police were asked to maintain their speed enforcement levels and practices as constant as practicable during the period of the study. Thus the study did not allow investigation of the possibility that the speed-related publicity may magnify any enforcement increases, or the publicity may have greater effects during periods when there is a greater consciousness of enforcement presence. It was aimed at measuring publicity effects independent of enforcement (i.e. enforcement held constant at a non-zero level).

The study found small, but statistically significant, reductions in speeds in the short term associated with the speed-related publicity. Waves achieving 537 TARPs were associated with 0.13 km/h reduction in mean speed and 0.31 km/h reduction in 95<sup>th</sup> percentile speed. The reductions in speed associated with 925 TARPs were *smaller*, suggesting that high intensity advertising (of this type) may not be as effective as moderate level advertising. Research in Adelaide relating the risk of casualty crash to travel speeds (Kloeden et al 1997) suggests that a power of 9 law applies in models first developed by Nilsson (1984). If so, the reduction in mean speed would suggest a 1.4% casualty crash reduction. However, the reduction in 95<sup>th</sup> percentile speeds suggests a 3.7% reduction, and these crashes are likely to be more severe.

These reductions in speeds (and the estimated potential crash reductions) associated with moderate levels (537 TARPs) of speed-related publicity, found by Woolley et al (2001), are consistent with the 5-7% reductions in serious casualty crashes associated with TAC speed-related advertising each year during 1990-1996, estimated by Newstead et al (1998). During months when they were active during 1990-1996, TAC placed 535 TARPs of speed-related advertising on Melbourne television (including the principal concentration-theme advertisement, "Country Kids", which had speeding images and reference to speed cameras). Thus the similarity of levels of effect are to be expected. Any small differences of effect may relate to the use of advertisements with non-emotive styles in South Australia during the study period (1998-2001), compared with the predominantly emotive-style advertisements used in Victoria during 1990-1996.

### ***Restraint Use***

In 1998 observational studies were conducted in South Australia both prior to and following a publicity campaign aimed at increasing restraint use in rural South Australia (Wundersitz, Kloeden, & Walker, 2000). The aim of the first study was to identify levels of restraint use and accumulate baseline data for comparison with later studies. Observations were undertaken in Adelaide, Whyalla, Mount Gambier and the Riverland. In February 1998 restraint use in rural regions of South Australia was significantly less than in metropolitan Adelaide with Whyalla recording the lowest wearing rates (84%). Therefore, Whyalla was chosen as the site for implementation of the publicity campaign.

The campaign comprised three key elements; police enforcement, community activities and public education through the use of mass media. The campaign ran for two three-week periods between 23 November 1998 and 13 December 1998 and 28 February 1999 and 20 March 1999. The media component consisted of four television advertisements developed on the basis of research results and focus group testing. These advertisements were supported by radio and newspaper ads. During first two weeks of the campaign a caution rather than an infringement notice was issued. However, in the final week of each period seatbelt laws were strictly enforced.

Following the first survey of restraint use in February 1998, two subsequent surveys were taken in December 1998 and March 1999. In both of these follow up surveys, Whyalla

recorded higher seatbelt use rates than metropolitan Adelaide. Restraint use in Adelaide during this period remained relatively constant at around 92 percent. In contrast, restraint use rates in Whyalla increased from a base level of 84 percent to a high of 93 percent. Restraint use in the remaining rural towns was consistently less than for metropolitan Adelaide although a general increase in usage did occur. The variation in enforcement levels across the rural towns makes it difficult to determine the extent to which the publicity in Whyalla affected the use of seat-belts. Nevertheless, the results of surveys relating to awareness of the advertising and enforcement efforts indicated that 74 percent of those surveyed were aware of the campaign. Similarly, 70 percent of respondents claimed that they felt more likely to be caught by Police when not wearing a seatbelt. However, only 28 percent of respondents stated that the advertising encouraged them to wear seatbelts.

The results presented above appear to indicate that seatbelt use increased in Whyalla as a result of the enforcement and publicity campaign. However, these increases occurred in the context of a general upward trend in usage rates in rural South Australia. The exact cause of this general trend cannot be isolated. In addition, there is no evidence of the long-term effect of the campaign on restraint use rates in Whyalla nor was the short-term effect of the publicity alone isolated. Therefore, the results of the evaluation presented here should be viewed with some caution.

#### **4.4. NORTH AMERICA**

In the last quarter of 1995, twenty States in the USA commenced the implementation of Occupant Protection Special Traffic Enforcement Programs (OP sTEPS) funded by NHTSA (Solomon, Nissen, & Preusser, 1999). Funding continued in most states until the end of 1997. The programs involved enhanced enforcement of seatbelt laws accompanied by high levels of publicity. The publicity included paid and unpaid public service announcements on television and in the print media, press releases and media launches immediately prior to enhanced enforcement efforts. Public announcements of results after the completion of periods of enhanced enforcement also occurred.

The legislation supporting enforcement operations varied somewhat between states. However, the type of legislation in operation can generally be described as either primary or secondary. States with primary legislation enable offenders to be issued with infringement notices for the failure to wear a seatbelt alone. In contrast, secondary legislation requires that an offender be stopped for an offence other than failure to wear a seatbelt before an infringement notice can be issued. It is noted that the difference in legislation led to significantly different rates of issuance of infringement notices for seatbelt offences. In primary law states, 43 percent of all infringement notices issued related to seatbelt offences compared to 21 percent in secondary law states.

Consistent with previous research, identified increases in seatbelt use were greatest at the beginning of the campaign period and fell (although generally not back to original levels) in between waves of enforcement. Little publicity occurred when enhanced enforcement was not occurring. Over the reporting period 1995-1995 the rate of seatbelt use increased in both primary and secondary law states. However, the average increase in primary law states (16.8%) was greater than in secondary law states (5.6%).

It is noted that the analysis techniques employed in this evaluation were relatively restricted and that no definite conclusions can be drawn about the effect of the publicity on

the rates of seatbelt use. Nevertheless, if the increases in seatbelt use are attributable to OP sTEP programs, the results add to the large body of research that suggests enforcement and publicity together can influence driver behaviour.

Two further evaluations of American enforcement and media campaigns aimed at increasing the use of seatbelts consider the effect of mass media campaigns on road user behaviour. The first of these investigates the 'Click it or Ticket' campaign conducted in North Carolina in 1993 and 1994 (Williams, Wells, McCartt, & Preusser, 2000). This program involved the extensive use of television, radio and newspaper advertising over an eight week period in 1993 and during a smaller campaign lasting three weeks in August 1994. More particularly, the total media spend for the initial campaign was \$US446,097 and \$US158,720 for the follow up campaign. In addition to the media activity enforcement checkpoints and dedicated mobile enforcement patrols were used during both campaigns.

The 1993 campaign was conducted in the North American autumn and consisted of two weeks of public information followed by 3 weeks of enforcement. During the next two weeks no enforcement was present, however, this was followed by one final week of enforcement. The media advertising was on going throughout the eight-week period. Due to the length of the follow up campaign in July 1994 media advertising and enforcement were in operation during the entire three-week period.

Observational studies were conducted at seventy two representative points across North Carolina prior to and following the 1993 program and at a subset of 24 sites following the 1994 program. The analysis indicates that seatbelt use rose during the campaign but dropped off significantly in the period between the initial and follow up campaign. Prior to the 1993 campaign the rate of seatbelt use for drivers was 65 percent. During and immediately following the campaign this increased to 80 percent but seven months after the campaign the use of seatbelts had dropped to 73 percent. After the follow up campaign in 1994 seatbelt use rose again to 81 percent. The use of structural time series models was also employed to estimate the savings in injuries and costs generated by the program. This analysis found that from 1987 until the end of September 1993 fatal and serious injuries fell by an estimated 7 percent. It is noted that no distinction was made between the impact of the enforcement and that of the mass media campaign on behaviour or crashes. In addition, no longer term observational results are available.

The second of the evaluations relates to a seatbelt use campaign first launched in 1984 in Elmira, New York (Williams et al., 2000). The campaign launch coincided with the introduction of legislation enabling infringement notices to be issued for a failure to wear a seatbelt. Prior to the introduction of this legislation the rate of seatbelt use was 14 percent. Since that time but prior to the new campaign in 1999 the rate of use has increased to 69 percent. In October 1999 the 'Buckle up NOW' campaign was launched and made extensive use of newspapers, radio and billboards to alert the public to the increased levels of enforcement. The target level of compliance at the end of the three-week campaign was set to 90 percent. In conjunction with the publicity campaign enhanced seatbelt law enforcement took place over a two-week period at 32 checkpoints throughout the county. The maximum fine for failing to wear a seatbelt was \$US50. The effectiveness of the campaign was evaluated in terms of the observed increase in seatbelt use.

The analysis completed shows that the use of seatbelts by front seat occupants rose from a baseline level of 69 percent to a high of 90 percent in October 1999 after the completion of

the campaign. Seatbelt use rates in other areas of the state remain relatively stable over that period. The longer term effects of the program have not been evaluated although the authors suggest that seatbelt use rates are likely to decline if no further follow up enforcement or publicity occurs.

#### **4.5. SWEDEN**

In an effort to address previous research indicating that media campaigns work best when messages are appropriately targeted, a drink drive communication campaign aimed at 16-24 year olds was launched by the National Board of Road Safety in Sweden in 1998. The major component of the campaign consisted of three television productions with drink-driving themes aired on television during prime time viewing hours in December, 1998. Each of the productions adopted a different approach to the drink driving theme. In particular the first program showed the effect of alcohol consumption on driving performance using well known artists. The second contained interviews with young drivers involved in alcohol related accidents and the final program demonstrated and discussed police work related to drink driving enforcement. The productions included both logical and emotional styles and were presented in the context of ongoing engineering and enforcement initiatives.

An evaluation of this initiative was conducted in two parts focusing on changes in attitudes and self-reported behaviours only (Linderholm, 2000). The evaluation involved a survey of approximately 2,000 individuals with the target age group. The first wave of surveys was conducted immediately prior to the campaign and involved 1,360 respondents. The second wave was conducted two months after the completion of the campaign and involved 969 respondents. Attempts were made to ensure that the same respondents were involved in both surveys.

The results of the evaluation suggest that the communication campaign did not achieve widespread exposure. Only 21 percent of respondents had seen at least one of the programs although 50 percent reported to have heard about them. Nevertheless, changes in attitudes towards drink-driving were identified between the two surveys. The analysis indicates that 6 percent of respondents had more negative attitudes towards drink driving following campaign completion. Further, there was a strong relationship between those who had seen the program and attitudes. That is, those who had seen the program were more likely to have more negative attitudes towards drink driving following the communication campaign. The second key effect of the campaign was to increase knowledge of the BAC limits as they apply in Sweden.

The results of this study do not identify any evidence of behaviour change. However, it appears that the campaign was successful in changing attitudes, at least in the short term. Longer term research and research demonstrating a statistical association between the campaign and changes in attitudes would be required to make definite claims about the effect of the communication campaign. However, it is again noted that this campaign, as are many others, was conducted in combination with ongoing engineering and enforcement initiatives. The combined effect and the contribution of these other initiatives has not been considered in this evaluation.

## 4.6. CONCLUSION

Available evaluations of mass media campaigns indicate that they are effective in improving road safety as measured by casualty crash frequency. However, there is great variation in the magnitude of the effect sizes presented in the evaluations examined in this review. A key limitation of much of the research in this area is that it does not isolate the effect of mass media campaigns on the relevant measure of effect from the effect of other supporting activities. This factor may contribute to the variation in the magnitudes of the measures of effect presented. Nevertheless, it is apparent that the extent to which any individual mass media campaign affects crash frequency is determined by the characteristics of the individual campaign. The research discussed above suggests that the following characteristics are of particular importance.

- The use of an underlying theoretical model
- The consideration of prior quantitative or qualitative research on the issue(s) addressed in the campaign
- The use of campaign supports such as legislation, enforcement and public relations or associated publicity
- The type of appeal approach adopted in the campaign and the media mix used to transmit the message
- The intensity, duration, timing and exposure of the campaign

The relative merit of the presence of each of these characteristics in a mass media campaign will be considered further in the following chapter of this report.

## 5. MASS MEDIA CAMPAIGNS: BEST PRACTICE AND RECOMMENDATIONS

Since the use of mass media in public health and road safety campaigns commenced, there has been much research conducted concerning the effectiveness of these campaigns. However, the majority of this research investigates individual campaigns with a diverse range of characteristics not common to all campaigns. It is therefore difficult, on the basis of any individual piece of research, to draw definite conclusions relating to the most effective type or style of mass media campaign. Further, the majority of individual campaign evaluations focus on the combined effect of a number of elements of a campaign and rarely isolate the effect of the mass media component alone. This further complicates the task of distilling the research to determine best practice. However, the consolidation of the individual pieces of research, in the form of the two meta-analyses discussed in this report, provides an opportunity to highlight some of the key characteristics of successful road safety mass media campaigns.

First, the manner in which the effectiveness of a campaign is measured will influence the magnitude of the effect. Measures of effect such as awareness of a campaign or campaign message are likely to change the most as a result of a road safety mass media campaign. In contrast, changes in objective measures of behaviour, such as seat-belt use or the frequency or severity of crashes, are likely to be much smaller in size. As discussed previously, the relationship between attitude and behaviour change is unclear and the mechanisms behind the relationship are still the subject of debate. Nevertheless, the research in the area of road safety at least, suggests that mass media campaigns are more effective in changing awareness when compared to objective criteria such as changes in crash frequency. It also indicates that the use of measures of effect such as awareness, whilst commonly used in the field of brand advertising, do not provide sufficient information to fully understand effects on road safety. They relate more to exposure and campaign intensity and do not represent actual changes in behaviour nor consequent reductions in crashes.

Second, the base level of the measure of effect will also influence the degree to which a campaign is successful. In general, the higher the base level of the relevant measure of effect, the smaller the expected impact of the mass media campaign. This is consistent with expectations as the target group on which the campaign can act is smaller in size. When examining the cost effectiveness of road safety mass media campaigns this is an important factor to consider.

Third, a wide variety of psychological concepts are available to guide the development and design of mass media campaigns. Psychological theories have been developed for and applied to mass media campaigns. There has been debate regarding the utility of the theories, concluding that the use of psychological theories of behaviour change in campaign development is useful. Campaigns that have been evaluated as more effective frequently utilised theories to guide the campaign development. Theories of particular relevance to road safety mass media campaigns include Rogers' Protection Motivation Theory and Extended Parallel Process Model (see Chapter 2 for details), both of which utilise concepts such as fear arousal, coping responses and self-efficacy. General Deterrence Theory is also highly relevant, with its highly specific coverage of road safety elements, including enforcement. Furthermore, campaigns utilising fear appeals have also been shown to be more effective, however, more work needs to be done to operationalise measures of fear, in order to identify optimum levels of fear arousal.

Further issues impact upon the strategic development of the mass media campaign. Such issues include the legal status of the behaviour. In the area of road safety, depending on the level of enforcement associated with the target behaviour, campaigns can be linked to enforcement with good effect. Identifying the target group has also been shown to be a necessary step in campaign development. Knowledge about the target group can allow for more specific and appropriate targeting within the campaign. A caveat is provided in regard to evaluations, which are rarely completed on the target group. Such targeting however, is still more likely to increase the overall success of the campaign, as the campaign is focussed towards those with the lower base level of the relevant measure of effect.

Media choice has been widely discussed in the literature, with television considered the most effective choice for road safety campaigns. Television is particularly effective when changing the pre-cursors to unsafe road behaviour, and also for emphasising the consequences of unsafe road behaviour. Supporting material has been shown to add to the effectiveness of campaigns, and can utilise any of a range of other media, including radio, press advertising and brochures. Media placement also needs to be of sufficient duration, intensity, timing and exposure. Placement needs to be timed appropriately for the target group. Research suggests campaigns lasting up to one year were associated with greater effect sizes. A minimum of three exposures is necessary for the commencement of assimilation, and consistent exposure is also required.

Message characteristics also play an important role in the success of the campaign, and include both content and style. Research suggests that related messages need to include a consistent slogan in order to link the messages together, and optimise the audience impact. New information can also increase the campaign effect size. Messages also need to be credible and realistic. The use of expert or target group relevant group models is also recommended. Research has also shown that a serious approach is more appropriate than a humourous approach.

Guidelines for campaign management have also been outlined. It is recommended that there is a key agency responsible for the co-ordination of all publicity, including the campaign and public relations. This also allows for priority setting. There should only be a limited number of themes and messages at any one time. Responsibility for decision-making regarding message development needs to be based on independent research rather than bureaucratic or governmental decisions. Community support should also be used where appropriate, as it has been found to increase campaign effects.

The evidence emerging from the psychological literature relating to the elements of successful campaigns is supported by the results from the evaluation research. In particular, three key conclusions have emerged.

- Conclusion One: campaigns with a persuasive orientation and those that use emotional rather than rational appeals tend to have a greater effect on the relevant measure of effect. In contrast, information based and educative campaigns have been associated with less effective campaigns.
- Conclusion Two: the use of explicit theoretical models and prior qualitative or quantitative research to inform the development of road safety mass media

campaign messages and execution has been found to increase the effectiveness of campaigns.

- Conclusion Three: the use of public relations and associated publicity appears to be more important to the outcome of the campaign than the use of enforcement. However, the combination of public relations and enforcement as supporting activities shows particularly large effects.

These conclusions emerging from the meta-analyses are supported by individual campaign evaluations conducted after 1997. Therefore, it is recommended that the development of future road safety mass media campaigns incorporate those elements identified as likely to increase the effectiveness of the campaign.

Further to the above conclusions, other noteworthy results emerged from evaluations of individual road safety mass media campaigns. In particular, the short term use of speed-related publicity alone was found to lead to casualty crash reductions. Further, in Victoria, no evidence of an interaction effect between speed camera enforcement and publicity on casualty crash frequency could be identified. *These two results suggest that it is not necessary for speed enforcement and speed-related publicity to operate together to produce maximum effect.* However, it is noted that other elements of the Victorian mass media road safety campaign, such as the covert nature of speed camera enforcement, may have influenced this result.

Finally, it is noted that the research is subject to a number of limitations and it is necessary to make some general comments on the research in the area of mass media publicity and its effect on behaviour. First, there is a tendency for only those mass media campaigns that result in positive changes to be reported. Further, many campaigns that are evaluated result in documents published within organisations that are not publicly released. These trends limit the conclusions that can be drawn from the meta-analyses that have been conducted. Notably however, very few campaign evaluations attempt to isolate the effects of the advertising component of the campaign alone; despite the fact that the majority of campaigns involve supporting activities such as enforcement or public relations. Therefore, particularly when examining evaluations of individual campaigns it is necessary to consider the influence of all the campaign characteristics in assessing the impact of the campaign. Also, relevant to an assessment of the campaign is the time over which any improvements in the relevant measure of effect took place. Many evaluations of mass media campaigns consider the effect of the campaign, either during or immediately following the completion of the campaign. It is recommended that future research, where possible, examine the longer-term effects of mass media campaigns.

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