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LN Wundersitz, TP Hutchinson, JE Woolley

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ABSTRACT

This report provides a timely review of what is currently known about road safety advertising design and evaluation. Australian and international advertising literature published from 2001 to 2009 was reviewed to determine best practice for road safety mass media campaigns in South Australia. Instead of determining whether road safety advertising is effective or not, this review focused on what elements of road safety advertising are more effective and for whom. The review describes current psychological theories of behaviour change and social persuasion that are relevant to road safety advertising. In terms of mass media campaign design, factors that can improve campaign effectiveness were identified such as integrating advertising with other activities (e.g. enforcement), tailoring message content and means of communication to the characteristics of the target audience, and using new technology and multiple forms of media to reach the target audience. In addition, the effects of different levels of advertising exposure were considered and the efficacy of threat appeals and alternatives (i.e. positive emotional appeals) were discussed. The review also highlighted the difficulties in establishing the effectiveness of a mass media campaign, considered different evaluation methods and discussed the value of different campaign evaluation measures. Recent campaign evaluations were reviewed to highlight current key issues in campaign evaluation research. The report concludes with constructive recommendations for best practice for road safety mass media campaigns.

KEYWORDS

Road safety advertising, mass media, campaign evaluation, message effectiveness, threat appeal

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Summary

Road safety mass media campaigns play a valuable role in improving road safety by promoting safe behaviours. Given the costs associated with mass media advertising, it is important to understand what elements make a road safety mass media campaign effective and how future campaigns might be made more effective.

A review of best practice in the road safety mass media literature was conducted in 2001 as part of the South Australian Road Safety Media Evaluation Study. This report provides an update of the current level of knowledge for road safety advertising. Australian and international road safety mass media literature published from 2001 to 2009 was reviewed to determine best practice for mass media campaigns in South Australia. Where necessary public health literature was also examined but the primary focus was on road safety. Rather than concentrating on whether road safety advertising is effective or not, this review focused on what elements of road safety advertising are more effective and for which road user groups.

The review specifically focused on:

- The latest theoretical models of behaviour change relevant to health advertising
- New issues associated with campaign development such as message content and style, target group, communication mode etc.
- The efficacy of fear inducing or threat appeals and alternatives
- The effect of different levels of advertising exposure
- Evaluations of mass media campaigns, with an emphasis on behavioural change.

Pertinent 'best practice' findings from the literature review are reported for each of the topics below.

THEORIES OF BEHAVIOUR CHANGE

There is general agreement that the most effective health-related mass media campaigns use wellresearched psychological theories of behaviour change to develop the campaign. Theory can provide a conceptual foundation for a campaign, assist in determining where campaign messages might focus, and accommodate evaluation of the campaign. A number of psychological theories that concentrate on predicting behaviour change, explaining social persuasion and the process of behaviour change are described. Despite the known benefits, few campaigns use a theoretical framework when designing campaigns.

CAMPAIGN DESIGN AND DEVELOPMENT

- Use systematic data driven processes to identify the target behaviour and the target audience.
- Segment the target audience then tailor the message to the motivation and needs of these subgroups.
- Clearly define the campaign objectives and select appropriate variables that can measure whether these objectives were achieved.
- Integrate mass media with other campaign activities such as enforcement/ legislation/education.
- New forms of media and technology offer innovative new ways to convey messages and also a means for measuring on road behaviour when evaluating campaigns. Different types of media should be combined to reach as many as possible in the target group.

• Campaign messages can be communicated more effectively when the mode of communication matches campaign goals and the target group preferences.

THREAT APPEALS

- Despite much research, the literature examining the effectiveness of threat appeals is inconclusive. There are some suggestions that fear appeals can have an impact but only when specific conditions are satisfied. The fear appeal must describe a threat (i.e. severity, personal relevance, vulnerability) and suggest a specific plan for reducing or avoiding the threat (e.g. a safe behaviour) that is possible to carry out, perceived as effective, and allows the target audience to believe that they are capable of performing the safe behaviour. The campaign may be counterproductive without all of these factors, as individuals may believe that they are unable to protect themselves from the threat, resulting in defensive and maladaptive responses. On this basis, fear appeals should be used with caution and road safety campaign developers should consider using different appeals.
- Gender may influence the effectiveness of different emotional appeals. There is some evidence suggesting that positive emotional appeals (e.g. humorous) may be more persuasive for males than fear appeals and vice versa for females.

ADVERTISING EXPOSURE

 Industry standards suggest three exposures are needed to achieve minimum effective frequency although there are suggestions that a single exposure might be enough in some situations. In the absence of any new knowledge from road safety campaigns, it is recommended that industry standards not be exceeded.

EVALUATIONS

- Need realistic expectations from campaigns. Mass media campaigns are more successful at conveying information and altering attitudes rather than changing behaviour. Behaviour change might occur after many years but longer-term effects are difficult to measure.
- The variability in crash data means that it is not an optimal outcome measure for mass media campaigns.
- Where possible, evaluations should be based on before and after comparisons of behaviours or variables that can be objectively observed and are closely linked to safety.
- The systematic on-going measurement of safety-related behaviours allows baseline measures to be obtained before campaigns are implemented. South Australia now has on-going surveys of vehicle speeds and recent observational measures of other driver behaviours (i.e. seat belt surveys). There is scope to collect data on other easily observed objective measures to assess campaign effectiveness.

A review of evaluated road safety mass media campaigns in the published literature examined 14 studies. Due to the lack of scientific evaluations, generally poor methodological designs, confounding factors, and lack of documentation of campaign activities, it was difficult to determine what elements of the road safety mass media campaigns were effective. Nevertheless, some comments were made concerning the improvement of media campaign design and evaluation that highlighted previous findings from the literature.

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Introduction 1

1.1 Background

Mass media campaigns are used extensively as a means of promoting road safety issues. Given the relatively high cost of mass media advertising, it is essential to know what elements make a road safety mass media campaign effective and how future campaigns might be made more effective.

To ascertain the effectiveness of recent mass media campaigns, a scientific outcome-based evaluation is desirable. However, a rigorous evaluation is very difficult and costly to achieve and may not necessarily provide definitive answers. In the absence of such an evaluation, a more constructive approach is to review the literature on best practice in road safety mass media campaigns. A review of best practice in the road safety mass media advertising literature was conducted as part of the South Australian Road Safety Media Evaluation Study in 2001. Therefore, it is timely to provide an update of the current level of knowledge for road safety advertising.

The aim of this project is to review recent Australian and international road safety mass media literature to determine best practice for mass media campaigns in South Australia. Rather than focusing on whether road safety advertising is effective or not, this review is concerned with what elements of road safety advertising are effective and for whom. This review might assist in enhancing the ability of campaigns to reduce the number of crashes on South Australian roads and associated injury claims.

To determine best practice, a situation scan of the road safety literature was undertaken. Where necessary public health literature was also examined but the primary focus was on road safety. Given that the Woolley (2001) report provided a comprehensive coverage of the literature published prior to 2001, this review covers international literature published from 2001 to 2009. The literature search uncovered a large body of research relating to mass media campaigns from a wide range of different perspectives.

The scope of this review was to look at:

- The latest theoretical models of behaviour change relevant to health (i.e. not product) advertising
- New issues associated with campaign development such as message content and style, target group, communication mode etc.
- The efficacy of fear inducing or threat appeals and alternatives ٠
- ٠ The effect of different levels of advertising exposure
- ٠ Evaluations of mass media campaigns, with an emphasis on behavioural change.

To provide some context, the report begins by summarising the key findings from Woolley's literature review and two other recent reviews. The next section describes a number of psychological theories that focus on predicting behaviour change, explaining social persuasion and explaining the process of change. The following section describes issues pertaining to the development of road safety mass media campaigns, specifically concerning the target audience, the type of media used, and the levels of exposure required. This is followed by a discussion of the message style, form and content used in campaigns with particular emphasis on the use of threat appeals and alternatives to threat appeals. Section six provides a theoretical discussion of the feasibility of evaluating mass media campaigns with illustrative examples. The difficulties in establishing the effectiveness of mass media campaigns is explained, potential evaluation methods are described and different campaign evaluation measures are considered. The seventh section examines recent campaign evaluations to highlight current key issues in campaign evaluation research. The final part of the report summarises best practice for road safety mass media campaigns.

1.2 Advertising and road safety

There is quite a substantial body of opinion, based on evaluations of individual campaigns, that advertising campaigns will not usually improve driver behaviour. According to Strecher et al. (2006, p. 35), "One-size-fits-all mass media interventions that run independently of other strategies have demonstrated little or no behavioural improvement." On the other hand, there seem to have been enormous changes in some attitudes over the past 30 years - less tolerance of smoking, and drink driving for example. Reasons for this contradiction are not well understood.

If it is agreed that there have been enormous changes in regard to these issues, several possible mechanisms of change might be held responsible.

- Direct effects in reducing the frequency of these behaviours.
- Change of attitudes of people, with behaviour changing as a consequence.
- Change of the policies chosen by policy makers, followed by enforcement of the new policies, compliance of the public with what is enforced, and change of attitudes to make them compatible with behaviour.

We are unable to say which of these mechanisms has been the most important. However, if it is true (as some people say) that attitudes have tended to follow rather than lead behaviour, this will weaken the argument that even in the absence of a demonstrable short-term effect, advertising may have a long-term effect on behaviour: it may be that the third of these mechanisms has been the most important, and that everything else follows from an appropriate policy and its enforcement.

2 Mass media reviews

To provide some context, this section provides a summary of the conclusions drawn by Woolley (2001) in his review of the mass media literature published before 2001. A summary of findings from two pertinent reviews of the mass media literature published since the Woolley report is also documented to provide an overview of some general principles associated with effective mass media campaigns. The first of these reviews draws on literature from public health in general, while the second review is more focused on road safety research but has also drawn on public health literature where relevant.

2.1 Woolley (2001)

Major findings from the Woolley's report are as follows:

- Mass media campaigns have a role to play in road safety but are unlikely to produce large behavioural change in isolation.
- Mass media should play a supporting role to other campaign activities (i.e. enforcement).
- Social persuasion marketing attempts to convince people that their current behaviour is undesirable and that they should change it; product or consumer advertising seeks to channel the same behaviour in a certain direction. Consequently, common principles of advertising do not necessarily suit all types of mass media campaigns.
- Campaigns aimed at behavioural change will be more successful if designed within social persuasion framework.
- Most effective public health mass media campaigns have used well-researched psychological theories of behaviour change when developing the campaign.
- The audience are not passive receivers (i.e. giving information does not result in desired behaviour change), but are selective and their motivation is important.
- Actions required by the target need to be clearly identified in the campaign.
- The amount of exposure needed to alter behaviour is inconclusive but perhaps greater efficiency is achieved in the first few exposures. According to product advertising, advertisements tend to be most effective in the first 3 to 10 exposures with wear out setting in around 10 to 20 exposures. High exposure levels in public health can be subject to wear out.
- The use of 'shock tactics' and extreme emotion should be avoided.

The following gaps were identified in the literature:

- How much advertising is enough?
- How can advertising effectiveness be adequately measured?
- Do threat appeals designed to evoke fear really work? "It has not yet been established whether the net gains by using strong emotional advertising outweighs the potential damage that it may produce. There is strong evidence however to suggest that the risk is high." Woolley (2001), p70.

2.2 **Recent reviews**

Several reviews of the road safety and public health mass media literature have been conducted since Woolley's 2001 report (e.g. Delaney et al., 2004; Delhomme et al., 2009; Haworth, 2005; Noar, 2006; Randolph & Viswanath, 2004; Rodriguez & Anderson-Wilk, 2002). A summary of the key elements found to enhance the persuasiveness of mass media campaigns from the two most recent reviews are provided below.

Based on public health literature, Noar (2006) argues that in the last decade health mass media campaign designers have increasingly adhered to principles of effective campaign design, rather than discovering new principles and this has resulted in increased campaign success. Some of the major principles of effective campaign design applied to health mass media campaigns include:

- Conduct formative research with the target audience to clearly understand the problem or • behaviour (i.e. pre-test messages with target audience).
- Use theory as a conceptual basis for the campaign (e.g. to develop messages).
- Segment audience into meaningful subgroups based on important demographics (e.g. age, gender, socio-economic, risk, personality).
- Use a message design approach directed to the targeted audience segment. Develop novel and creative messages that start interpersonal discussions and persuade people important to the target audience.
- Use channels widely viewed by target audience and strategically position campaign messages within the channel.
- Conduct a process evaluation that includes the monitoring and collecting of data on implementation of campaign activities.
- Use a sensitive outcome evaluation design that reduces threats to internal validity and allows causal conclusions about influence on attitudes and behaviours.

Delhomme et al. (2009) observed that it is not practical to conduct a rigorous outcome based evaluation of the effectiveness of mass media campaigns in road safety. They concluded that the best evidence comes from broad literature reviews or meta-analyses of mass media campaigns. From a synthesis of findings from descriptive studies and meta-analyses in the public health and road safety domains, they found that campaigns were enhanced by the following key elements:

- Combined with other activities such as enforcement, education and/or legislation
- A theoretical model is used
- The campaign is based on prior research •
- ٠ A single theme is chosen rather than multiple themes
- A specific target audience is addressed ٠
- The target audience is segmented (e.g. by demographics, attitudes, values etc.).

We saw the report by Vaa and Phillips (2009) too late for proper discussion to be included here. They are quite positive about campaigns, but they are largely referring to something rather different from what is usually thought of as media campaigns. They emphasise the use of a personal element or the use of other people as channels for the delivery of the campaign message, and the delivery of the message to drivers at a place that is in terms of space and time close to the target behaviour - what they term intimacy and immediacy.

3 Theories of behaviour change

There is general agreement in the literature that the most effective public health mass media campaigns have used well-researched psychological theories of behaviour change to develop the campaign. Theory can serve as a conceptual foundation for a campaign, assist in determining where campaign messages might focus, and accommodate the possibility of evaluating the effectiveness of the campaign. In terms of road safety advertising, it is important to understand what factors influence driver behaviour, what motivates a driver to behave in a safe manner or not, and the process of behaviour change.

This following section (3.1) outlines several theories that have been developed to predict behaviour. Theories that provide an explanation as to how changing individual attitudes and intentions through persuasive appeals might result in the adoption of the desired behaviour are described in Section 3.2. In Section 3.3, theories that explain the process of change are outlined. These theories are significant because they provide insight as to why a social persuasion campaign might not result in the desired behaviour change despite some success such as message acceptance by the target audience.

Many of these psychological theories or models were developed decades ago and are described in detail by Woolley (2001) and Delhomme et al. (2009) and so a brief overview is provided in this report. Note that this is a selective list of theories that are deemed to be most relevant.

3.1 Theories predicting behaviour change

3.1.1 Theory of Reasoned Action and Theory of Planned Behaviour

The Theory of Reasoned Action (TRA), developed by Fishbein and Ajzen (1975), suggests that peoples intentions to behave in a certain way are based on a set of weighted beliefs about the consequences of such behaviour. Essentially, intentions affect behaviour. This theory assumes that people make logical and consistent decisions, and that attitude and social normative beliefs are the determinants of intentions.

The Theory of Planned Behaviour (TPB: Ajzen, 1985) builds on the TRA with the addition of perceived behavioural control as a determinant of intentions. This additional variable extends that model to explain behaviour where the individual feels they have little control over whether a violation occurs or not (e.g. speeding behaviour). Consequently, if you want to change behaviour, behavioural intentions must first be changed and they are dependent on behavioural beliefs, normative beliefs and control beliefs.

3.1.2 Theory of Interpersonal Behaviour

The Theory of Interpersonal Behaviour (Triandis, 1977) is similar to the TPB as it also includes normative factors and the perceived consequences of behaviour as a predictor of intentions and consequently behaviour. However, it differs in that it includes habits as a predictor of behaviour. Habit refers to how automatic a process is, that is, behaviour might be habitual rather than intentional (or due to physiological arousal or facilitating conditions). This theory suggests that campaigns targeting habitual behaviours (e.g. smoking, habitual drink drivers) will have little effect if they concentrate on intentions or factors that influence intentions. This is because individuals do not consciously consider the advantages and disadvantages of habitual behaviour.

3.1.3 Health Belief Model

The Health Belief Model was one of the first behavioural change models and it has been modified several times over the years (e.g. Rosenstock, 1977). The theory postulates that individuals are motivated to take positive action and promote their health due to a desire to avoid negative health outcomes. For example, a seatbelt is worn to avoid serious injury in a crash. The model is broader than the TPB because it also includes different emotional responses: perceived susceptibility and perceived seriousness of the consequences. Together these factors define the perceived threat with a given behaviour that must be high for an individual to consider behaviour change. When considering behaviour change, the perceived benefits and the perceived barriers are compared to perform a cost benefit analysis. To further facilitate behaviour change, a high level of self-efficacy is required and cues to action are needed as motivators to raise the likelihood of action. The processes in this model assume that the individual is a rational decision maker.

3.1.4 Protection Motivation Theory

According to Protection Motivation Theory (Rogers, 1975), adaptive and maladaptive coping responses can result from a health threat due to two different appraisal processes: threat appraisal and coping appraisal. Threat appraisal is a function of the perceived severity and vulnerability to the threat and the extrinsic and intrinsic rewards associated with an unsafe behaviour (e.g. saving time when speeding). The coping appraisal is the result of response efficacy, self-efficacy and response costs associated with executing the recommended behaviour. The outcome of these appraisals influences an individual's protection motivation that leads to either adopting the desired behaviour or not.

Unlike the heath belief model, this theory is able to explain rational and irrational decision making processes. For instance, when response efficacy and self-efficacy are high and vulnerability and severity factors are high, the individual will perceive that they can do something to avert the threat. However, when response efficacy and self-efficacy are low and vulnerability and severity factors are high, an individual might feel helpless and unable to avert the threat and/or perform the recommended behaviour, leading to maladaptive responses. This is one reason why fear appeals do not always work (see Section 5.2 for a detailed discussion).

3.2 Theories explaining social persuasion

To understand how to persuade an individual to adopt new attitudes or behaviours, specific theories of persuasion or motivation to change need to be examined. The following theories view behavioural change as the outcome of information processing.

Elaboration-Likelihood Model 3.2.1

The Elaboration-Likelihood Model (Petty & Cacioppo, 1986) views persuasion as a means of forming or changing attitudes and there are two routes of persuasion by which attitude change may occur: central and peripheral. Motivation and ability are required for high elaboration in cognitive processing, that is, when individuals actively think about the campaign message, judge and evaluate it, and link the content to information already stored in their memory. Individuals might be motivated to process a message if it is perceived as relevant or they feel a high level of personal responsibility. Factors influencing an individual's ability to process the message include prior knowledge of the message, comprehensibility of the message and whether there are any other distractions. Assuming that both motivation and ability are sufficient, the right informational cues need to be present. Persuasion can also occur with low elaboration, but rather than going through the elaborate assessment via the central processing route, the individual follows the peripheral route where simple decision rules are derived by the situation at hand. For example, attitudes might change based on the attractiveness or expertise of the message presenter.

3.2.2 Associative-Propositional Evaluation Model

A more recent model is the Associative-Propositional Evaluation Model (APE; Gawronski & Bodenhausen, 2006). The APE is a dual attitude model whereby evaluations of attitude objects are based on the type of attitude: implicit or explicit. Implicit attitudes are based on associative process such that evaluations are automatic, affective reactions to an attitude object (e.g. salt is automatically associated with pepper). Such evaluations are not intentional and require limited cognitive resources. Explicit attitudes are reported by the person that holds these attitudes and they are activated more deliberately, requiring more cognitive effort. In contrast to implicit attitudes, explicit ones derive from evaluative judgements. The model suggests that explicit attitudes are able to better predict behaviours that are under volitional control.

Attitude change can proceed differently depending on which type of attitude is to be changed. Implicit attitudes require changes to associative evaluations, which may take place through incremental changes or by changes in the pattern of activation. Explicit attitude change can occur by changing associative evaluations that will cause subsequent changes to evaluative judgements, or making changes to the information used in the evaluation (i.e. new beliefs/knowledge or additional consideration of existing beliefs/knowledge).

3.3 Theories explaining the process of behaviour change

The following theories explain the process of behaviour change so that campaigns might be designed to support the desired behaviour or influence the behaviour change process. They also provide insight as to why the desired behaviour has not occurred.

3.3.1 Theory of Self-Regulation

The Theory of Self-Regulation (Carver & Scheier, 1981) describes the way in which individuals change their behaviour based on the concept of negative feedback. Individuals compare their current situation with a goal (attainment or avoidance) or reference situation. If a discrepancy is observed, action is taken to minimise the discrepancy. Goal disengagement may also occur when an individual decides to abandon a goal or exchange it for a more realistic one. This is not necessarily negative but may be positive or adaptive. For example, a goal disengagement message such as slowing down speeders on 50km/h roads might also have a spill over effect into other areas such that speeding is reduced in all speed zones. Campaign developers then need to decide whether to focus on goal attainment or goal disengagement. The decision might be determined by the aim of the campaign and the target audience.

3.3.2 The Transtheoretical Model of Change

The Transtheoretical Model of Change, developed by Prochaska and DiClemente (1983), has received much attention in the area of behaviour change and health promotion such as smoking cessation (Spencer *et al.*, 2002), promoting physical activity (De Bourdeaudhuij *et al.*, 2004) and encouraging commuters to cycle (Gatersleben, 2003). A major contribution of the model is that it considers the readiness of the individual to change their behaviour. The model outlines six stages of change through which an individual must progress before a new behaviour can be established and

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maintained. Individuals do not necessarily follow a linear pattern through the stages but may move both forwards and backwards.

The stages of the model are:

- Pre-contemplation No consideration or intention to change behaviour and change may be resisted.
- Contemplation Awareness of the problem behaviour but costs and benefits associated with the behaviour are seen as equal.
- Preparation The intention to take action is high and some reductions in problem behaviour may have occurred.
- Action Some change in behaviour has occurred but much effort is required. This is the most unstable stage and the risk of returning to the old behaviour is high.
- Maintenance The new behaviour has started to become habitual but still a chance of relapse when emotionally distressed. The new behaviour needs to be rewarding.
- Termination The new behaviour is established and there is no longer a temptation to return to the old behaviour.

There are some issues associated with specific stages that have implications for mass media campaigns. In the pre-contemplation stage, the individual is not aware that they are engaging in a problem behaviour therefore merely informing a person about the disadvantages of their behaviour will not have the desired effect. Message evaluation is highly dependent on the receiver's own underlying beliefs. People in this stage are also very hard to reach, as they do not actively seek information. However, some health research has reported positive results by proactively seeking and contacting pre-contemplators (Reed, 2001).

To progress to the contemplation stage, individuals need to become aware of the problem behaviour and what they need to do. This might be achieved by highlighting the conflict between their needs and those of the general public, resulting in cognitive dissonance, dissatisfaction and a desire to change. Individuals in the contemplation stage are open to new information and want to learn more. Progression to the next stage might occur if the message is seen as functionally relevant or there is a push from others in the community (DeBono, 1987).

This is one of the more widely used psychological theories at present. Knowing at which stage the target audience is situated is very useful when developing road safety campaigns. This and other factors associated with mass media campaign development are discussed in the next section.

4 Road safety mass media campaign development

4.1 Target audience

Identifying the target audience is a key factor to campaign success. The more that is known about the target audience characteristics, knowledge, beliefs, behaviours, social environment and stage of behaviour change, the greater the chance of developing an effective campaign that might influence attitudes and/or behaviour.

The process of identifying the target behaviour and target audience should be data driven and systematic. It should involve examining several different sources of data such as crash statistics, traffic offence data, behavioural observations, household surveys, and focus groups. For instance, data from household surveys suggests that young males aged 20 to 29 years are the age group most likely to have consumed illegal dugs in the last month (Australian Institute of Health and Welfare, 2005) yet South Australian police enforcement data (number of drug detections) suggests that males aged 30 to 40 years are most likely to drug drive, although the level is relatively high for males aged between 20 to 50 years (Wundersitz *et al.*, 2009). Crimmins and Callahan (2003) illustrate the importance of understanding the background of the target audience in social marketing by examining the precipitating factors, underlying causes, motivations and needs of drivers prone to road rage. From this analysis or 'target insight', they developed an advertising strategy to reduce road rage.

The audience is not a passive receiver; the desired behaviour change does not necessarily follow after a message is imposed (Elliott, 1989). Audiences can be quite selective and may have different underlying behavioural motivations. Indeed, a lack of audience segmentation and message targeting are thought to be significant factors that have contributed to the failure of health mass media campaigns in the past (e.g. Noar, 2006; Strecher et al., 2006). Audience segmentation involves dividing the audience into meaningful homogenous subgroups based on important characteristics. These characteristics may vary according to what type of information is available but there are four main ways: using demographic, geographic or behavioural characteristics; according to primary and secondary audiences; based on a theoretical model (e.g. stages of change) and combining different types of segmentation (Delhomme et al, 2009). According to Delhomme et al. (2009), the following principles should guide decisions concerning which segments of the audience to address and how many segments might be targeted:

- those with the greatest needs (i.e. according to crash data)
- those most ready for action and able to respond
- those easiest to reach (but this should not be at the expense of those most at risk who are difficult to reach)
- those that are the best match for the organisation developing the campaign in terms of expertise and resources.

The effectiveness of mass media campaigns might be increased if message content and communication channels are tailored to the characteristics of these more narrowly defined segments or subgroups.

4.1.1 The fit between a message and its audience

It is sometimes said that some aspect of the style of a public health message should be targeted to some aspect of the audience. Goldstein (1959) found that a strong fear appeal receives greater acceptance among those he referred to as copers than among those he referred to as avoiders, while

a minimal fear appeal receives greater acceptance among avoiders than among copers. He was able to refer to other literature supporting the idea of individual differences in reactions.

There has been much subsequent research. According to a review by Atkin (2001, p. 23), "Effectiveness can be increased if message content, form, and style are tailored to the predispositions and abilities of the distinct subgroups". Later in that review, there is discussion of mechanisms causing health campaigns to fail. These mechanisms will apply to some audiences and in some circumstances, while for other audiences and in other circumstances, the campaign would have its intended effect. Evidently, then, the hypothesis is that what matters is the difference between some aspect of presentational style (e.g., how graphic and threatening it is) and some aspect of the people receiving the message (e.g., the extent to which they are sensation seekers), with effectiveness declining either side of some optimum.

Jones and Owen (2006) draw attention to the variety of different findings concerning the effect of level of threat on likelihood of behavioural change, including the possibility of an inverted-U relationship. Ulleberg (2001) identified six subtypes of young drivers and found that a traffic safety campaign targeting these young drivers appealed least to the high-risk subtypes, and that the sensation seeking and normless subtypes might require campaign strategies different from each other. Santa and Cochran (2008) examined viewer characteristics in relation to the impact of anti-drink driving advertisements. Less experience with DUI, lower sensation seeking, higher motivation to change and higher perception of danger associated with DUI were all predictors of higher perceived effectiveness of the advertisements. That is, participants who were least likely to drink drive were most receptive to the campaign. Strecher et al. (2006) criticised mass communication modalities for their inability to tailor health education messages according to the characteristics of the individuals making up the audience.

An example of the need to target different audience segments comes from Beale and Bonsall (2007) who found that marketing material encouraged bus use among some groups of people, but decreased it among others. They concluded, "responses to a message are conditioned by existing attitudes and behaviours.... A message designed for people who seldom if ever use buses (and thus, in theory, have greatest scope to increase their bus use) might need to acknowledge their negative image of the bus, but such an acknowledgement could alienate regular bus users" (p. 284). Personality and attitude typically persist over time, whereas mood is temporary. Faseur and Geuens (2005) report an experiment in which different styles of message accompanied different moods of the audience. Congruence of message and mood led to the most favourable attitude (the message was commercial in nature).

Some techniques of message delivery (e.g., mailed letters, emails) permit the message to be created individually for each recipient, perhaps even taking account of the recipient's attitudes and behaviours discovered by interview beforehand. This is sometimes termed tailoring or customising the message, as distinct from targeting the message, which refers to the use of broad demographic characteristics.

To assess whether the message fits with the characteristics of the target audience and how the message is received and interpreted, the campaign message should be pre-tested with the target audience. There are a number of different strategies for pre-testing a campaign including interviews, focus groups, questionnaires and thought-listing tasks (for more information, see Bourlanger *et al.*, 2007).

4.2 Means of communication

4.2.1 Type of media

The number of media choices available continues to expand. In 2009, there are 65 licensed broadcasters in South Australia, many with 2 or 3 associated TV channels or radio stations that are free to air (Australian Communications and Media Authority, 2009). On pay TV, there are approximately 130 stations Australia wide. This growth has an impact on the reach of mass media campaigns as it is unlikely that one single TV program or station will be watched by a large number of viewers at any one time.

For print media, there are two daily national newspapers, two metropolitan newspapers, 13 suburban newspapers and 31 regional papers available in South Australia (Crown Content, 2005). However, circulation figures are likely to be declining with the increase in online access and activities. At the end of June 2009, there were 8.4 million active Internet subscribers in Australia. This level has increased by 50 per cent since 2006 when there were 5.9 million subscribers (ABS, 2009).

Given the wide media choice, decisions on what media to use should be made based on the target audience and the characteristics of the media itself such as reach and selectiveness, information capacity, lifespan, ability to gain attention and costs. A list of the advantages and disadvantages of audiovisual, printed, outdoor, interpersonal and electronic media have been compiled by Delhomme et al. (2009) and are provided in Tables 4.1 - 4.4.

One consideration that is particularly relevant for road safety communications is that advertising needs to be close to the point of impulse. Radio and outdoor advertising provides an ideal opportunity to deliver road safety messages at a time when the target driver behaviour might be expected. These types of media are also useful for reaching mobile young people when they are 'out and about' (Crimmins & Callahan, 2003).

Different types of media can have synergistic affects, for example, newspapers are used to prime people to watch TV campaigns, TV campaigns might promote visiting a website and vice versa.

ant fo	- production	and a second second	Audiov	isual media		t har i s
East	i deni cin	Advantages	nation particular de la companya de La companya de la comp	C	Disadvantages	e tradicione de la composición de la co
Television	Reach and selectiveness	Information capacity, lifespan, attention	Cost	Reach and selectiveness	Information capacity, lifespan, attention	Cost
ant The base for the state of the state of the the state of the	 Very large reach in general segments Selective in specific segments High frequency in specific audiences Accessible to everyone 	 Allows for more complex messages Combines audio and video Possibility of eliciting emotions in target audience 	■ Most cost- efficient to reach large audience	Low useful reach	Short-lived duration of messages (seconds)	■ High production cost
Radio	Reach and selectiveness Large reach Good for reaching local audience High selectivity Dynamic Allows for on-the-spot presence	Information capacity Good as reminder Stimulates imagination Possibility of eliciting emotions in target audience	Cost Low production cost	Information of Low attentic Short lifespa Fleeting dur Not for com	apacity, lifespa on an ation of messa oplicated messa	nn, attention ge nges
Cinema	Reach and selectiveness Selective Low noise ratio	Information of lifespan, attention High attention Allows for m messages Possibility of emotions in ta	apacity, ation on nore complex f eliciting arget audience	Cost ■ High produ	ction cost	

Table 4.1 Advantages and disadvantages of audiovisual media. Source: Delhomme et al. (2009)

	inski	Print	ed media	
	Adv	/antages	Disa	dvantages
Newspapers	Reach and selectiveness	Information capacity and lifespan	Reach and selectiveness	Information capacity and lifespan
	 Excellent at reaching mass audience Large reach in general Allows geographical selectivity, e.g., local audience 	 High credibility Flexible High information capacity Short lead time 	■ Poor demographic selectivity	 Poor reproduction quality Short lifespan
Magazines	Reach and selectiveness	Information capacity and lifespan	Cost	Information capacity and lifespan
	■ Excellent at reaching segmented audience (and pass-along readership)	■ Long lifespan ■ Excellent reproduction quality	■ High insertion cost	 Slow production cycle Not flexible High noise ratio Long life span Low frequency Long lead time Topic of campaign has to rely on editorial content (can also be an advantage)
Flyers, leaflets, brochures	Reach and selectiveness Image: call ■ High ■ // selectiveness col	formation Cost pacity Allows for I Low cost mplex	Information c attention	apacity, lifespan, n
Direct mailings	Reach Selective commu	essages inication tively small target n leaders	Information # "Junk mail" Need for ad	image dress lists

Table 4.2 Advantages and disadvantages of printed media. Source: Delhomme et al. (2009)

	Interpersonal	communication
Sector 8	Advantages	Disadvantages
Face-to-face Events, personal discussions, group discussions, forums, lectures, speeches, exhibition stands	Information capacity Effective Involvement of target group	Reach Cost ■ Low exposure ■ High cost per contact
Telephone	<i>Reach</i> Possibility of reaching people more than once	Reach Cost Low High cost reachability scale per contact Need for address lists, people do not like it
	Electroni	c supports
	Advantages	Disadvantages
E-newsletters, direct e-mailings, sms, Internet discussion forums, viral marketing	 Provides effortless transfer to others Utilizes existing communication networks (e.g., family, friends, co-workers, customers) Takes advantage of others' resources (relay messages by placing links on 3rd party resources) Low cost 	 Need to simplify the message so it can be transmitted easily and without degradation ("The shorter the better") Audience controls exposure
Internet websites	Reach Information Cost capacity	Reach
alitan est an arca sidina an arca sidina arcan	 High Interactive, Low cost flexible Allows for complex messages 	■ Low impact ■ Audience controls exposure

Table 4.3 Advantages and disadvantages of interpersonal and electronic media. Source: Delhomme et al. (2009)

		12	Outdoo	or media
e (p. 216) e la companya de la compa	Ad	vantages		Disadvantages
Billboard posters	Reach	Lifespan	Cost	Information capacity
Small-size posters, banners Variable message signs	 High exposure Able to reach the audience nearly everywhere / exposure near (on-the-spot presence) 	■ Long lifespan	■ Low cost	■ Low attention ■ Low information capacity
	Geographically selective			

 Table 4.4

 Advantages and disadvantages of outdoor media. Source: Delhomme et al. (2009)

The media preferences of different target audiences should also be considered. The following comments relate to young adults. The Gannett news network from the US documented some of their observations about young people and mass media based on their experience publishing eight free weekly printed publications for vouth with associated websites (see http://www.gannett.com/go/newswatch/2004/april/nw0430-5.htm). They commented: "We know young adults are an Internet savvy, multitasking and headline scanning crowd. They are sophisticated news consumers." Focus groups were conducted with their readerships and several salient points are highlighted below. While these comments are directed at news in mass media, they are applicable to road safety advertising targeting young people.

- "There is no typical young adult. There are enormous variations and subgroups ...
- They are avid news consumers, and they use whatever form of media is available in a very customized and constant way. There is so much news and information available to them that they are less likely to adopt any single medium.
- They don't seek out information services; they expect the information services to be where they are. So (our) publications must be distributed where they go. Convenience is critical. They want it where they want it.
- We know the publications must be written from the point of view of young adults and include their faces, voices and opinions. Readers in this age group like to get information from many sources, and they also like to know the credibility of the source.
- This age group expects to be able to interact, speak up and out. Providing many forums for feedback in print and online is essential.
- Robust web sites that leverage speed, depth and interactivity are important companions to the print products.
- They care a lot about their leisure time and social life."

These comments highlight that young adults are moving away from traditional media and into the digital world. Young people are not just a target audience – they are also a medium. Much information is now forwarded through social media networks, that is, people will refer friends and family to websites of interest through social networking sites such as Facebook and My Space. A recent report

by Neilson stated that 84% of Australian Internet users share content through their social sharing services (Moses, 2009).

A peer-to-peer style approach, or communicating and collaborating within their own age group, is likely to increase the effectiveness of road safety messages being transferred successfully among young people (Henderson, 1992). This approach was used in Western Australia by the RAC where students from year 10 to 12 were invited to create a road safety advert that would feature across the state in a major newspaper, on a youth radio station and in cinemas (Maisey & Jones, 2006). While there were no real measurable outcomes to assess the effectiveness of the project, the participation level was reasonably high (63 entries) and received over \$100,000 of free road safety media coverage.

4.2.2 Levels of exposure

To elicit a response, there is a minimum frequency or number of times that an audience is exposed to an advertisement. The effective frequency is the optimum number of exposures required to effectively convey the campaign message to the desired audience. Above this level, response to the message will decrease so any additional exposure is unlikely to be cost effective.

Woolley (2001) conducted a comprehensive review of the debate surrounding effective frequency and concluded that we do not yet know how much advertising is enough in terms of health and road safety advertising. High levels of exposure to a campaign might be promoted in consumer advertising to keep products 'top of mind' but high exposure levels in public health advertising could be subject to wear out. Faster wear out in health advertising might be expected because mass media campaigns are promoting issues or behaviours that are well known but largely ignored by the audience in terms of their behaviour (Donovan *et al.*, 1995).

The current effects model proposes that advertising can have an effect after one exposure and is supported by empirical research (Weitz & Wensley, 2002). In contrast, the cumulative effects model suggests that the effect of advertising messages builds up over time with multiple exposures although the question remains as to how many exposures. Delhomme et al. (2009) reports that industry generally agrees that three exposures is the minimum effective frequency. According to Achenbaum's Effective Ratings Points Theory (Naples, 1979), a theory based on consumer advertising principles, reach obtained prior to the third exposure is ineffective. Three to ten exposures are seen to be most effective while over ten exposures is believed to be excessive and after 15 it becomes negative exposure. In other words, wear out is likely to occur between 10 and 20 exposures.

Woolley (2001) concluded that past research examining the optimal amount of exposure for health mass media campaigns is inconclusive but suggestive of perhaps greater efficiency in the first few exposures, following the law of diminishing returns (see Wild, 1995). Since Woolley's review, there has been very little research on the topic. In the absence of other research, industry standards provide the best guidelines for road safety mass media advertising.

Another consideration is the way in which exposures are spaced out over time. The timing of advertisement exposure can be cyclical (or seasonal) or run over a short period via burst advertising, continuous advertising or intermittent advertising. The decision about the timing of the campaign is likely to be influenced by the theme of the campaign and the communication goal. For example, a fatigue campaign might be run during the Christmas/summer holiday season to coincide with increases in holiday travel. Burst advertising (when exposure is concentrated over a short period) is designed to attract maximum attention and interest and is often used around Christmas for drink driving campaigns.

5 The message content, form and style

The ultimate goal in social marketing is to devise a message that captures the attention of the target audience and leads them to adopt the desired safe behaviour. To achieve this goal, the message needs to be credible, possible to achieve and honest, used repeatedly, easy to understand, persuasive, relevant and appealing (Delhomme et al., 2009). Moreover, the message is more likely to be persuasive if the individual feels motivated to process it, and the cognitive processing will be more effective if the message is comprehensible. As mentioned in Section 4.1.1, there is increasing evidence that the style of message may interact with certain characteristics of audience such that one style of advertising might work for one audience but not another.

5.1 Message execution strategy

The message execution strategy consists of defining: the structure of the message, the framing of the argument, the approach or appeal (emotional versus rational), and the style of the message.

5.1.1 Message structure

A message can be structured so that it presents either a one-sided or two-sided argument. One-sided messages can be effective when the target audience is sympathetic to the message, the message is the only one on the given topic, or an immediate or short-term opinion change is desired. A recent meta-analysis indicated that one-sided messages increase attitude stability and therefore the link with the behaviour (Glasman & Albarracin, 2006). However, the link is dependent on direct experience with the problem behaviour. Two-sided messages are effective when the target audience initially disagrees with the message and when the target audience is likely to be exposed to contradictory messages. They can also be effective in changing opinions when there is an awareness of the negative aspects of the problem behaviour and it can be successfully argued against.

5.1.2 Framing

The main argument of a message can be constructed in a way that the target audience evaluates the information regarding risk as either a gain or a loss. A message might focus on the advantages of adopting a safe behaviour (positive, gain framing) or the negative consequences of not adopting it (negative, loss framing). For instance, in a campaign against drink driving, a positively framed message could be "Don't drink and drive, your life is important" while a negatively framed argument might be "If you drink and drive, you could lose your life". Fear appeals are an extreme version of loss framing. The type of framing can influence the effectiveness of the message in terms of how the audience receives the message and assesses the problem. Delhomme et al. (2009) reports that the findings from non-road safety studies on the effects of message framing are far from unanimous although meta-analyses on the effects of message framing have reported that gain framed messages are more important when the goal is prevention (O'Keefe & Jensen, 2006).

There are indications that the concept of framing might be relevant to road safety campaigns. Sibley and Harre (2009) compared the effects of positively and negatively framed drink driving advertisements on young drivers. Positively framed ads (i.e. modelling safe alternatives to dangerous driving) were more effective than negative framed ads (i.e. depicting drink drivers killed in crashes) in reducing conscious (explicit) overestimation of driving skills (self-enhancement bias). Similar effects were found for males and females. Implicit, automatic self-enhancement biases (measured by a reaction time task, IAT) were not influenced by exposure to positive or negative framed drink driving ads. While a high level of self-perceived driving ability is associated with overconfidence and the

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tendency to take risks, it is not known to what extent changes in biases result in changes in behaviour. The direct effect of message framing on driver behaviour is an interesting area for further research.

5.1.3 Rational and emotional appeals

A campaign might be designed with a rational and/or an emotional appeal. Rational appeals provide objective information about the issue and emphasize deductive logic and cognitive processing (e.g. state the benefits of adopting a safe behaviour). Emotional appeals emphasize feelings and images and can be positive, negative or a combination of both. Appeals do not necessarily have to be either emotional or rational as they may contain elements of both. Emotional appeals can be useful when the target audience already has a strong intention to adopt the safe behaviour (Delhomme et al, 2009). Donovan et al. (1995) argue that it is not the type of appeal that is important, but what emotion is relevant to the motivation underlying the decision making for a specific issue. There is a need to obtain a better understanding of the relationship between the extent to which an emotion is evoked and the strength of subsequent attitudinal and behavioural effects.

5.2 Threat appeals and fear

Fear and threat appeals are not identical. A threat appeal refers to the undesirable consequences of certain behaviours that are contained in a message while fear refers to the emotional reaction from the audience in response to a threat (Cauberghe *et al.*, 2009). Consequently, it is important to distinguish between the stimulus of a threat, the emotion of fear and the cognitive awareness of danger (Woolley, 2001).

Threat appeals have been used widely in road safety advertising to provoke fear, anxiety or apprehension in the target audience. While there is much interest in the use of threat appeals, after many years of scientific research its effects are far from clear and unequivocal.

Essentially, these are the main steps to the threat appeal technique (adapted from Delhomme et al, 2009).

- 1. Attract and hold the target's attention
- 2. Generate fear or anxiety
- 3. Suggest a safe behaviour to cope with the threat
- 4. Increase the target's confidence in their ability to successfully and easily perform the safe behaviour.

While step one is usually accomplished by most campaigns, steps three and four (relating to efficacy) are often forgotten.

There are several theoretical models that offer an explanation as to how fear appeals work (see Delhomme et al, 2009 for a discussion). The most conventional are:

- The Parallel Response Model (Levanthal, 1970)
- Protection Motivation Theory (Rogers, 1983)
- Extended Parallel Process Model (EPPM) (Witte, 1992)

The third model is the most recent and combines the two previous models. The EPPM suggests that when both the perceived threat and efficacy are high, danger control processes are initiated, resulting in adaptive behaviour. On the other hand, when perceived threat is high but perceived efficacy is low, fear control processes commence, resulting in maladaptive behaviour.

There is increasing evidence supporting the theoretical models and processes behind threat appeals in the road safety literature. However, note that many of these studies only test part of the models or processes.

Experimental evidence suggests that threat appeal advertisements that also advise drivers how to drive safely (i.e. effectively avert a threat) are more effective than ads that only attempt to stimulate feelings of fear, shock or grief (see Elliott, 2003). For example, Tay & Watson (2002) examined drivers reactions to fear-based (high threat) fatigue advertisements with and without coping strategies. They found that including coping strategies in high threat messages increased perceived efficacy and consequently increased the likelihood of message acceptance more than fear alone. In addition, the level of fear evoked was correlated with message rejection but not message acceptance leading the authors to suggest that fear could be reduced moderately without reducing message acceptance.

Again, in an experimental setting Rossiter and Thornton (2004) demonstrated that anti-speeding television advertisements with a fear-relief pattern (fear is aroused and then reduced by a recommendation to adopt a specified safe behaviour) reduced young drivers speed choice on a simulated driving test initially and after heavy repetition of the ad. Advertisements demonstrating fear but without relief (i.e. no coping strategy) increased speed choice initially. Speed choice decreased after heavy repetition but not to the same level as produced by the fear-relief ads.

A subsequent experimental study by this research group tested the advertising wear out of fear-relief and fear-only patterns of fear appeal in anti-speeding advertising after repeated exposures (Algie *et al.*, 2008). The study found that emotion and attention wear out occurred immediately for both fear patterns. Persuasiveness of the advertisements, measured in terms of a decrease in selected speed on a driving simulator, was highest for the fear-relief advertisement. While the level of fear experienced was found to diminish quite quickly with successive exposures for both patterns of fear appeals the fear-relief ad continued to be effective in reducing simulated speeding behaviour with increased exposure.

A strong efficacy component is also essential in fear appeals. Various studies have demonstrated that fear arousing messages can be persuasive when the audience have high self-efficacy and perceive high response efficacy (they believe they have the ability and are capable to deal with the threat) but work less well or not at all when the audience has low self-efficacy. Some evidence of the importance of efficacy in road safety advertising using threat appeals comes from Thornton & Rossiter (2004). They found that high threat/high efficacy anti-speeding ads were more likely to reduce drivers' relative speed choice on a driving simulator than were high threat/low efficacy ads. This effect was reported among young male drivers but not young female drivers. However this experiment demonstrated only short-term immediate effects of anti-speeding ads on speed choice. The fact that fear appeals may be counterproductive for people with low efficacy responses means that fear campaigns are less effective among those who are least well equipped to change their behaviour but probably most in need (Hastings *et al.*, 2004).

Lewis et al. (In press) argue that response efficacy (belief that coping strategy is able to avert threat) is more important, in a practical sense, than self-efficacy (belief that self is capable of averting threat) for influencing message effectiveness. Response efficacy can be developed and placed within a message, having a direct influence on the effectiveness of a message. Self-efficacy is largely dependent on the individual and is rarely amenable after a single exposure to a message in a campaign. More specifically, Lewis et al. found that response efficacy was contingent on the type of emotional appeal: for positive emotion-based appeals, it increased message acceptance and reduced message rejection while for negative fear-based appeals, it minimised message rejection.

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Consequently, response efficacy appears to improve the persuasiveness of emotion-based messages in general, not just fear based messages.

Elliott (2003) examined the literature on fear appeals from 1996 to 2003 and concluded that road safety media campaigns should use fear with caution as fear arousal can have both facilitating and inhibiting effects and can lead to defective coping mechanisms. Indeed, a number of studies have found that exposure to fear appeals can elicit maladaptive responses (e.g. Schoenbachler & Whittler, 1996; Witte *et al.*, 1998), that is, responses that do not try to control or remove the threat implied by the fear message but attempt to cope with unpleasant feelings that result from the advertisement. Such maladaptive responses might include defensively avoiding or ignoring the message, failing to process the threatening part of the message and denying the personal relevance of the message. It may also promote reactance against a message such that individuals view the message as a challenge and increase the undesired behaviour. In other words, the message is rejected or regarded as ineffective. All of these responses are dangerous because they can reduce the threat without reducing the actual level of risk.

If a threat is perceived as exaggerated, over the top, or it does not reflect the personal beliefs and experiences of the target group, the campaign and even the communicator may lack credibility. This is illustrated by some research exploring young male responses to threat appeals used in Irish television advertisements.

"Some of the current Irish road safety adverts were perceived by respondents as being visually impressive and highly dramatic but essentially "fake" and over the top. This lack of advert credibility is a barrier to attitude and behaviour change. Due to the dramatic crashes depicted in some adverts, young drivers are found to cognitively discredit the accuracy of the advert. The upward trend in producing increasingly shocking adverts appears to have tilted the balance of power away from the advertiser. If the advert is perceived as being 'over the top', then the integrity of the message contained in the advert is compromised. It is recommended that more research be conducted to ascertain what content young male drivers believe to be realistic and credible." (Harman & Murphy, 2008, p. 133)

Another consideration is that fear appeals can "expose a person against his or her will to harmful or seriously offensive images" (Hyman & Tansey, 1990, p.110) and may create unnecessary anxiety amongst viewers. Exposing individuals to levels of fear that are psychologically uncomfortable could be considered unethical (see Hastings et al., 2004).

Researchers argue that the severity of threat alone may not motivate behaviour but that the relevance of, and susceptibility or vulnerability to the threat is important (Stephenson & Witte, 2001). This argument is reinforced by several studies from the public health arena (de Hoog *et al.*, 2005; Peckmann *et al.*, 2003). De Hoog et al. (2005) demonstrated that evoked fear was not the most important factor in threat appeals, but the extent to which a person believes they are vulnerable to the health risk (in this case RSI). The perceived threat rather than evoked fear motivated individuals to form the intention to engage in the recommended behaviour.

In terms of relevance of the threat, not all types of threat (i.e. physical, social, psychological, financial) might be considered relevant to the target audience. For instance, road safety advertisements tend to concentrate on physical threats such as injury or death but such appeals might not be regarded as relevant or persuasive to high-risk groups such as young drivers. Based on a study of smokers, Henley & Donovan (2003) found that young people appeared most affected by threats to their freedom or mobility and threats of pain rather than the threat of death. There are suggestions in the road safety literature that social threats (e.g. stigma attached to loss of licence) might be more effective among young people although more evidence is needed (see Lewis *et al.*, 2009).

In summary, fear appeals can have an impact but only when specific conditions are satisfied. The arousal of fear alone is not enough to adequately motivate behaviour. The fear appeal must: describe a threat (emphasising the severity of the threat and the vulnerability of the audience), the threat should be personally relevant, and recommendations must be provided for reducing or avoiding the threat (e.g. a safe behaviour). However, the recommendations must (from Donovan et al., 1995):

- Be realistic and credible (i.e. possible to carry out)
- Suggest a specific plan for avoiding the threat (i.e. coping strategy)
- Be perceived as effective and useful to avert the threat (i.e. high response efficacy)
- Allow the target audience to believe that they are capable of carrying out the suggested actions (i.e. high self-efficacy).

Without such recommendations the campaign has a strong chance of being counterproductive as individuals may believe that they are unable to protect themselves from the threat, resulting in defensive and maladaptive responses to the campaign. On this basis, fear appeals should be used with caution and road safety campaign developers should consider using different appeals.

5.2.1 Gender

Earlier meta-analytic research suggested that gender and age had little influence on the effectiveness of fear appeals (Witte & Allen, 2000). However, more recent research suggests that males and females react differently to fear appeal approaches. Goldenbeld et al. (2008) found that anti-speeding fear appeals had a positive or neutral effect for females but evoked counterproductive negative reactions from males. After viewing the fear appeal advertisements males had less positive attitudes to speed zones, were less likely to perceive speeding as a problem and had weaker intentions to comply with speed limits. While an association between perceiving speeding as a problem and less self-reported speeding was found for females, no such relationship was found for males. The authors suggested one interpretation of these findings is that male drivers dissociate their own speeding behaviour from a social problem, essentially a defensive self-justification response to the fear appeal.

Lewis et al. (2007a) conducted an experiment examining pre-exposure and post-exposure driving intentions and perceptions of anti-speeding and drink driving advertising depicting high physical threats. Females reported that the messages would have more influence on themselves than others while males reported the messages would have more influence on others than themselves (third-person effect). In addition males reported more unsafe speeding and drink driving intentions than females after viewing the advertisements.

A subsequent study by Lewis et al. (2008b) suggests that positive emotional appeals may be more persuasive for males than fear-based negative emotional appeals. For males, message acceptance after exposure to a positive emotional appeal was a more important predictor of subsequent speeding behaviour than previous speeding behaviour. For negative emotional appeals, previous driving behaviour was the only significant predictor. However, there are some limitations associated with this study: the use of self-reported measures of behaviour and a small sample size, particularly of males in the positive emotional appeal condition (n=24).

Social psychological theories offer some explanations for these gender specific findings. Sex role identity theory suggests that positive emotions are more stereotype-congruent for males than positive emotions so males will respond more favourably to positive emotional appeals (Fisher & Dubé, 2005). The selectivity hypothesis from information processing theory posits that males are selective processors while females are more elaborate processors (Dubé & Morgan, 1996). Negative information is thought to be more consequential than positive information therefore, women are more

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likely to attend and process negative information while males are more likely to attend to and process positive information.

In summary, these studies indicate gender is an important factor that influences the way in which individuals process the relevance of messages using fear appeals. The threat of physical harm does not appear to be effective for targeting young males drivers therefore other appeals need to be considered. Fear appeals may fail to reach and influence one of the most relevant target groups for which they were developed (Tay & Ozanne, 2002). While there is a growing body of evidence accentuating the importance of gender in relation to road safety campaign persuasiveness an explanation for this effect has not yet been developed.

5.2.2 Methodological limitations of fear appeal studies

The majority of fear appeal studies have been conducted in laboratory or experimental settings (Hastings et al, 2004; Witte & Allen, 2000). Hastings et al. (2004) observe that it is these types of studies that have suggested fear appeals can work but such studies have limitations including forced exposure, short-term measurement of effects and an over-dependence on university student samples. The experimental design and contrived setting of these studies means that participants are forced to attend to the ads. In reality, individuals may choose not to watch the ads after several viewings or not pay full attention and consequently the persuasiveness of the message may be reduced or disappear. There are few 'real-world' evaluations of fear appeals and their findings usually suggest that fear has a weaker effect (i.e. raise awareness or change attitudes rather than change the targeted behaviour) and, sometimes, unintended detrimental effects (Hastings et al, 2004). More research conducted in naturalistic settings is needed to overcome these limitations and enable examination of selective exposure (changing channels), attention and comprehension. Follow up measures could also be incorporated in research designs to determine whether the effectiveness of different appeals varies over time.

Another issue associated with empirical studies designed to evoke fear, but also other emotions, is that they often do not check that the advertisement message is evoking the desired emotion. This is important because different discrete emotions can have different persuasive effects; some inhibit while other facilitate persuasion. If the emotion evoked in response to a message is different to the anticipated emotion or the anticipated emotion is not successfully evoked, then the study is not actually measuring the intended relationship. Rather than relying on assumptions about the appeal's content and assuming that the manipulated effect was achieved, changes in the level of the emotion should be measured or manipulation checks of the emotion should be undertaken (Lewis et al., 2009). While such measures and checks are advocated, there are problems associated with these self-reported measures of individual emotional responses. For instance, there may be individual differences in the interpretation of words used to describe emotions (Morris *et al.*, 2002).

5.3 Alternatives to threat appeals and fear

Positive emotional messages aim to evoke humour, excitement, hope or 'good' feelings in contrast to negative emotional or threatening messages that aim to evoke fear, anger, or guilt. Despite calls for more positive emotion based appeals in road safety campaigns few campaigns have adopted such an approach. This may be partly due to a lack of knowledge about factors that influence the effectiveness of such appeals, relative to the abundance of literature concentrating on fear appeals. Nevertheless recent evidence suggests positive emotional approaches can be more effective than negative fear based approaches for males (Lewis, 2008b). Political advertising research suggests that positive emotional (or reward) appeals may work better with people who are less authoritarian (Wan *et al.*, 2000).

Humour is a positive emotion that has been used occasionally in road safety messages but there is limited research investigating its effect. While some research has investigated the effect of humour in product or commercial advertising researchers have questioned whether it can be applied directly to road safety (Delhomme et al, 2009). Evidence from public health suggests that humorous appeals are more persuasive than non-humorous appeals for males when addressing AIDS and sunscreen use (Conway & Dubé, 2002; Struckman-Johnson *et al.*, 1994). There is also a suggestion that for speeding behaviour, positive emotional appeals are more effective for males than females and vice versa for fear-based negative emotional appeal (Lewis et al., 2008b).

There is concern that the increased use of positive emotional appeals in road safety, relative to negative appeals, are less likely to be recalled and therefore may be less effective over time (Lewis *et al.*, 2007b). However, some public health literature suggests that negative appeals might have a diminishing effect over time while positive appeals become more persuasive over time (see Lewis *et al.*, 2008a). Lewis et al. (2008b) conducted an experiment in which participants viewed ads with different appeals. The study found greater persuasiveness of negative (fear) appeals immediately after exposure but greater improvement for positive humorous appeals over time (up to a month).

Specific expectations regarding the type of message used in road safety might be built up from consistent exposure to a certain type of ad. For example, there may be the belief that a humorous appeal is relatively less effective than a fear based appeal because fear is used much more frequently. Lewis et al (2008a) suggests that the first step towards increasing the effectiveness of positive appeals in road safety campaigns may be to increase their use.

Response efficacy and the third person effect are as important for positive emotional appeals as for negative fear-based appeals, particularly among males (Lewis et al., 2008a). For instance, males with high response efficacy regarded a positive appeal as more personally influential to themselves than to others while both males and females with low efficacy reported a positive appeal message was more influential on others than themselves (i.e. classic third-person effect). While this research examined the relative persuasive outcomes of positive and negative appeals, further research could focus on the persuasive process associated with each appeal so that explanations might be provided as to how, when and why certain appeals work in road safety advertising. Note that this study conceptualised affect or the appeal in terms of a dichotomy, either positive or negative with the positive emotional appeal focussing on evoking humour. The affect associated with other positive emotions (e.g. pride, excitement) could also be explored.

One such study examined the effectiveness of three different types of approaches used in anti-drink driving public service announcements amongst a sample that consisted of mostly students (Santa & Cochran, 2008). They found that the empathy approach (highlights consequences to others resulting from behaviour) was perceived to be the most effective and elicited the most negative affect, followed by fear and informational or rational approaches.

There is clearly a need for further research investigating message content (themes and emotions) for positive emotional appeals in road safety advertising.

6 The evaluation of road safety mass media campaigns

6.1 Methods of evaluation

6.1.1 Overview

Four possible methods of studying the possible effect of a media campaign are as follows.

- 1. Before-after comparison.
- 2. Before-after comparison, with one or more control areas that have not received the campaign.
- 3. Before-after comparison, with several treatment and several control areas, randomly assigned.
- 4. Comparison of areas after exposure to the campaign with other areas not exposed to the campaign.

Method 4 is included only as a matter of formality: it is not used because naturally-existing differences between areas in respect of the numbers and types of road crashes are so big that it would seem impossible to attribute any of these differences to a media campaign.

The other methods require something (such as the frequency of crashes, or the frequency of some behaviour relevant to safety) to be measured before and after the media campaign is carried out. Thus the first point to stress is that it is vital for there to be sufficient time prior to the campaign for the "before" measurement to be conducted.

- Crashes are routinely reported to the police. Police data on crashes before and after may be sufficient.
- Many behaviours relevant to safety are not routinely measured. It will be argued below that evaluations of media campaigns typically need to rely on behaviours rather than crashes. Consequently, if it is desired to evaluate a media campaign, introduction of the campaign must wait until after the "before" (baseline) measurement has been made.

However, once there is commitment to a media campaign, there is a desire to carry it out straightaway, without a delay while the evaluation is planned and the "before" measurement is made. The conclusion we draw is that *there needs to be an on-going program of measuring the frequencies of various safety-related behaviours*. Such a program would mean that data would be continually generated that could be used in evaluations of campaigns, without the necessity to delay.

Method 3, with treatment and control areas randomly assigned, is preferred to Methods 1 and 2, as will now be discussed.

6.1.2 Randomised trials: The demand for high quality evidence

Discussing the disadvantages, in comparison with randomised trials, of observational studies and non-randomised trials, Glonek (2001, p. 3) wrote as follows:

"Associations apparent in observational studies and non-randomised experiments cannot be taken at face value as evidence of the true effect of the risk factors in question.... For example, the evaluation of a particular speed enforcement or advertising campaign, or blackspot program, will typically involve the comparison of crash rates before and after the intervention.... In this case it must be expected that many other factors, including the effects of other road

safety initiatives and various environmental factors such as the economy, will also influence the crash rates over time. There is no reason to suppose that the joint effect of such other factors should be negligible. In such circumstances, it is not possible to attribute any observed change in the crash rate to the intervention in question."

An additional factor is that there is now an influential and articulate body of opinion that strongly favours high quality evidence - largely, randomised trials for individual studies and (even better) combining the results of several randomised trials via meta-analysis - for public health and social policy decisions (e.g. Campbell Collaboration, http://www.campbellcollaboration.org/). Any public body that spends money on an intervention for which there is not high quality evidence, such as road safety media campaigns, is likely to come under scrutiny by people who emphasise the advantages of randomised trials. Researchers who evaluate an intervention by means other than a randomised trial may also come under scrutiny.

It is our view that scrutiny, and even criticism, is not to be feared, as there are valid responses to criticism. Firstly, there is the practicability issue: randomised trials are difficult and expensive to conduct. This is particularly the case with media campaigns, as it is so difficult to control who is exposed to an advertisement and who is not. One might have to enrol several cities in the trial, and run a television campaign in a randomly chosen subset of these. Secondly, there are some objections of principle to randomised trials (Hutchinson, 2007, especially pp. 33-36). Consequently, while we broadly support those who promote randomised trials, we do not agree with an extreme position.

Specific decisions, if taken on reasonable grounds, are likely to be defensible in the public arena, even if the evidence base is inconclusive or the decision turns out poorly. But there is one aspect of decision-making that has a long-term negative effect. This is that the failure to emphasise the quality of evidence and the tolerance of often unscientific evaluations (small sample sizes, failure to randomise into treatment and control groups) means that society collectively is unable to learn about the success or otherwise of its decisions.

6.2 Why is it not known whether media campaigns work or not?

6.2.1 The difficulty of establishing the effectiveness of campaigns

Evans (1990) judged that of the various approaches to protecting road users, behaviour modification based on social norms has been the most important in the past and has the greatest potential for the future. Evans views the mass media as extremely important in establishing social norms: he accepts that it may be difficult to prove that any one advertising campaign had an effect, but believes that the cumulative effect over a period of years or decades is great. Indeed, concerning any sort of campaign to improve driving behaviour and prevent crashes, there is little that can be said with real confidence.

- The vast majority of research is non-experimental: for example, a change is made and behaviour before is compared with behaviour after. There are many different assumptions and methods available in analysing the data. They may, and frequently do, give different results.
- There is little "experimental" research, in the sense of the relevant units (such as people or vehicles or cities) being randomly allocated to treatment or control groups, with a before-after comparison being made in both groups.

Evans (1990) accepts that it may be difficult to prove the effectiveness of advertising. Two further studies may be cited to support this rather negative view.

• Donovan et al. (1995, Section 8) attempted to review Australian road safety campaigns. However, they found (Section 8.1.3) that "Few campaigns are adequately documented, and perhaps fewer are appropriately evaluated. For this review, we received very few documented campaign evaluations, and even fewer that included formative research reports such as qualitative strategy development, and/or concept testing, and/or pre-testing of rough or finished ads. The usual campaign evaluation was a pre-post target population survey methodology (independent samples, quasi probability samples), or simply a post-only survey."

• T. Lewis (2001) describes how different analyses of time series (non-experimental) data on the effect of New Zealand television advertising against drink-driving lead to different conclusions. He ends his paper by advocating experimentation. Though Lewis accepts that the public may feel uncomfortable with the ethics of giving a "treatment" to some places and withholding it from others, because (of course) best practice should be followed in matters of public safety, he points out that "the experts do not know what is the best practice".

A wish to know how effective road safety advertising typically is, and how effective a specific campaign has been, is an example of a broader desire to monitor value-for-money in marketing for social purposes. Thus the following may be found at the website of the Media Evaluation Project, a project of the Communications Consortium Media Center in Washington, DC (http://www.mediaevaluationproject.org/overview.htm):

"The field of evaluating non-profit communications campaigns is not keeping pace with funder demands or grantee needs. Foundations desire to determine whether their investments are achieving targeted results. Meanwhile, grantees have little information about how to conduct meaningful evaluations of their communications activities."

Our view is that, for the most part, there will be no alternative but to tolerate this state of affairs for many years to come. That is, decisions about whether to advertise, how much to spend, what media to use, what style and content of advertisements to choose, and so on will be subjective, not based on solid evidence.

6.2.2 Illustrative calculation for South Australia

It is desirable that any road safety measure is evaluated by comparing the number of crashes before it is introduced with the number afterwards, and it is desirable that any such evaluation give credible evidence for or against the proposition that the measure is worthwhile. However, let us consider the case of a mass media campaign.

Baldock and McLean (2005) estimated the annual cost of road crashes in South Australia to be about 1200 million dollars. That figure is still usable, as since the report, the number of crashes has fallen by about 16 per cent and there has been inflation of about 16 per cent. Thus a reduction of 1 per cent that lasted for 1 year would be worth about 12 million dollars. A reduction of 0.1 per cent that lasted forever would be worth about 12 million dollars (if the cost of money is 10 per cent per annum). Consequently, a media campaign that cost 12 million dollars and caused a reduction of either 1 per cent for 1 year or 0.1 per cent permanently would be said to have broken even.

In recent years, the year-to-year variability (in the sense of the standard deviation) in the number of injury crashes in South Australia has been about 4 per cent of its mean. Thus a campaign could easily be effective enough to be worthwhile in an economic sense, and yet so little effective that the reduction in crashes is utterly imperceptible against the background of ordinary year-to-year variability. The same applies even to a media campaign costing 120 million dollars: if the cost of money is 10 per cent per annum, the 120 million dollars costs 12 million dollars per annum (for ever) - but there is an equal gain if even 1 per cent of crashes are prevented (every year, for ever), and that reduction will not be detected when year-to-year variability is 4 per cent.

Suppose we find a negative result, in the sense of a reduction that is much less than the standard error associated with it, and thus is termed non-significant according to the usual statistical criteria. The reasoning above suggests the unwelcome conclusion that this is not useful information: the data are also compatible with a reduction that is large enough to be cost-effective. The situation is unlikely to be any more favourable in the case of a campaign targeted at a subset of road users, e.g., young drivers: firstly, year-to-year variability will be proportionately larger for subsets of crashes, and secondly, there is no way of excluding the possibility that the campaign is having some general effect on everyone exposed to it (not only on the targeted subset).

In short, a negative result is not useful information, and decades of experience have demonstrated that a convincing positive result is rare. Thus the decision whether to spend money on a media campaign, and how much to spend, appears to be a matter of faith, not science.

6.2.3 Are there any alternatives to evidence from crashes?

Given that evidence from crashes is unlikely to be persuasive, we consider here whether there is any indirect evidence that could stand in its place.

There are some behaviours or variables that can be objectively observed and are closely linked to safety. Examples include: blood alcohol concentration (and breath alcohol concentration), speed, and the usage of secondary safety devices (seat belts, child restraints, motorcycle helmets, cycle helmets). In each case, a change would be seen as implying a change in safety. Quantitatively, however, it would not be known how much change in safety would result from a given observed behavioural change.

The following behaviours are observable, but their linkage with safety is (in our view) not sufficiently tight that a change be seen as necessarily implying a change in safety: driver head movements at junctions, pedestrians crossing at designated crossings rather than elsewhere, traffic conflicts, taking a rest break on long journeys, gap acceptance, various driving offences and infringements. See Kloeden et al. (2008) for a discussion on whether an intervention shown to influence the number of traffic offences also provides evidence of an influence on crashes.

There are scales and questionnaires that purport to measure attitudes and self-reported behaviours. In our view, this type of evidence will not persuade the sceptics. Firstly, there are substantial measurement difficulties, including poor reliability and validity of these scales. Secondly, the connection between a change in attitudes or self-reported behaviour is insufficiently well established.

A summary of the current data sources available in South Australia to monitor selected driver behaviours (as specified by MAC) is provided in Table 6.1. In the table, "Potential" means that there may not be any statistics currently available but information could be gained from this data source. Crash statistics refers to the TARS database and offence statistics refers to traffic offence statistics recorded by TRUMPS. Both of these databases are maintained by DTEI.

South Australia currently measures a number of driver behaviours that might be monitored before and after mass media campaigns. A systematic and on-going program that monitors vehicle speeds was introduced in South Australia in 2007. Speed data is collected at around 130 sites on a variety of different road types in the Adelaide metropolitan area and rural regions (Kloeden & Woolley, 2009). On-road speed survey data is strongly preferred to crash data. This is because it is often difficult to establish the speeds of crash involved vehicles and so speeding tends to be under-reported in police crash records. Observational studies of adult and child restraint use have been conducted in metropolitan Adelaide and five rural cities/towns periodically since 1998. The most recent survey was conducted in 2009 (Wundersitz & Anderson, 2009). Roadside breath alcohol surveys have not been

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undertaken in South Australia since 1997 (Kloeden & McLean, 1997). Such surveys provide a useful measure of the distribution of driver's BAC levels but there are methodological and ethical issues that might impede future surveys. While roadside surveys of drug use would provide useful information about levels of drug driving, similar issues would also need to be resolved. Measuring the effectiveness of any campaigns targeting driver fatigue is difficult given that there is no current objective measure of driver fatigue.

Driver behaviour / road user group	Crash stats	Offence stats	On-road surveys	Market research (self-report)	Other potential data sources
Drink driving	Yes	Yes	Not since 1997 ¹	Potential	
Drug driving	Yes	Yes	Potential	Potential	
Speeding	Yes but limitations	Yes	Yes ²	Potential	Black box devices?
Seat belts	Yes	Yes	Yes ³	Potential	
Fatigue	No	No	No	Potential	Observations at rest stops Examine truck tachographs
Inattention					
mobile phones	No	Yes	Potential	Potential	
Vulnerable road users	Yes	Yes	Potential	Potential	
Young drivers	Yes	Yes	No	Potential	Dependent on campaign focus
Unregistered vehicles	No	Yes?	Potential	Potential	

Table 6.1	
Current data sources available to monitor selected driver behaviours in South Australia,	2009

¹ Kloeden & McLean (1997)

² Kloeden & Woolley (2009)

³ Wundersitz & Anderson (2009)

There is also scope to collect data for other easily observed objective measures, should mass media campaigns focus on these issues. For instance, observations of mobile phone use and pedestrian behaviour (count pedestrians crossing away from a designated crossing or at a designated crossing against a red light), or licence plate checks to determine whether a vehicle is registered. Such surveys could potentially be conducted on an on-going basis and it may be possible to combine some observations (e.g. observe restraint use and mobile phone use).

Technological advancement offers new methods for objectively measuring driver behaviours. For example, the tachographs in trucks could be inspected to examine changes in truck speeding behaviour. Black box technology could also provide information on speeds for many different types of vehicles. However, the majority of the vehicle fleet would need to have the devices to reflect the population exposed to advertising campaigns and to avoid selection biases. This is not currently practical or feasible.

Market research can potentially be used to measure self-reported attitudes and behaviours for each of the listed topics. However, these are not ideal measures, as mentioned above, but may need to be used in the absence of any other data.

The following studies provide examples of mass media campaign evaluations in which driver behaviours were used as an alternative measure to crashes.

EXAMPLE 1: REDUCTION OF SPEED

In the South Australian study of Taylor et al. (2001), an attempt was made to measure the effectiveness of television advertising. The dependent variable was on-road speeds, not the number of crashes. The study lasted three years. Eighteen of the 36 months alternately were designed as advertising months. These began with a three-week period in which there was a high level of advertising or a low level of advertising or no advertising. Speeds were measured in the next week at six locations in Adelaide.

Taylor et al. presented results using several methods of analysis. The results depended on the variable (mean speed, 85th percentile, 95th percentile) and the method of estimation, but were roughly a 0.2 km/h speed reduction. Again depending on the variable and the method, this sometimes was and sometimes was not statistically significant. Taylor et al. (p. 13) noted: "general perceptions may demand a change of perhaps 5 km/h as being relevant from the point of view of an individual driver". Nevertheless, their view was that the small change observed would imply a "meaningful" and "modest but worthwhile" reduction in casualty crashes.

Each period of advertising lasted three weeks, and there were 12 of them, yet the effects on speed were small in size and of borderline credibility. This study was not designed to measure any long-term effects of the advertising, and it gives no evidence one way or the other about whether these exist. It also remains possible, of course, that some future campaign might be more successful than this one was.

EXAMPLE 2: PROMOTION OF CHILD BOOSTER SEAT USE

The promotion of child booster seat use in cars might appear to be a relatively easy topic to research: all that is necessary is to observe use of booster seats before and after an intervention, in treatment and control groups. Thus in this example the link between booster seat use and injury reduction is presumed to be sufficiently strong that it is not necessary to demonstrate injury reduction, and all the problems with using crashes or injuries as the dependent variable are avoided.

Ehiri et al. (2006) reviewed interventions aimed at increasing children's booster seat use. They found 1350 reports on child motor vehicle occupant protection, of which 18 dealt specifically with booster seat interventions. A minority of these used mass media; most could be described as educational. Thirteen studies were excluded due to methodological weaknesses. Ehiri et al. felt able to state a conclusion: "Incentives or the distribution of free booster seats combined with education increase the use of booster seats" (p. 185).

Discussing this, Hutchinson (2008) made the following methodological points about the five studies that Ehiri et al. finally considered. Two did not use randomised assignment; of the remaining three one used self-report, not observation, of booster seat use, and one had a follow-up period of only two weeks. The final remaining study had a 34 per cent dropout rate of children. Further, control as well as treatment groups were exposed to publicity regarding booster seat legislation. From 3070 individuals in 5 studies, there remain 136 children in one study of limited generalisability.

Hutchinson (2008) consequently noted that out of 18 studies of booster seat interventions identified in the review, not one produced credible, useful, results. Systematic reviews like that of Ehiri et al. bring home how little good quality evidence there really is. Concerning a road safety culture based on fact, Hauer (2007) writes (p. 329), "The main obstacle is the near absence of professionals who can be the carriers and providers of factual road-safety knowledge. The second important obstacle is the weakness of the knowledge in which these professionals would have to be trained."

6.3 Conclusions

There is no point in attempting local evaluations based on crashes before and after a campaign: a negative result is not useful information (because it could be a false negative), and decades of experience have demonstrated that a convincing positive result is rare.

If there are opportunities to take part in multi-centre trials, in which different cities or areas are randomly assigned to different groups (that receive different treatments, one of which will usually be no treatment), consideration should be given to taking part.

For the most part, however, evaluation should be based on before and after comparison of behaviours or variables that can be objectively observed and are closely linked to safety.

The time between commitment to a media campaign and starting the campaign is often too short for the baseline measurement of the safety-related behaviour to be planned and take place. Consequently, there needs to be an on-going program of measuring the frequencies of certain safety-related variables and behaviours - blood alcohol concentration, speed, the usage of secondary safety devices, and so on.

Traffic conflicts (as observed via video cameras) and the occurrence of various driving offences and infringements are also potentially useful for monitoring safety - but they need to be understood better before they can be used, as their link with crashes is not as close as for the behaviours listed in the previous paragraph.

7 Evaluations of road safety mass media campaigns (2001-2009)

To further determine what elements might enhance a mass media campaign, it is best to look at accumulated knowledge from past campaigns. There is an increasing body of research evaluating the effectiveness of road safety mass media campaigns, of varying quality. In the literature, campaign effectiveness or persuasiveness is measured in a number of different ways such as changes in self-reported attitudes or beliefs, behavioural intentions, recall or awareness of the message or, to a lesser extent, behaviour.

A description of evaluations of road safety mass media campaigns published from 2001 to 2009 and their findings are presented in Table 7.1. Note that this is not an exhaustive list of mass media campaign evaluations. For each campaign, details are provided on: the country where the campaign was conducted; the target behaviour and approach; the target audience; the campaign message or slogan; the campaign duration intensity and types of media used; any associated activities and enforcement; method of evaluation; outcomes of the evaluation and specifically any scientific outcomes of the evaluation. It is acknowledged that by confining this review to published evaluations the literature may be biased towards studies that achieved a positive result; unsuccessful results are less likely to be published.

A synthesis or summary of the results has not been attempted because the campaign objectives, methods, outcomes and quality are varied. Instead, a number of constructive observations have been made concerning the improvement of campaign design and evaluation based on the fourteen studies included in Table 7.1. Many of these points will serve to highlight comments made earlier in the report.

Conduct scientific campaign evaluations using appropriate behavioural measures and improve methodological design

A recent review of 45 anti-speeding campaigns from 20 different countries (most campaigns were national and less than five years old) concluded that scientific evaluations of such campaigns were lacking (Phillips & Torquato, 2009). The present review, including only mass media campaigns that have been evaluated, yielded a similar finding - few mass media campaigns were subject to rigorous scientific evaluation. Many of these evaluations measured only audience response to campaigns such as recall of the advertisement message or self-reported attitudes, rather than measuring any behavioural change per se. Only one evaluation (Solomon *et al.*, 2009) compared objectively observable behaviour that was closely linked to safety (i.e. seat belt use) before and after the campaign. Insensitive outcome measures are likely to incorrectly estimate the effectiveness of a campaign leading to incorrect inferences about the campaigns impact. Where crashes were used as an outcome measure and a decrease in crashes was observed, in most cases the effects of the mass media campaign could not be isolated from other factors such as enforcement (e.g. D'Elia *et al.*, 2007; Guria & Leung, 2002).

Two studies evaluating the effectiveness of the New Zealand campaign on drink driving offence rates used the same data but obtained different results due to differences in methodologies (Tay, 2002). Similarly, three studies using the same data to examine the campaigns effectiveness on mortality and morbidity rates reported different results based on different methodologies. Tay (2001) maintains that the perfect evaluation of countermeasures does not exist and these varied findings illustrate why it is important that any road safety programs not only be evaluated but re-evaluated by different analysts using different outcome measures and evaluation methodologies. While this is certainly desirable, it must be acknowledged that conducting multiple scientific evaluations is a difficult and costly process.

Another observation from the present review of campaign evaluations is that the evaluation designs used are generally simple before and after comparisons. While it is heartening to see that more recent evaluations appear to be including baseline measures, there were no randomised trials and only two evaluations included a control group (Solomon et al., 2009; Whittam et al., 2006). The inclusion of a control group is not always feasible, particularly when complete populations are targeted (i.e. national mass media campaigns). However, they should be strongly considered when designing local or regional campaigns.

Mass media campaigns may have longer-term effects on attitudes and behaviours that take many years to emerge (see Section 6.1). Very few studies evaluate the longer-term effects of road safety media campaigns, most likely due to methodological difficulties such as separating the effects of the campaign from other factors. One of the reviewed studies examined crashes over a six year period but found only short lived effects confined to the duration of the campaign (Whittam et al., 2006).

Due to the lack of scientific evaluations, generally poor methodological designs and confounding factors, it is difficult to determine what elements of the road safety mass media campaigns are effective.

Need realistic expectations of campaigns

Road safety mass media campaigns are more successful in conveying information and changing attitudes rather than altering driver behaviour (Donovan et al, 1999; Rodriguez et al, 2002). It should not be expected that road safety advertising will directly change behaviour but it may be useful for agenda setting (i.e. changing social norms) or helping to form beliefs or reinforce existing beliefs. For example, the 'Speeding. No one thinks big of you' campaign developed by the RTA in New South Wales was developed to create social disapproval of speeding (Watsford, 2008). The researchers evaluating the 'Foolspeed' campaign from Scotland acknowledged the limitations of mass media advertising as a means of stimulating behavioural change and were satisfied with the campaign achieving a change in attitudes toward speeding and in affective beliefs (the emotional benefits of speeding) (Stead & Eadie, 2007).

Campaigns are more effective when combined with other activities such as enforcement (but it is difficult to separate their individual effects)

It is well known that mass media campaigns in conjunction with enforcement have a greater effect on driver behaviour than on their own (e.g. Elliott, 1993). However, multicollinearity and the complementary effects of advertising and enforcement on each other make it difficult to separate and determine the individual effects of these two variables. The campaign evaluations reviewed in this section highlight this issue. There were six campaigns in which it was known that media was combined with enforcement activities (predominantly speeding campaigns). Of these, five did not attempt to separate the effects of publicity and enforcement. The exception was Cameron et al. (2003) who reported no interaction between the effects of speed enforcement and publicity however, the study examined changes in speed camera hours of only one-month duration. Longer periods of speed camera activity might result in different interactions with mass media campaigns. Other evaluations that attempted to measure changes in behaviour (i.e. crashes, seatbelt use) resulting from the combination of enforcement and publicity reported positive results.

Campaigns need a theoretical basis

For many years reviews of the mass media literature in road safety and public health consistently advocate basing campaigns on explicit theoretical framework (e.g. Delhomme et al., 2009; Elliott, 1993; Woolley, 2001). Yet very few of the mass media campaigns listed in Table 7.1 were designed around psychological theories. One of the few exceptions is the "Foolsspeed" anti-speeding campaign described by Stead & Eadie (2007). The five-year campaign was based on the Theory of Planned Behaviour.

Shift away from threat appeals

Several campaigns in Australia and New Zealand used fear or emotional appeals in the early 2000s (e.g. Guria & Leung, 2002; e.g. Tay, 2001; Tay, 2002). In more recent years, there has been a shift away to more rational and realistic approaches (e.g. Stead & Eadie, 2007).

Phillips and Torquato (2009) recently reviewed 45 anti-speeding campaigns and found that the approaches taken were typically rational persuasion or hard-hitting emotional persuasion. Often campaigns combined a number of different approaches.

Need for better documentation of campaign activities

Very few of the campaigns gave a detailed description about the mass media campaign duration and intensity; an exception is Cameron et al. (2003). Consequently, it is difficult to provide any indication as to how long a campaign should be conducted or the intensity of exposure. Nevertheless, Milano et al. (2004) suggests some guidelines for *combined* enforcement and publicity campaigns to increase seat belt use. These guidelines are based on mass media campaigns that have been operating in some US states for six years at varying intensities and a national paid media campaign that was mobilised in 2003. Note that seat belt use is not compulsory in all US states therefore these guidelines may not be directly applicable to the Australian context.

- · Messages should focus on enforcement and show visuals of enforcement.
- Timing is important. Motorists should be aware of approaching enforcement campaigns. Paid advertising should commence at least one week prior to enforcement and continue well into enforcement period.
- Intensity. State media should result in at least 400-600 gross rating points of television and 200-300 of radio over at least two weeks.
- Repetition of ads is critical to a campaigns success. Product advertising suggests that 3-4 viewings are needed for a person to recognise a message, 7-8 viewings to remember a message and 6-18 viewings to change attitudes or behaviours as a result of the message.
- Earned (unpaid) media is not effective by itself to reach high-risk groups. Paid media can be more effective in reaching target groups through targeted placement, timing and intensity. Paid media can be used to leverage earned and public service media (i.e. negotiate discounts).
- A combination of earned and paid advertising can be effective in conjunction with enforcement.

Studies from the US have considered the relationship between money spent on campaigns (a pseudo measure of intensity) and campaign effectiveness. Solomon et al. (2009) compared enforcement and publicity campaigns encouraging seat belt use at night in three different US counties. The type and amount of enforcement and media in each county varied and was tailored to the county. The study is further complicated by the fact that each county had different seat belt laws (i.e. primary, secondary). The campaign consisted of four waves and the amount spent on media varied between waves with the greatest amount of dollars spent on Wave 1 (to capture attention) and the smallest amount spent on lower cost media in Wave 3. Solomon et al. (2009, p.36) concluded: "Results from this study showed little or no consistent relationship between amount of dollars spent on paid media and awareness, risk perception or change in belt use behavior." Consistent with this finding, a NHTSA sponsored study

(Hedlund *et al.*, 2008) found that some US states had higher seat belt use rates than other states due to higher levels of enforcement rather than demographics or funds spent on media. All states had the "Click it or ticket" campaign.

Combine different forms of media

Phillips and Torquato (2009) acknowledge the increasing use of websites to deliver road safety messages, particularly to reach younger target audiences. Websites are often central in campaigns that focus on 'edutainment', incorporating information, games and videos in a way that is not possible through other media. Billboards, posters and television are then used to promote the website. Many of the reviewed campaigns used multiple forms of media to promote their message amongst the target group (e.g. Think! anti-speeding campaign, see Angle *et al.*, 2009). While websites provide new and creative ways of reaching the target audience, evaluations of its effectiveness are not widely available.

Table 7.1 Descriptions of evaluations of road safety mass media campaigns published from 2001 to 2009

Target behaviour & approach Enforcing seat belt Course of sinth time	You	Target audience ng males 18-	Campaign message or slogan Enforcement	Campaign duration, intensity & media Television and radio	Other supporting activities Media supporting	Evaluation method (N) Pre and post test	Outcome Awareness and perception of	Scientific evidence Observational seat
use at right time 34 years centred message add tailored to and individual county enfi- eac "Click it or ticket" Inte "Band national eac "Click it or ticket" Inte use	34 years centred message add tailored to and individual county eaf and national eac "Click it or ticket" Inte "Band add add add add add "Ute add add add add Nati	centred message add trailored to and individual county eaf and national eac "Click it or ticket" Inte "Click it or ticket" regi Nati use	ads and enfr eac regi use use	In week prior to I during orcement for h of 4 waves. Insity varied by ion and wave. ional campaign d during Wave 2	nign visibility enforcement. Some earned media.	surveys around each of 4 campaign waves in 3 counties, 2 control counties N= approx 400 each survey	enforcement surveys Largest increases in campaign awareness during Wave 1 & 2. Perceived risk of ticket did not increase.	Bent surveys Significant increases in seat belt use at in the two counties that used checkpoint style enforcement supported by publicity.
Speed-Lifestyle or Speed-All drivers THINK! brand Speed campaign personal Motorcycles – Speed campaign 2005 consequences of car drivers, "Live with it". Tele consequences of car drivers, "Live with it". 700 speeding for driver. urban and leisure Slogan "It's 30 for 700 Focus on 30mph motorcyclists. a reason" You speed limit. Motorcycles – Motorcycles – 2006 look out and motorcyclists be motorcyclists be 2006	Speed-All drivers THINK! brand Speed Campaign 2005 Motorcycles - Speed campaign 2005 car drivers, "Live with it". Tele urban and leisure Slogan "It's 30 for cine] You' motorcyclists. a reason" Motorcycles - Motorvices - "How close?" "How close?" Turun	THINK! brand Spee Speed campaign 2000 "Live with it". Tele Slogan "It's 30 for cine! a reason" Moto Motorcycles – Moto "How close?" runn	Spee 2009 Tele Cine Moto 2009 TV, _	ed – Feb-March 9. vision, radio, ma, posters, Tube. Tube. P but long ing campaign. radio, on-line.	Speed –unknown Motorcycles – Think! Motorcycle Academy, sponsorship of British Superbikes championship	Pre and post surveys based on personal interviews. N=approx 2000, 65% drivers)	Awareness and attitudes. Attitudes towards speeding did not change significantly. Speed TV ad – 20% recall from 500 TVRs. Motorcycle ad has now reached saturation point with impact now in decline.	None
Increasing Males 17-29 yrs THINK! brand Three awareness of Campaign Summ personal "Personal Christr consequences" Summ drink driving triving twoment of doubt" Televis "Moment of doubt" Televis Radio-	Males 17-29 yrs THINK! brand Three Campaign Summ Campaign Christr Campaign Christr "Personal Summ "Personal Summ TV/cinema ad Third t "Moment of doubt" Televis Radio- Radio-	THINK! brand Three Campaign Summ "Personal Christr consequences" Summ TV/cinema ad Third t "Moment of doubt" Televis Cinem Radio-	Three Summ Christr Third t Televis Cinem Radio- Intensi	bursts in er 2007, anas 2007 & er 2008. ourst: sion-4 weeks a-2 weeks 3 weeks ty unknown.	Partnership marketing campaign Pub ambient advertising	Pre and three post test surveys based on personal interviews. N=approx 2000	Awareness and attitudes. 94% of target group aware of campaign. TV ad- 88% recognition from 347 16-34yrs male TVRs (summer 2008), 65% recognition from 247 16-34yrs male TVRs (Christmas 2007) Around 60% thought caught by police if drink driving. No comparison with pre level.	None
Create social Males 17-25 "Speeding. No one One te disapproval of years thinks big of you." Duratic speeding (Pinkie) unknov	Males 17-25 "Speeding. No one One te years thinks big of you." Duratic (Pinkie) (Pinkie) unknov	"Speeding. No one One te thinks big of you." Duratic (Pinkie) unknov	One te Duratic unknov	levision ad. n & intensity vn.	Unknown	Tracking survey – Pre-test/post-test N = u/k	Awareness & intentions: 97% awareness target group 95% awareness community	None. Reductions in fatalities cannot be causally linked to

advertising. No controlling for other factors.	None	Attempted but inconclusive. Crash reductions reported for whole package but can not isolate advertising effects.	21.6% decrease in at-fault crashes for drivers aged 16- 19yrs during the intervention. Short-
78% self report "will encourage them to obey speed limit". Simple comparison of NSW road fatalities in 2006/07 to 2007/08. Reductions in speed (32%), young driver (30%) and speeding young driver (45%) fatalities but can not causally link to advertising.	Recall/awareness: Respondents recognized and identified with everyday driving behaviours and plausible consequences of speeding. Realistic type of advertising (rather than graphic) might norurage deeper self-reflection but more dramatic ads were found to be more engaging. Suggestive that ads need to portray dramatic but credible consequences to evoke emotional responses that make drivers reflect meaningfully on their own driving behaviour.	Telephone surveys of awareness and attitudes. Some positive responses (e.g. believe more chance of being caught speeding).	Telephone surveys of awareness and recall. (N=661) 98% recall by target group. 20% of parents of 14-15 yrs reported talking about ads with
	Ten focus groups. N=u/k	Time trend analysis through statistical regression modeling.	Longitudinal time series analysis including a nonequivalent control group.
	None	Speed-related package -Use of covert operations -Increase in speed camera hours -Lowering of speed detection threshold -50km/h speed limit introduced -Restructure of speeding penalties	None
	Five year campaign. Four television ads. 1. Spring 1999 2. Spring 2000 3. Summer 2004, Autumn 2005. Other publicity materials. Intensity unknown	Whole package: Dec 2000-July 2002. Advertising: Aug 2001-July 2002 6 television ads supported by radio and bilboard Also had "Wipe off 5 week", merchandise and promotion at AFL game.	 4.5 mth campaign. Two television, ads, two radio ads and 16 billboards. Frequency ads
	"Foolsspeed" 1. "Mirror"- attitudes 2. "Friends & family"- subjective norms 3. "Simon says" – perceived behavioural control 4. "Doppelganger" – affective beliefs	"Wipe off 5".	"What's the hurry?"
	General driving population. Sub-group of known speeders: males aged 25- 44 yrs in urban areas.	General driving population	Young drivers aged 16-19 yrs
	Reduce inappropriate and excessive speeding based on the Theory of Planned Behaviour. Realistic approach.	Speeding (low level) – Small reductions in speed can reduce crash risk. Also informing that speed enforcement has increased.	Highlight the consequences of risky driving.
	Stead & Eadie (2007) Scotland	D'Elia et al (2007) Victoria	Whittam et al (2006) United States

				played: TV – 4332 times Radio – 1080 times			kids.	term effects that only lasted as long as the campaign.
Scottish Executive Social Research (2005) Scotland	Increase awareness of young driver vulnerability on the road	Novice young drivers	Young driver campaign	Two week campaign. One radio ad, 180 outdoor posters, 30 ads on buses	None	12 focus groups	Recall of, and reaction to, campaign. Three months after campaign, half recalled poster when prompted, none recalled bus ads. Gender differences and variations in driving ability were found to affect message absorption; most effective among females and those learning to drive. Reasons for male disinterest – female character, depiction of mild injuries and not linked to cause of crash, lack of activities depicted that they could relate to and authoritarian tone.	None
Mruk Ltd (2004) Scotland	Drink driving – highlighting likelihood of being caught.	Young males aged 17-29 yrs	"Don't risk it"	Christmas holiday period to Feb. Radio, television features, posters, urinal stickers. Intensity unknown.	Usual enforcement.	14 focus groups, 10 in-depth interviews.	Recall, awareness and understanding. Messages highlighting financial/litestyle consequences (i.e. lose licence) are most likely to influence behaviour. Loss of life or injury is emotive but not useful in preventing drink driving.	None
Milano et al (2004) United States	Increasing restraint use using enforcement-related messages.	Males aged 18- 34 yrs.	"Operation ABC" (always buckle children) with message "Click it or ticket".	Paid media (television, radio, print) preceded enforcement by 1-2 wks, continued for 1-2 wks into 2-3 wk enforcement period.	National mobilizations including intensified enforcement and some earned and public service media.	Telephone surveys – pre (<i>n</i> =600) & post media (<i>n</i> =800)	Awareness and perceptions. Evidence that message reached the target group. Paid advertising over consecutive years had higher recall and perceptions of police enforcement than a single application (i.e. one year) of paid advertising. See additional points	None
Ormston (2003) Scotland	Drug driving – Increasing awareness of drug testing (uses humour)	Young drivers aged 17-24 yrs	"Now who's laughing?"	One television ad. Duration and intensity unknown.	None	Telephone survey (N=730), peer focus groups	Awareness and understanding. Although the ad was seen as informative, there were doubts about the credibility of the enforcement message. Young drivers had problems identifying	None

							with the characters. Lack of info	
tyle		General driving	Varied	Campaign 1996 to 2000. Television ads June 1999 (270 TARPS) & Nov 1999 (340 TARPS). See report for further details.	Increases and decreases (one month) in speed camera enforcement.	Telephone surveys (N=1115 over 5 waves) Poisson regression modeling and logistic regression	Perceptions and behavioural intentions. Some evidence that publicity increased risk of detection but did not change speeding behavioural intentions. Inconclusive findings regarding effect of interaction between enforcement and publicity, most likely because drivers did not notice changes in enforcement (covert in nature).	No interaction between effects of speed enforcement and publicity on crashes, possibly due to short period (1mth) of change in enforcement. High publicity awareness (500 Adstock units) associated with 12% reduction in crashes but not crash severity
ad driving attitudes All road us ind behaviours. Emotion & shock pproach	All road us	See	nwoun	Five year campaign. Intensity and media used are unknown.	Part of supplementary road safety package that also included more insk-targeted enforcement (i.e speeding, drink driving, seat belts)	Principle component regressions. Ten year annual models.	None.	Attempted but inconclusive. Over the five years, estimated savings of 285 to 360 fatalities (conservative range) but individual effects of advertising and enforcement could not be separated.
change attitudes Young mal nd behaviours drivers age award drink driving 25 yrs who sing fear-based consume a pproach (graphic rash scenes).	Young mal drivers age 25 yrs who consume a consume a	d 18- Icohol	Linknown	Four year campaign. Intensity and media used are unknown.	Campaign supplemented police enforcement.	Questionnaire after four year campaign (N=201)	Attitudes and behavioural intentions (Tay, 2001). Significant increase in perceived risk of fatal/injury crash and decrease in intention to drink drive. Campaign did not have a stronger impact on target audience relative to non-target audience. However, little change in perceived risk of apprehension, most likely because campaign focused on fear of injury.	Tay (2001) Reanalysis of data evaluating effects of supplementary Road Safety Package in NZ (enforcement and advertising) found it was effective in reducing serious casualties in the first two years of the campaign.

8 Best practice for road safety mass media campaigns

Given all the evidence in the available international literature concerning road safety mass media campaigns, what can be considered best practice in the Australian context?

Firstly, expectations regarding what road safety mass media advertising can achieve need to be realistic. Mass media campaigns are generally more successful in conveying information and changing attitudes rather than altering driver behaviour. Behaviour change might occur over a number of years or decades but such longer-term effects are not easily measured. Mass media campaigns are also useful for agenda setting or changing social norms, that is, they can have a societal value.

Noar (2006) commented that in the last decade health mass media campaign designers have increasingly adhered to principles of effective campaign design, rather than discovering new principles. While this comment was based on health literature, it is also applicable, to some extent, to road safety mass media campaigns. The following list of key elements to enhance campaign effectiveness has several recommendations that have appeared on such lists for over a decade.

CAMPAIGN DESIGN AND DEVELOPMENT

- Use systematic data driven processes to identify the target behaviour and the target audience.
- Segment the target audience then tailor the message to the motivation and needs of these subgroups. There is increasing evidence that one style of message may work for one audience but not another.
- Use a psychological theory as a conceptual base for the campaign; theoretically guided campaigns have a greater chance of success.
- Clearly define the campaign objectives and select appropriate variables that can measure whether these objectives were achieved.
- Integrate mass media with other activities such as enforcement/legislation/education.
- Technological advances offer innovative new ways to convey messages (e.g. social networking on the Internet, SMS's). Messages might be communicated more effectively when the mode of communication matches campaign goals and the target group preferences. Different types of media should be combined to reach as many as possible in the target group.
- Industry standards suggest three exposures are needed to achieve minimum effective frequency (i.e. convey a campaign message) although there are suggestions that a single exposure might be enough in some situations. In the absence of any new knowledge from road safety campaigns, it is recommended that industry standards not be exceeded.

THREAT APPEALS

Despite much research, the literature examining the effectiveness of threat appeals is inconclusive. There are some suggestions that fear appeals can have an impact but only when specific conditions are satisfied. The fear appeal must describe a threat (i.e. severity, personal relevance, vulnerability) and suggest a specific plan for reducing or avoiding the threat (e.g. a safe behaviour) that is possible to carry out, perceived as effective, and allows the target audience to believe that they are capable of performing the safe behaviour. Without these elements, the campaign may be counterproductive, as individuals may believe that they are unable to protect themselves from the threat, resulting in defensive and maladaptive responses. On this basis, fear appeals should be used with caution and road safety campaign developers should consider using different appeals.

Other new findings from the literature include:

- Threat appeals appear to impact least on those most in need of changing their behaviour such as young males.
- Gender may influence the effectiveness of different emotional appeals. There is some evidence suggesting that positive emotional appeals (e.g. humorous) may be more persuasive for males than fear appeals and vice versa for females.

EVALUATIONS

A discussion of the difficulties in establishing the effectiveness of mass media campaigns, different evaluation methods, and different evaluation measures produced the following conclusions:

- Conducting an evaluation of a mass media campaign is costly but its importance should not be undervalued.
- The variability in crash data means that it is not an optimal outcome measure for mass media campaigns.
- The ideal evaluation methodology is not always feasible or practical. Where possible, it should be based on before and after comparisons of behaviours or variables that can be objectively observed and are closely linked to safety.
- The systematic on-going measurement of safety-related behaviours allows baseline measures to be easily obtained before campaigns are implemented.
- South Australia now has useful on-going surveys of vehicle speeds and recent observational measures of other driver behaviours (i.e. seat belt surveys). There is scope to collect data on other easily observed objective measures to assess campaign effectiveness, should mass media campaigns focus on these issues (i.e. observations of mobile phone use, pedestrian behaviour).

The review of evaluated road safety mass media campaigns was unable to make any definitive conclusions about what works and what does not. This was partly due to few mass media campaigns being subjected to rigorous scientific evaluation. The evaluations were typically based on self-reported attitudes and behaviours or message awareness/recall rather than outcome measures that directly related to the behaviour of interest. Many studies also used very simple before and after analyses that did not take into account other factors that might influence behaviour (i.e. no control group). In addition, a number of mass media campaigns were integrated with other activities such as enforcement so it was very difficult to isolate the effects of mass media from these confounding factors. Another factor was the lack of documentation of details about the intensity, duration and content of the media campaign and any associated activities. Despite these issues, a number of observations were made that reinforced points made previously.

GAPS IN KNOWLEDGE

The following issues are identified as requiring further research:

- Generally, there is a need for further research to determine which advertising appeals are most effective for particular behaviours and road user groups. More of this research should be conducted in 'real world' settings and include manipulation checks.
- Several theories have been developed around the persuasiveness of threat appeals but little theoretical support has been developed for positive emotional appeals. In addition, the message content and factors affecting positive emotional appeals should be investigated further.

- The effectiveness of persuasive messages has been investigated for some driver behaviours more than others in road safety advertising. For example, research has focussed on drink driving and speed related advertising (e.g. Algie et al., 2008; Lewis et al., 2007a; Rossiter & Thornton, 2004) but little is known about what persuasive strategies are most effective for drug driving, fatigue, mobile phone use and inattention.
- Emerging evidence suggests that positive emotional appeals are potentially more effective than traditional negative, fear based approaches for males, a high risk group (Goldenbeld et al., 2008; Lewis et al., 2008b). This is an important and interesting area for further research however, more evidence is required to determine whether these findings apply to driver behaviours other than speeding, and such research should include larger sample sizes.
- More comprehensive documentation of campaign activities, duration and intensity are needed to better understand the relationship between advertising exposure and behaviour change in road safety.
- New technology offers innovative new ways to disseminate messages and also for measuring on road behaviour when evaluating campaigns (e.g. in vehicle GPS systems). Further research should explore and evaluate these options.

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References

- Atkin, C. (2001). Impact of public service advertising: Research evidence and effective strategies, Report prepared for the Kaiser Family Foundation. Retrieved October 2009, from http://www.kff.org/ entmedia/20020221a-index.cfm
- Ajzen, I. (1985). From intentions to action: A theory of planned behaviour. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behaviour*. Heidelberg: Springer.
- Algie, J., Jones, S., & Rossiter, J. R. (2008). *Examining the effect of fear patterns with repeated exposures*. Paper presented at the World Social Marketing Conference, Brighton and Hove City, England, 29-30 September 2008.
- Angle, H., Greggs, J., & Goddard, E. (2009). Think! Road safety campaign evaluation post stage: 'live with it' speed campaign and motorcycle campaign. Retrieved 14 October, 2009, from http://think.dft.gov.uk/pdf/332982/3329861/0904-mc-speed.pdf
- Angle, H., Kirwan, S., Buckley, K., & Goddard, E. (2008). Think! Road safety campaign evaluation post evaluation of the 'personal consequences' drink drive campaign. Retrieved 14 October, 2009, from http://think.dft.gov.uk/pdf/332982/3329861/drinkdrivereport.pdf
- ABS. (2009). 8153.0 Internet activity, Australia, June 2009. Australian Bureau of Statistics. Retrieved 14 December, 2009
- Australian Communications and Media Authority. (2009). *Broadcasters by region and state*. Sydney: Australian Communications and Media Authority.
- Australian Institute of Health and Welfare (2005). 2004 National drug strategy household survey: Detailed findings. Canberra: Australian Institute of Health and Welfare.
- Baldock, M R J, and McLean, A J (2005). The economic cost and impact of the road toll on South Australia. Report 009, Centre for Automotive Safety Research, University of Adelaide.
- Beale, J R, and Bonsall, P W (2007). Marketing in the bus industry: A psychological interpretation of some attitudinal and behavioural outcomes. Transportation Research, Part F, 10, 271-287.
- Bourlanger, A., Daniels, S., Delhomme, P., Deugnier, M., Divjak, M., Eyssarteir, C., et al. (2007). *Campaigns and awareness-raising strategies in traffic safety. Deliverable 2.2: Comparison of research designs.* Brussels, Belgium: Belgian Road Safety Institute.
- Cameron, M., Newstead, S., Diamantopoulou, K., & Oxley, P. (2003). *The interaction between speed camera enforcement and speed-related mass media publicity in Victoria*. Clayton, Victoria: Monash University Accident Research Centre.
- Carver, C. S., & Scheier, M. F. (1981). Attention and self-regulation: A control-therapy approach to human behaviour. New York: Springer-Verlag.
- Cauberghe, V., De Pelsmacker, P., Janssens, W., & Dens, N. (2009). Fear, threat and efficacy in threat appeals: Message involvement as a key mediator to message acceptance. *Accident Analysis and Prevention, 41*, 276-285.
- Conway, M., & Dubé, L. (2002). Humor in persuasion on threatening topics: Effectiveness is a function of audience sex role orientation. *Personality and Social Psychology Bulletin, 28*(7), 863-873.
- Crimmins, J., & Callahan, C. (2003). Reducing road rage: The role of target insight in advertising for social change. *Journal of Advertising Research, December*, 381-389.
- Crown Content. (2005). Margaret Gee's Australian media guide. Melbourne: Crown Content.
- D'Elia, A., Newstead, S., & Cameron, M. (2007). Overall impact during 2001-2004 of Victorian speedrelated package (No. 267). Clayton: Monash University Accident Research Centre.
- De Bourdeaudhuij, I., Philippaerts, R., Crombez, G., Matton, L., Wijndaele, K., Balduck, A., et al. (2004). Stages of change for physical activity in a community sample of adolescents. *Health Education Research*, *20*(3), 357-366.

- de Hoog, N., Stroebe, W., & de Wit, J. (2005). The impact of fear appeals on processing and acceptance of action recommendations. *Personality and Social Psychology Bulletin, 31*(1), 24-33.
- DeBono, K. G. (1987). Investigating the social-adjustive and value-expressive functions of attitudes: Implications for persuasion processes. *Journal of Personality and Social Psychology, 52*, 279-287.
- Delaney, A., Lough, B., Whelan, M., & Cameron, M. (2004). *Review of mass media campaigns in road safety* (No. 220). Clayton, Victoria: Monash University Accident Research Centre.
- Delhomme, P., De Dobbeleer, W., Forward, S., & Simoes, A. (2009). *Manual for designing, implementing and evaluating road safety communication campaigns*. Brussels: Belgian Road Safety Institute.
- Donovan, R., Henley, N., Jalleh, G., & Slater, C. (1995). *Road safety advertising: An empirical study and literature review*. Canberra: Federal Office of Road Safety.
- Dubé, L., & Morgan, M. S. (1996). Trend effects and gender differences in retrospective judgements of consumption emotions. *Journal of Consumer Research*, 23, 156-162.
- Ehiri, J. E, Ejere, H. O. D., Hazen, A. E., Emusu, D., King, W. D., & Osberg, S. J. (2006). Interventions to increase children's booster seat use: A review. *American Journal of Preventive Medicine*, 31, 185-192.
- Elliott, B. (1989). Effective road safety campaigns: A practical handbook. Canberra: Federal Office of Road Safety.
- Elliott, B. (1993). *Road safety mass media campaigns: A meta analysis* (No. CR 118). Canberra: Federal Office of Road Safety.
- Elliott, B. (2003). *The psychology of fear appeals re-visited.* Paper presented at the Road Safety Research, Policing and Education Conference, 24-26 September, Sydney, NSW.
- Evans, L (1990). An attempt to categorize the main determinants of traffic safety. Health Education Research. *Theory and Practice*, 5, 111-124.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Faseur, T., & Geuens, M. (2005). Different positive feelings leading to different ad evaluations: The case of coziness, excitement and romance. Working Paper 2005/32, Vlerick Leuven Gent Management School.
- Fisher, R. J., & Dubé, L. (2005). Gender differences in response to emotional advertising: A social desirability perspective. *Journal of Consumer Research, 31*, 850-858.
- Gatersleben, B. (2003). On your bike for a healthy commute. In L. Hendrixkx, W. Jager & L. Steg (Eds.), *Human decision making and environmental perception*. Groningen, The Netherlands: Department of Psychology, Rijksuniversiteit Groningen.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin, 132*, 692-731.
- Glasman, L. R., & Albarracin, D. (2006). Forming attitudes that predict future behaviour: A metaanalysis of the attitude-behaviour relation. *Psychological Bulletin, 132*(5), 778-822.
- Glonek, G. (2001). On the strengths and weaknesses of experimental and observational methodologies. In Road Safety Research. Proceedings of the National Speed and Road Safety Conference, held in Adelaide.
- Goldenbeld, C., Twisk, D., & Houwing, S. (2008). Effects of persuasive communication and group discussions on acceptability of anti-speeding policies for male and female drivers. *Transportation Research Part F, 11*, 207-220.
- Goldstein, M. J. (1959). The relationship between coping and avoiding behavior and response to feararousing propaganda. *Journal of Abnormal and Social Psychology*, 58, 247-252.

- Guria, J., & Leung, J. (2002). *An evaluation of a supplementary road safety package.* Paper presented at the 25th Australasian Transport Research Forum, Canberra, 2-4 October 2002.
- Harman, B., & Murphy, M. (2008). The application of social marketing in reducing road traffic accidents among young male drivers: An investigation using physical threat appeals. *International Journal of Business and Management, 3*(7), 129-139.
- Hastings, G., Stead, M., & Webb, J. (2004). Fear appeals in social marketing: Strategic and ethical reasons for concern. *Psychology and Marketing*, *21*(11), 961-986.
- Hauer, E (2007). A case for evidence-based road-safety delivery. In: *Improving Traffic Safety Culture in the United States.* The Journey Forward. Washington, DC: AAA Foundation for Traffic Safety.
- Haworth, N. (2005). Maximising the impact of road safety advertising. *Road and Transport Research*, *14*(4), 3-11.
- Hedlund, J., Hope Gilbert, S., Ledingham, K., & Preusser, D. (2008). *How states achieve high seat belt use rates*. Washington DC: US Department of Transportation, National Highway Traffic Safety Administration.
- Henderson, M. (1992). *Education, publicity and training in road safety: A literature review*. Clayton, Vic: Monash University Accident Research Centre.
- Henley, N., & Donovan, R. (2003). Death anxiety and threat appeals: Toward a practical application in the context of health promotion. *Omega The Journal of Death and Dying, 46*(3), 225-240.
- Hutchinson, T. P. (2007). Concerns about methodology used in real-world experiments on transport and transport safety. *Journal of Transportation Engineering (American Society of Civil Engineers)*, 133, 30-38.
- Hutchinson, T. P. (2008). Promoting child booster seat use: Has no-one ever done high-quality research? *American Journal of Preventive Medicine*, 34, 267-268.
- Hyman, M. R., & Tansey, R. (1990). The ethics of psychoactive ads. *Journal of Business Ethics*, 9, 105-114.
- Jones, S. C., & Owen, N (2006). Using fear appeals to promote cancer screening --- Are we scaring the wrong people? *International Journal of Nonprofit and Voluntary Sector Marketing*, 11, 93-103.
- Kloeden, C. N., Anderson, R. W. G., & Hutchinson, T. P. (2008). Differences between groups of drivers: Offences contrasted with crashes. *Flinders Journal of Law Reform, 10*(3), 815-830.
- Kloeden, C. N., & McLean, A. J. (1997). *Night-time drink driving in Adelaide: 1987-1997*. Adelaide: Office of Road Safety.
- Kloeden, C. N., & Woolley, J. E. (2009). *Vehicle speeds in South Australia in 2008*. Adelaide: Centre for Automotive Safety Research.
- Levanthal, H. (1970). Findings and theory in the study of fear communications. *Advanced Expert Social Psychology*, *5*, 119-186.
- Lewis, I., Watson, B., & Tay, R. (2007a). Examining the effectiveness of physical threats in road safety advertising: The role of the third-person effect, gender, and age. *Transportation Research Part F, 10*, 48-70.
- Lewis, I., Watson, B., Tay, R., & White, K. (2007b). The role of fear appeals in improving driver safety: A review of the effectiveness of fear-arousing (threat) appeals in road safety advertising. *International Journal of Behavioral Consultation and Therapy*, *3*(2), 203-222.
- Lewis, I., Watson, B., & White, K. (2008a). An examination of message-relevant affect in road safety messages: Should road safety advertisements aim to make us feel good or bad? *Transportation Research Part F, 11*, 403-417.
- Lewis, I., Watson, B., & White, K. (2008b). *Predicting future speeding behaviour: The appeal of positive emotional appeals for high risk road users.* Paper presented at the High Risk Road Users Conference, Joint ACRS-Travelsafe National Conference, Brisbane, 18-19 September 2008.

- Lewis, I., Watson, B., & White, K. (2009). *What do we really know about designing and evaluating road safety advertising? Current knowledge and future challenges.* Paper presented at the 2009 Australasian Road Safety Research, Policing and Education Conference, 11-13 November 2009, Sydney.
- Lewis, I., Watson, B., & White, K. (In press). Response efficacy: The key to minimizing and maximizing acceptance of emotion-based anti-speeding messages. *Accident Analysis and Prevention*.
- Lewis, T. (2001). Same data, different conclusions: Analysis of the New Zealand drink-driving campaign data. Every picture tells a different story. *Marketing Bulletin*, 12, Commentary 1.
- Maisey, G., & Jones, J. (2006). *Press, vibes and videotapes a peer road safety education project.* Paper presented at the Australasian Road Safety Research, Policing and Education Conference, Surfers Paradise, Queensland.
- Milano, M., McInturff, B., & Nichols, J. L. (2004). The effect of earned and paid media strategies in high visibility enforcement campaigns. *Journal of Safety Research*, *35*, 203-214.
- Morris, J. D., Woo, C., Geason, J. A., & Kim, J. (2002). The power of affect: Predicting intention. *Journal of Advertising Research, May/June*, 7-17.
- Moses, A. (2009, 5 February). Australians desert myspace for facebook. The Age.
- mruk. (2004). Scottish executive evaluation of the 2003-2004 festive drink drive campaign. Retrieved 28 August 2009, from http://www.scotland.gov.uk/Publications/2004/10/20002/43912
- Naples, M. J. (1979). *Effective frequency: The relationship between frequency and advertising effectiveness*. New York: Association of National Advertisers.
- Noar, S. M. (2006). A 10-year retrospective of research in health mass media campaigns: Where do we go from here? *Journal of Health Communications, 11*, 21-42.
- O'Keefe, D. J., & Jensen, J. D. (2006). The advantages of compliance or the disadvantage of noncompliance? A meta-analytic review of the relative persuasive effectiveness of gain-framed and loss-framed messages. *Communication Yearbook, 30*(1), 1-43.
- Ormston, R. (2003). Evaluation of the drug driving TV advert. Retrieved 28 August 2009, from http://www.scotland.gov.uk/Publications/2003/02/16456/18656
- Peckmann, C., Zhao, G., Goldberg, M., & Reibling, E. (2003). What to convey in anti-smoking advertisements for adolescents: The use of protection motivation theory to identify effective message themes. *Journal of Marketing*, 67, 1-18.
- Petty, R. E., & Cacioppo, J. T. (1986). Communication and persuasion: Central and peripheral routes to attitude change. New York: Springer-Verlag.
- Phillips, R., & Torquato, R. (2009). A review of 45 anti-speeding campaigns. Oslo, Norway: Institute of Transport Economics.
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking. Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, *51*, 390-395.
- Randolph, W., & Viswanath, K. (2004). Lessons learned from public health mass media campaigns: Marketing health in a crowded media world. *Annual Review of Public Health, 25*, 419-437.
- Reed, G. R. (2001). Adherence to exercise and the Transtheoretical model of behaviour change. In S. Bull (Ed.), *Adherence issues in sport and exercise*. Chichester, UK: John Wiley and Sons.
- Rodriguez, L., & Anderson-Wilk, M. (2002). *Communicating highway safety: What works*: Centre for Transportation Research and Education, Iowa State University.
- Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, *91*, 93-114.

- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo & R. E. Petty (Eds.), *Social psychophysiology: A sourcebook*. New York: Guilford.
- Rosenstock, I. M. (1977). What research in motivation suggests for public health. *Journal of Public Health*, *50*, 295-302.
- Rossiter, J. R., & Thornton, J. (2004). Fear-pattern analysis supports the fear-drive model for antispeeding road safety TV ads. *Psychology and Marketing*, *21*(11), 945-960.
- Santa, A. F., & Cochran, B. N. (2008). Does the impact of anti-drinking and driving public service announcements differ based on message type and viewer characteristics? *Journal of Drug Education*, *38*(2), 109-129.
- Schoenbachler, D. D., & Whittler, T. E. (1996). Adolescent processing of social and physical threat communications. *Journal of Advertising*, *25*, 37-54.
- Scottish Executive Social Research. (2005). Creative development and evaluation of the SRSC young driver campaign 2005. Retrieved 28 August 2009, from http://www.scotland.gov.uk/Publications/2005/10/25130500/05009
- Sibley, C. G., & Harre, N. (2009). The impact of different styles of traffic safety advertisement on young drivers' explicit and implicit self-enhancement biases. *Transportation Research Part F, 12*, 159-167.
- Solomon, M. G., Chaffe, R. H. B., & Preusser, D. F. (2009). *Nighttime enforcement of seat belt laws: An evaluation of three community programs*. Washington DC: US Department of Transportation, National Highway Traffic Safety Administration.
- Spencer, L., Pagell, F., & Hallion, M. E. (2002). Applying the Transtheoretical model to tobacco cessation and prevention: A review of literature. *American Journal of Health Promotion*, *17*, 7-17.
- Stead, M., & Eadie, D. (2007). Evaluation of Foolsspeed campaign: Final phase: Report. Retrieved 16 June, 2009, from http://www.scotland.gov.uk/Resource/Doc/171178/0047895.pdf
- Stephenson, M., & Witte, K. (2001). Generating fear in a risky world: Creating effective risk messages. In R. Rice & C. Atkin (Eds.), *Public communication campaigns* (3rd ed., pp. 88-102). Thousand Oaks: Sage.
- Strecher, V. J., Bauermeister, J. A., Shope, J., Chang, C., Newport-Berra, M., Giroux, A., et al. (2006). Interventions to promote safe driving behaviour: Lessons learned from other health-related behaviours. In *Behavioural research in road safety 2006, sixteenth seminar* (pp. p28-38). London: Department for Transport.
- Struckman-Johnson, C., Struckman-Johnson, D., Gilliland, R. C., & Ausman, A. (1994). Effect of persuasive appeals in aids, psaz and condom commercials on intentions to use condoms. *Journal of Applied Social Psychology, 24*, 2223-2244.
- Tay, R. (2001). Methodological issues in evaluation models: The New Zealand road safety advertising campaign revisited. *Road and Transport Research, 10*(2), 29-39.
- Tay, R. (2002). Exploring the effects of a road safety advertising campaign on the perceptions and intentions of the target and nontarget audiences to drink and drive. *Traffic Injury Prevention*, *3*, 195-200.
- Tay, R., & Ozanne, L. (2002). Who are we scaring with high fear road safety campaigns? *Asia Pacific Journal of Transport, 4*, 1-12.
- Tay, R., & Watson, B. (2002). Changing drivers' intentions and behaviours using fear-based driver fatigue advertisements. *Health Marketing Quarterly, 19*(4), 55-68.
- Taylor, M. A. P., Woolley, J. E., & Dyson, C. B. (2001). *Outcomes from the South Australian road safety media evaluation study.* Proceedings of the National Speed and Road Safety Conference, held in Adelaide.

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- Thornton, J., & Rossiter, J. R. (2004). *The effectiveness of threat-only messages versus threat-andefficacy messages in anti-speeding advertisements.* Paper presented at the Road Safety Research, Policing and Education Conference, Perth, 14-16 November 2004.
- Triandis, H. C. (1977). Interpersonal behaviour. Monterey, CA: Brooks/Cole.
- Ulleberg, P. (2001). Personality subtypes of young drivers. Relationship to risk-taking preferences, accident involvement, and response to a traffic safety campaign. *Transportation Research, Part* F(4), 279-297.
- Vaa, T., & Phillips, R. (Editors) (2009). Effects of road safety campaigns. Report D1.3, CAST (Campaigns and Awareness-raising Strategies in Traffic Safety) Project, European Commission. http://www.cast-eu.org/docs/CAST_WP1_Deliverable%201.3%20REVISED.pdf
- Wan, F., Meirick, P., Williams, J., Holmes, J., & Feibich, C. (2000). *Threat, authoritarianism and political advertising: An experiment in personality and persuasion.* Paper presented at the Association for Education in Journalism and Mass Communication (AEJMC), Phoenix, AZ.
- Watsford, R. (2008). *The success of the 'pinkie' campaign speeding. No one thinks big of you: A new approach to road safety marketing.* Paper presented at the High Risk Road Users Conference, Joint ACRS-Travelsafe National Conference, 18-19 September, Brisbane.
- Weitz, B. A., & Wensley, R. (2002). Handbook of marketing. London: Sage.
- Whittam, K. P., Dwyer, W. O., Simpson, P. W., & Leeming, F. C. (2006). Effectiveness of a media campaign to reduce traffic crashes involving young drivers. *Journal of Applied Social Psychology*, 36(3), 614-628.
- Wild, C. (1995). How TV campaigns work. Qualitaten der Fernsehwerbung, p125-145.
- Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Community Monograph, 59*, 329.
- Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*(October), 591-615.
- Witte, K., Berkowitz, J. M., Cameron, K. A., & McKeon, J. K. (1998). Preventing the spread of gential warts: Using fear appeals to promote self-protective behaviors. *Health Education & Behavior, 25*, 571-585.
- Woolley, J. E. (2001). *Literature review on best practice with mass media*. Adelaide: Transport Systems Centre, University of South Australia.
- Wundersitz, L., & Anderson, R. (2009). On-road observational survey of restraint and child restraint use, 2009. Adelaide: Centre for Automotive Safety Research.
- Wundersitz, L., Hiranandani, K., & Baldock, M. (2009). *Annual performance indicators of enforced driver behaviours in South Australia, 2007* (No. (CASR058)). Adelaide: Centre for Automotive Safety Research.