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What can we learn from recent evaluations of road safety mass media campaigns?

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Abstract

Mass media campaigns can play an important role in promoting road safety issues to a large proportion of the population. In order to understand what elements make a road safety mass media campaign effective and how we might enhance future campaigns, a review of the literature published during the last decade was conducted. Any general principles concerning effective mass media campaign design and development were identified within the literature. Following this, recent evaluations of road safety mass media campaigns were examined to determine whether campaigns were adopting these best practice principles and the quality of these evaluations was reviewed. A number of broad principles that can enhance the effectiveness of road safety mass media campaigns were identified. While campaign designers appear to be increasingly adhering to these principles, there is still much room for improvement. Closer examination of the road safety campaigns revealed that few were subject to thorough scientific evaluation. It is suggested that evaluations may need to be based on 'before and after' comparison of behaviours or variables that can be objectively observed and are closely linked to safety.

Keywords

Campaign evaluation, Mass media, Road safety advertising, Threat appeal

Introduction

Mass media campaigns are used extensively as a means of promoting road safety issues. The use of mass media campaigns

is based on the premise that targeting the population as a whole has the benefits of potentially altering the knowledge or attitudes of a large proportion of the population and providing social support for behaviour change [1].

Mass media advertising and the provision of information to road users are relatively cheap countermeasures to road crashes, per person reached. A ten million dollar campaign in a city of one million people is only $10 per person, which might be thought very little when the annual cost of road crashes may be about $700 per person (as it is in South Australia), even if the campaign does not reach everyone in the community. However, it has been controversial for decades whether mass media campaigns have any worthwhile effect.

There is quite a substantial body of opinion, based on evaluations of individual campaigns, that mass media campaigns will not usually reduce crashes [e.g. 2, 3]. Strecher et al. [4, p. 35] argues 'One-size-fits-all mass media interventions that run independently of other strategies have demonstrated little or no behavioural improvement'. On the other hand, advocates of advertising point to significant changes in some attitudes over the past 30 years, for example, less tolerance of smoking and drink driving. Indeed, research suggests mass media campaigns are generally more successful in fulfilling an agenda setting role (i.e. changing social norms) by increasing awareness of an issue or problem rather than altering behaviour [1].

To determine the effectiveness of recent mass media campaigns, a scientific outcome-based evaluation is desirable. However, a rigorous evaluation is difficult and costly to achieve and may not necessarily provide definitive answers (for a discussion, see [5]). In the absence of such an evaluation, a more constructive approach is to review the literature to determine what conditions are necessary for mass media campaigns to successfully change road safety related outcomes. In the past, a number of studies have used meta-analytic techniques or have reviewed the literature to determine key elements associated with effective road safety mass media campaigns [e.g. 6, 7]. However, this paper aims to provide a timely update on the current status of evidence by reviewing the most recent literature.

The purpose of the present paper - which includes some parts of the report by Wundersitz et al. [8] - is to review research literature published over the last decade to identify any general principles associated with effective road safety mass media campaigns and to also comment on what might be done to improve campaign design, development and evaluation. Comments concerning potential improvements to future campaigns will be based on a review of recent road safety mass media campaign evaluations, and how they compare to best practice, as stated in the literature.

Method

Australian and international mass media literature published during the last decade (2001-2009) was identified and reviewed to determine general principles associated with effective mass

media campaigns. Given that public health and road safety media campaigns have much in common (e.g. goal of reducing injuries, changing health related behaviours), the review included public health literature, where necessary, but the primary focus was on road safety.

Literature searches were performed using the following electronic reference databases and sources: PubMed, Academic Search Premier (Media and Health), PsychInfo, Informit (ATRI, Humanities and Social Sciences), OvidSP (Transport), TRIS, and the Cochrane Library. The search strategy was customised for each database and included journal articles, reports, conference papers, reviews and electronic materials. The bibliographies of included papers and reviews were also examined to identify relevant literature. While this review was not intended to be exhaustive, it was intended to be representative of literature published in the English language during the last decade.

To examine how recent road safety mass media campaigns are designed and evaluated, and how they might be improved, the literature review focused on studies evaluating the effectiveness of road safety mass media campaigns. The campaigns included were those involving at least one form of mass media (e.g., TV, press, radio) either alone or in conjunction with other interventions. At least one form of mass media had to be purchased. 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.

Each evaluation of a road safety mass media campaign identified in the literature was examined and assessed in terms of: the target behaviour and audience; the main campaign message; approach used to convey the message; the campaign duration and intensity; the different types of media used; any activities or enforcement accompanying the campaign; method of evaluation; and any outcomes of the evaluation with particular emphasis on scientific evidence, that is, campaign effectiveness in the sense of changes in objective measures such as crashes or behaviour (as distinct from recall or change in attitudes).

Results

The literature search uncovered a large body of research relating to mass media campaigns from a wide range of different perspectives. Over 125 publications specifically related to road safety mass media campaigns were identified with most of these being experimental studies or review articles. Of these, only 14 publications were evaluations of individual campaigns that met the inclusion criteria.

Best practice principles from the literature

Noar [9] commented that in the last decade health mass media campaign designers have increasingly adhered to general 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. The present review of literature from road safety and public health suggests the following principles might enhance the effectiveness of mass media campaigns.

Campaign design and development

- Strategically develop the campaign. Clearly define the campaign objectives and select appropriate variables that can measure whether these objectives were achieved [e.g. 10].

- Use systematic data driven processes to identify the target behaviour and the target audience [e.g. 9].

- 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 [e.g. 2, 11].

- Use a psychological theory as a conceptual base for the campaign; theoretically guided campaigns have a greater chance of success [e.g. 7, 9, 10].

- Integrate mass media with other activities such as enforcement, legislation, and education [e.g. 6, 7, 10].

- Messages might be communicated more effectively when the mode of communication matches campaign goals and the target group preferences [e.g. 4, 9].

- Different types of media should be combined to reach as many as possible in the target group [e.g. 10, 12].

- There is some evidence from occupational health and safety back pain mass media campaigns [13, 14] suggesting messages need to make explicit behavioural recommendations relevant to the specific context of the desired behaviour.

Type of appeals

- Threat appeals aiming to evoke fear have often been used in road safety advertising. 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 [15]. 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, be perceived as effective, and allow the target audience to believe that they are capable of performing the behaviour [15]. Campaigns may be counterproductive without these elements, as individuals may believe that they are unable to protect themselves from the threat, resulting in defensive and maladaptive responses [e.g. 16]. On this basis, fear appeals should be used with caution.

- 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 [17, 18].

Evaluations of road safety mass media campaigns

To further determine what elements might enhance a mass media campaign, it is best to look at accumulated knowledge from past campaigns. This section provides an overview of road safety mass media campaigns that were subject to an evaluation to determine their effectiveness, and the evaluation was published and made available to the public. Therefore, these evaluations cannot be viewed as representative of all road safety mass media campaigns, only those that match the sampling criteria. Fourteen evaluations of road safety mass media campaigns were identified and they were of varying quality in terms of the quality of the evaluation and the type of outcome measures used.

A description of each of the evaluated campaigns published from 2001 to 2009 is summarised in Table 1 (see Appendix) with the studies listed in reverse chronological order. The level of detail for each individual campaign is heavily dependent on descriptions provided in the research paper describing the evaluation. A number of important observations are made concerning the different design, delivery and evaluation methods used in these campaigns. Note that two different campaigns (speed and motorcycles) were evaluated in one publication; therefore, in most of the following results the total number of observations will be 15.

Target behaviour and audience

A variety of road safety behaviours were targeted by the campaigns including speed (n=5), drink driving (n=3), seatbelts (n=2), drug driving (n=1), risky driving (n=1), young driver vulnerability (n=1), motorcyclists (n=1) and road user attitudes and behaviours (n=1).

Six of the campaigns targeted the general driving population of which four were campaigns targeting speeding. The remaining nine campaigns cited more specific target audiences or subgroups identified as being at greater risk. These subgroups were demographically based with six targeting (young) males and three targeting young drivers in general.

Campaign approach and message

Generally, few details were provided about the content of mass media advertisements in the evaluations but it appears that almost all of the campaigns were intent on highlighting some aspect of the consequences of unsafe driving behaviour. An attempt was made to inspect campaigns on their websites but many campaigns were no longer viewable online. This was not surprising given that most campaigns were conducted in the earlier part of the last decade. More than half of the campaigns focused on the consequences related to enforcement, particularly the risk of being caught and punishment for unsafe behaviours. Several of these campaigns took an informative approach warning drivers of increased speed enforcement [19] or the commencement of drug testing [20]. The other campaigns focussed on more personal, emotional consequences such as crashing (killing others, injuries to self or others) or incurring social disapproval from risky behaviours such as

speeding [e.g. 21, 22]. Of interest, some evaluations suggested that messages emphasising financial or lifestyle consequences such as loss of licence were more likely to influence behaviour than messages highlighting loss of life or limbs [23, 24].

Only one campaign mentioned using a theoretical model when developing the campaign [25]. The 'Foolsspeed' campaign in Scotland was based on the Theory of Planned Behaviour (TPB) [26], a model that explains and predicts behaviour in terms of key psychological determinants. The TPB was used to shape a series of four television advertisements, with each advertisement message designed to address a key determinant of behavioural intentions according to the TPB: attitudes regarding speeding and speed choice, subjective norms in relation to speeding, perceived behavioural control, and affective beliefs (i.e. the positive benefits of calmer driving).

Few evaluations mentioned the type of appeal used in the campaign. Of those that did, two earlier studies adopted graphic shock or threat based campaigns [27, 28], one used humour to create awareness of drug testing [20] and another intentionally depicted more realistic, credible scenarios rather than a hard-hitting threat based approach [22].

Around half of the campaigns incorporated specific behavioural instructions on how to achieve the desired safe behaviour in the main campaign message or slogan. Some good examples of campaigns that adopted this practice include a seatbelt campaign from the United States (US) 'Operation ABC – Always Buckle Children' [29], the Victorian 'Wipe off 5' speed related campaign [19] and the UK motorcycle campaign aimed at drivers 'Take longer to look for bikes' [30].

Length and intensity of campaigns

The length of the campaigns varied across the studies ranging from two weeks to five years. Six campaigns were undertaken for less than one year while six campaigns were operational for at least one year of which three lasted for five years. The length of the campaign was not specified in three evaluation studies.

While evaluations often listed media schedules with respect to timing, only three evaluations [31-33] gave any details related to variations in the level of intensity of the campaigns and one provided frequency information [34]. Solomon et al's [32] evaluation of enforcement and publicity campaigns encouraging seatbelt use at night in three different US counties attempted to link intensity levels with outcome variables. The type and amount of enforcement and media in each county varied and was tailored to the county. The study was further complicated by the fact that each county had different seatbelt 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. [32, 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 behaviour.'

Campaign media

The vast majority of campaigns (n=13) used a combination of different media with television being the most common communication medium (n=12). Radio (n=9) was the next most frequently used medium to deliver campaigns followed by billboards/posters (n=5), cinema (n=2) and press (n=1).

The internet is the only medium that has the ability to provide information in an interactive manner combined with games and films but only two recent campaigns (United Kingdom speed and motorcycle campaigns [30]) mentioned using online activities. This finding is likely to be, at least partly, reflective of the inherent time lag involved in the publication of evaluations. Merchandise and promotion at a sporting event (AFL game) was used in one Australian anti-speeding campaign and stickers in urinals were used during a Scottish anti-drink driving campaign.

Some campaigns also earned free media publicity, that is, they generated media interest through press releases or public events. The practice is most useful for campaigns with few monetary resources but is also generally an opportunity to promote road safety issues. While only two campaigns documented that they received free publicity, it is likely to be under-reported and so it probably occurs much more frequently.

Supporting activities

Despite the known benefits of incorporating mass media campaigns with other supporting activities [e.g. 6], there were only eight mass media campaigns in which it was known that media was integrated with other activities. Of these, six were combined with enforcement activities. These six campaigns were predominantly anti-speeding campaigns, lasted for longer than one year and reported positive findings. Interestingly, none of the reviewed campaigns specified that education materials or a change in legislation accompanied the mass media component.

Evaluation quality, methods and outcomes

Few of the road safety campaigns were subject to rigorous scientific evaluation, that is, using an experimental design and objective behavioural outcomes. Five studies were cross-sectional surveys, eight were uncontrolled before and after evaluations and two were controlled before and after evaluations. The inclusion of a control group is not always feasible, particularly when entire populations are targeted, as is the case in national mass media campaigns (e.g. New Zealand supplementary road safety package). Some of the before and after studies without a control group used a number of statistical procedures to control for other confounding variables.

Six studies reported objective behavioural measures while the other studies focused on indicators of message recall, awareness, attitudes, behavioural intentions or self-reported behaviours. Of the behavioural measures used, one study conducted observations of seatbelt use while the remaining five attempted to link campaign effectiveness to crashes. Evaluations that attempted to measure changes in behaviour resulting from the combination of enforcement and publicity generally reported

positive results. However, findings on the effectiveness of advertising alone (predominantly speeding campaigns) were largely inconclusive because advertising and enforcement effects could not be separated. An exception was Cameron et al. [31] 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.

Discussion

The mass media related literature reviewed in this paper identified a number of broad principles that can be adopted to enhance the effectiveness of road safety mass media campaigns. While many of these principles have been known for some time, it was evident from evaluations of campaigns published during the last decade that many of these principles have not yet been put into practice. This paper has shown that there is still some room for improvement when designing and evaluating such campaigns. The most salient areas for improvement are now discussed.

Realistic expectations of campaigns

Road safety mass media campaigns are generally more successful in conveying information and changing attitudes rather than altering driver behaviour [35, 36]. Despite this, many campaigns focused on behaviour change. While road safety advertising is unlikely to directly change behaviour it may be useful for agenda setting 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, particularly among young people [21]. The researchers evaluating the 'Foolspeed' campaign in 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 [22]. Future campaign designers need to have realistic expectations regarding what road safety advertising can achieve.

Use a theoretical basis for the campaign

For many years, reviews of the mass media literature in road safety and public health have advocated basing campaigns on explicit theoretical framework [e.g. 6, 7, 10]. However, very few of the mass media campaigns reviewed were designed around psychological theories. One of the few exceptions was 'Foolsspeed' [22], a five-years anti-speeding campaign based on the Theory of Planned Behaviour.

The Transtheoretical Model of Change [37] is one of the more widely used psychological theories at present, receiving much attention in the area of behaviour change and health promotion such as smoking cessation [38], promoting physical activity [39] and encouraging commuters to cycle [40]. A major contribution

of the model is that it considers the readiness of the individual to change their behaviour and recognises that characteristics implicit to each population are pertinent for creating or resisting change. Knowing at which stage the target audience is situated, or indeed subgroups within the target audience, can be useful in the development of road safety campaigns such that different messages match the different stages of readiness to change. While this theoretical model is appealing it is not without critical review of conceptual and methodological issues surrounding the stages [for a review see 41].

Shift away from threat appeals

Two campaigns in Australia and New Zealand used graphic threat-based appeals in the early 2000s [i.e. 27, 28]. The research literature highlights the importance of including specific elements in fear campaigns (i.e. evoking fear, suggesting a safe behaviour that is perceived as effective and possible to carry out) to avoid defensive responses. A lack of specific information made it difficult to determine whether these principles were adopted.

In more recent years, there was a shift away from threat appeals to more rational and realistic approaches [e.g. 22]. A recent review of 45 anti-speeding campaigns found that the approaches taken were typically rational persuasion or hard-hitting emotional persuasion [42]. In the present review campaigns targeting males did not appear to use threat based appeals, consistent with the literature that suggests positive emotional appeals might be more effective than threat appeals for males [17, 18].

Emerging research suggests response efficacy (the belief that a coping strategy can avert a threat) may influence the effectiveness of positive emotional appeals (i.e. humour and pride) as well as threat appeals [43]. This suggests that future campaigns using positive emotional appeals should also consider featuring messages that provide effective emotion relieving strategies or safe behaviours for the target audience.

Combine different forms of media

Research indicates campaigns using multiple forms of media can be as effective in communication as television only campaigns and print only campaigns [12]. In addition, different types of media can have synergistic affects; for example, newspapers are used to prime people to watch television campaigns, television campaigns might promote visiting a website and websites can create awareness and interest in topics (i.e. through interactive games) primarily advertised on television.

Information is increasingly being forwarded through social media networks on the Internet whereby people will refer friends and family to websites of interest through social networking sites. Some of the biggest advantages of social media are the ability to quickly spread concise messages and facilitate the two-way flow of information. Social networking is most popular among younger people; therefore, they should be considered not only a target audience but also a medium. 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 30] but few mentioned using websites or social networks when targeting young people. Matching the type of media to target group preferences is highly desirable.

Provide better documentation of campaign activities

Very few of the campaigns gave a detailed description about the mass media campaign duration and intensity, with the exception of Cameron et al. [31], Solomon et al. [32] and Angle et al. [33]. Consequently, it is difficult to provide any indication as to how long a campaign should be conducted or the intensity of exposure.

Studies from the US have considered the relationship between money spent on campaigns (a pseudo measure of intensity) and campaign effectiveness. Consistent with Solomon et al.'s [32] finding of a lack of relationship, a National Highway Traffic Safety Administration (NHTSA) sponsored study [44] found that some US states had higher seatbelt use rates than other states due to higher levels of enforcement rather than demographic differences or funds spent on media.

The general lack of information describing the intensity and coverage of road safety mass media campaigns needs to be addressed so that there is a better understanding of the relationship between exposure and campaign outcomes.

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

Over 15 years ago, Donovan et al. [15] attempted to review Australian road safety campaigns but found that 'Few campaigns are adequately documented, and perhaps fewer are appropriately evaluated.' For the most part, these conclusions are still valid. There were few mass media campaigns that were subject to thorough scientific evaluation with most evaluations measuring only audience response to campaigns such as recall of the advertisement message or self-reported attitudes, rather than measuring any behavioural change per se. These findings are also consistent with Phillips and Torquato's [42] conclusions following a review of 45 anti-speeding campaigns from 20 different countries.

Less than half of the studies in the present review reported using behavioural measures. Five evaluations used crashes as an outcome measure but the variability in crash data means that it is not an optimal outcome measure for mass media campaigns (for a discussion see [5]). Moreover, when 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. 19, 27]. Only one evaluation [32] compared objectively observable behaviour that was closely linked to safety (i.e. seatbelt use) before and after the campaign. Insensitive outcome measures are likely to inaccurately estimate the effectiveness of a campaign leading to incorrect inferences about the campaigns impact.

Evaluation designs were generally simple before and after comparisons among the target population. 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 [32, 34]. 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.

Behaviour and attitude change resulting from mass media campaigns might occur over a number of years or decades but such longer-term effects are not easily measured. 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 shortlived effects confined to the duration of the campaign [34].

Tay [45] maintains that the perfect evaluation of countermeasures does not exist so it is important that road safety interventions not only be evaluated but re-evaluated by different analysts using different outcome measures and evaluation methodologies. His comments were made following multiple analyses of data examining the effect of the New Zealand media campaign against drink driving, which resulted in different conclusions [28]. While conducting multiple scientific evaluations is certainly desirable, it must be acknowledged that it is a difficult and costly process.

To improve our understanding and knowledge of what factors increase the effectiveness of road safety campaigns, more scientific campaign evaluations using appropriate objective behavioural measures and sound methodological design (i.e. use control groups and before and after measures) are needed. However, for the most part, it is likely that there will only be weak evidence about the effectiveness of media campaigns (i.e. how much to spend, what media to use, campaign message, appeal and content etc.) for some time.

So how might decisions be made about campaigns now, and what should be done to improve the decisions about campaigns in the future? If examining changes in the number of crashes is unlikely to provide any strong evidence due to the strong variability in crashes, more evaluations need to be based on before and after comparison of behaviours or variables that can be objectively observed and occur reasonably frequently. The behaviour needs to be closely linked to safety, and this link needs support from some credible theory in order that a safety change can confidently be inferred from a behaviour change. The improved understanding of risk factors such as speed and alcohol provides some optimism for this approach.

The way in which campaigns are approved and funded often means that there is little time or inadequate resources for baseline measurements of the safety-related behaviour to take place. Consequently, there is a need for ongoing programs measuring the frequencies of important safety related variables and behaviours such as blood alcohol concentration, speed and the use of restraints.

Conclusion

The research literature reviewed in this paper identified a number of general principles that might be used to enhance the effectiveness of road safety mass media campaigns. While campaign designers appear to be increasingly adhering to these principles, an analysis of road safety mass media campaign evaluations published during the last decade revealed that there is still much room for improvement.

Conducting an evaluation of a mass media campaign is costly but its importance should not be undervalued. Consistent with previous reviews, few mass media campaigns were subjected to thorough scientific evaluation with evaluations typically based on audience responses rather than outcome measures that directly related to the behaviour of interest. The ideal evaluation methodology is not always feasible or practical but, 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. Systematic ongoing measurements of safety-related behaviours (e.g. speed) would allow baseline measures to be easily obtained before campaigns are implemented. The inclusion of more detail about the campaign content, approach and intensity in campaign evaluations would also greatly assist campaign developers in understanding what works and does not work.

Acknowledgements

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