



Meta-analysis of the effect of road safety campaigns on accidents

Ross Owen Phillips^{a,*}, Pål Ulleberg^b, Truls Vaa^{a,*}

^a Institute of Transport Economics, Gaustadalléen 21, 0349 Oslo, Norway

^b Department of Psychology, University of Oslo, PB 1094, Blindern, 0317 Oslo, Norway

ARTICLE INFO

Article history:

Received 8 September 2010

Received in revised form

15 December 2010

Accepted 2 January 2011

Keywords:

Road safety

Campaigns

Accidents

Effect

Meta-analysis

ABSTRACT

A meta-analysis of 67 studies evaluating the effect of road safety campaigns on accidents is reported. A total of 119 results were extracted from the studies, which were reported in 12 different countries between 1975 and 2007. After allowing for publication bias and heterogeneity of effects, the weighted average effect of road safety campaigns is a 9% reduction in accidents (with 95% confidence that the weighted average is between –12 and –6%). To account for the variability of effects measured across studies, data were collected to characterise aspects of the campaign and evaluation design associated with each effect, and analysed to identify a model of seven campaign factors for testing by meta-regression. The model was tested using both fixed and random effect meta-regression, and dependency among effects was accounted for by aggregation. These analyses suggest positive associations between accident reduction and the use of personal communication or roadside media as part of a campaign delivery strategy. Campaigns with a drink-driving theme were also associated with greater accident reductions, while some of the analyses suggested that accompanying enforcement and short campaign duration (less than one month) are beneficial. Overall the results are consistent with the idea that campaigns can be more effective in the short term if the message is delivered with personal communication in a way that is proximal in space and time to the behaviour targeted by the campaign.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

Each year more than 40,000 people are killed in accidents on European roads (Delhomme et al., 2009). Planners and policy-makers aiming to reduce this number continue to invest in road safety campaigns even though there remains little consensus about their efficacy after sixty years of study (Delaney et al., 2004; Hyman and Sheatsley, 1947; Mendelsohn, 1973). Debate among researchers has become somewhat polarised, some claiming it is also clouded by attempts to explain behavioural change in terms of attitude concepts (OECD, 1993, 1994). Lack of agreement among practitioners is rooted both in the lack of guidance from research and in differences between their own subjective experiences of campaigns with widely different properties and contexts. The situation is also exacerbated by the different accident measures and designs used by the studies evaluating campaigns (Tay, 2001).

To overcome these difficulties there have been calls for systematic syntheses of the research on road safety campaign effectiveness (Black, 2001; Morrison et al., 2003). Meta-analysis is a statistical technique used to systematically summarise the results of a group of individual studies with a common research hypothesis and a

common measure of effect (Elvik, 2005). The method has been used to summarise the effects of various road safety interventions (e.g. Elvik, 1996; Erke, 2009), including road safety campaigns (Elliot, 1993; Hagenzieker et al., 1997; Delhomme et al., 1999; Elvik and Vaa, 2004; Vaa et al., 2004).

To our knowledge, three meta-analytic studies have addressed the effects of campaigns on accidents. Summarising 13 studies, Elvik and Vaa (2004) conclude that campaigns reduce accident levels by somewhere between 0 and 49%, depending on the type of campaign and accident measure used. Delhomme et al. (1999) summarise 72 effects from 35 evaluation studies, most of which are also reviewed and summarised by Vaa et al. (2004). Both these studies conclude that road safety campaigns are associated with an overall reduction of 9% while campaign activities are ongoing, increasing to 15% following campaign completion. Both studies also find a large variation in campaign effect, probably reflecting large differences in how the road safety campaigns summarised have been implemented.

By carrying out an updated and expanded meta-analysis, the present study aims to develop our current understanding of road safety campaigns. In particular, it aims to document important differences in content and delivery method between road safety campaigns, and use those differences to explain any systematic variation among the effects the campaigns have on accidents.

The content of a campaign – essentially the nature of the message(s) it delivers – will clearly influence its effect. Any message

* Corresponding authors. Tel.: +47 22 57 38 20; fax: +47 22 60 92 00.
E-mail addresses: rph@toi.no (R.O. Phillips), pal.ulleberg@psykologi.uio.no (P. Ulleberg), tvaa@toi.no (T. Vaa).

seeking to effect a change in behaviour must be persuasive. However, there is little consensus among previous campaigns about what types of message are most persuasive. For example, persuasion is often attempted rationally, through the presentation of facts or figures, but research shows that the effect can be larger if an emotional message is used (Elliot, 1993; Ulleberg and Vaa, 2009). The emotion invoked in the target audience can be negative, e.g. shock or fear appeals (Lewis et al., 2008), or positive, e.g. humour appeals (Weinberger and Gulas, 1992). Research on fear appeals suggests that their effects are weak, limited by defensive responses and dependent on personal relevance (Ulleberg and Vaa, 2009). Research on humour appeals is more limited, with some studies finding weakly positive effects and others finding neutral effects (Ulleberg and Vaa, 2009). Faced by the array of strategies used by previous campaigns and ambiguous recommendations from researchers it is difficult for practitioners to conclude anything about the emotional content their message should have (see e.g. SWOV, 2008; Lewis et al., 2007; Ulleberg and Vaa, 2009). The situation is typical of other aspects of campaign content. For instance, using either factual or emotional persuasion, many campaigns aim to highlight the risks associated with certain road user behaviour, though again it is not clear whether it is advantageous to do so (Elliot, 1993; Weber et al., 2006; Lewis et al., 2007; Williams et al., 1996; Snyder, 2001).

If a campaign message is persuasive, it will only be effective in terms of behavioural change and accident reduction if it reaches the target audience. In designing a campaign, it is thus important to consider effective ways to deliver the message. Again, however, there is little guidance on which method(s) is best. Delivery via mass media channels might be expected to increase the effectiveness of the campaign on the basis of the greater exposure achieved. However, the effectiveness of mass media channels alone has been questioned in the fields of both traffic safety (see e.g. Elliot, 1993; Vaa et al., 2004) and health promotion (Wilde, 1993; Donnerstein and Linz, 1995; Snyder, 2001), partly on the grounds that the audience is likely to be exposed to mass media at a time and place that is far removed from the context in which the targeted road user behaviour occurs. In addition, exposure in and of itself is not sufficient to guarantee that the target will attend to and elaborate the message, a process thought to increase the likelihood that they will subsequently change their behaviour (see e.g. Petty et al., 2009), and one which is best achieved using interpersonal communication rather than mass media (see e.g. Berger, 2005; Rice and Atkins, 2001; Petty et al., 2009; Ulleberg and Vaa, 2009; Vaa et al., 2004).

Irrespective of message content or delivery method used, accompanying enforcement activity by the police, to increase the saliency of punitive risks, has been found to be effective in reducing the number of road accidents (Elvik and Vaa, 2004), but little has been done to describe the campaign types and contexts for which enforcement works best.

In summary, there is a need to know what makes road safety campaigns effective. Given that previous campaigns vary widely along several dimensions, an effective method is needed to determine how much of the variation in road safety campaign effect can be explained by those differences. One such method is meta-regression, which can be included as part of a meta-analysis. Several models are described for conducting meta-regression – predominantly fixed and random effect models – but there is some disagreement about which is the best to use (Higgins and Thompson, 2004; Poole and Greenland, 1999; Schultz and Altman, 1993; Shadish and Haddock, 1994; Hardy and Thompson, 1996).

To our knowledge only one study has attempted to explain the variation in effect of campaigns on accidents using meta-regression (Vaa et al., 2004). This study was, however, somewhat compromised by the large number of predictors tested, the potential problem of dependence of effect sizes extracted from the same

evaluation study, and a lack of clarity about the meta-regression model used (Higgins and Thompson, 2004).

The present study uses meta-regression to identify, from available evaluations which factors, describing the nature of the campaign message and how it is delivered, are associated with significant variation in campaign effect. We attempt to base the meta-regression described on a large number of individual estimates and a limited number of predictors.

2. Method

2.1. Study design

2.1.1. Selection of studies

Evaluation studies of interest contained at least one estimate of the effect of a road safety campaign, as defined by Delhomme et al. (2009).¹ We did not limit the search to publicised evaluation studies, but rather sought to include any suitable evaluation we could access. We did not exclude non-controlled evaluation studies, but from the outset decided only to do so in the event that preliminary meta-analysis suggested that those effects derived from non-controlled evaluation designs were significantly different in size and variation from those derived from controlled evaluations. We did not limit the number of effects extracted from each single evaluation study, but instead collected all orthogonal effects reported, and checked for any signs of study-level dependence among the effects.

Evaluation studies were retrieved from the following sources:

- (i) Road safety campaign evaluation studies identified by Delhomme et al. (1999), Elvik and Vaa (2004), and Vaa et al. (2004) were retrieved and reanalysed, and in this way 43 suitable studies identified, up until 2004.
- (ii) Formal requests were made in 2008 to partners in European countries to search for and retrieve campaign evaluation data from their respective home countries. Eight suitable studies were identified in this way.
- (iii) New evaluation studies not previously included in meta-analysis were retrieved through normal literature searching. Evaluations published up until 2010 were searched for. Sixteen suitable studies were identified in this way.

Thus a total of 67 suitable studies were retrieved for meta-analysis.

2.1.2. Data collection and variables considered

Each effect was entered into successive cells of a column in an Excel spreadsheet, and data on variables describing how the campaign in question was delivered (delivery variables) and the type of message or material delivered (content variables) entered systematically into the row alongside each effect. Data were also entered describing the evaluation study from which each effect was derived (study variables). Effects were expressed in terms of the change in the number of accidents coinciding with the event of a road safety campaign (see Section 2.2). The delivery, content and study variables collected are detailed in Table 1.

Evaluation studies were characterised using eight variables. These included *timing*, i.e. whether accident levels were

¹ [A road safety campaign is a]...purposeful attempt to inform, persuade and motivate a population (or subgroup of a population) to change its attitudes and/or behaviours to improve road safety using organised communications involving specific media channels within a given time period, often supplemented by other safety-promoting activities (enforcement, education, legislation, enhancing personal commitment, rewards, etc.)."

Download English Version:

<https://daneshyari.com/en/article/10371439>

Download Persian Version:

<https://daneshyari.com/article/10371439>

[Daneshyari.com](https://daneshyari.com)