



# The effects of anti-speeding advertisements on the simulated driving behaviour of young drivers



Bernice R.C. Plant\*, Julia D. Irwin, Eugene Chekaluk

Department of Psychology, Macquarie University, North Ryde, NSW, 2109, Australia

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## ABSTRACT

Recent examinations of road safety communications, including anti-speeding advertisements, have considered the differential effects of positive and negative emotional appeals on driver behaviour. However, empirical evaluations of anti-speeding messages have largely relied on measures of viewers' reported intentions to comply with speed limits and the self-reported driving behaviour of viewers post-exposure, which might not be indicative of the direct effects that these messages have on real-world driving behaviour. The current research constitutes a first empirical evaluation of different real-world anti-speeding advertisements, as measured by their effects on young drivers' speeding behaviour, using a driving simulator. Licensed drivers ( $N=116$ ) aged 17–25 years completed driving measures prior to, immediately following, and 7–10 days after viewing one of four social marketing advertisements. Results indicated that young drivers' average driving speeds were modestly reduced immediately after they viewed an anti-speeding advertisement that depicted social consequences for speeding and employed a positive emotional appeal when compared to an emotion-matched control advertisement; however, this effect was not found for the anti-speeding advertisement depicting a crash. Interestingly, the results based on reported intentions to reduce speeding predicted the opposite pattern of results. However, there was no evidence that the immediate changes to speeding were maintained 7–10 days later, and prompts during Phase 2 did not appear to have an effect. The implications of these findings for road safety advertisements targeting young drivers are discussed.

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## 1. Introduction

Young drivers continue to be overrepresented in crash statistics in Australia and internationally, with road traffic injuries reported as the leading cause of deaths in 15–29 year olds (i.e., over 300,000 deaths around the world annually) (World Health Organization, 2015). Although young driver crash rates have declined significantly in Australia and other OECD countries since 1990 (see OECD/ITF, 2015), driving at high speeds remains the greatest contributor to road fatalities in Australia, particularly for young male drivers (e.g., BITRE, 2015). Given that a driver's travelling speed is controllable, the number of speed-related crashes involving young people could be reduced. In this way, health communications may have an important role in reducing young driver crash rates by

motivating people to change their behaviour (Lewis et al., 2009). Given that a lot of money is invested in persuasive road safety messages in Australia each year (Donovan et al., 1999), the evaluation of persuasive road safety messages is essential, as the cost of executing them could instead be used to implement other road-safety initiatives. If the goal of persuasive messages is to change behaviour, it follows that we should be interested in whether, and the extent to which, these messages have a direct impact on driver behaviour (also see similar discussions by Elliott, 2011; Wundersitz and Hutchinson, 2011) and which aspects of the message enhance effectiveness (also see Lewis et al., 2009).

### 1.1. Positive and negative emotional appeals in road safety advertising

Recent evaluations of road safety messages have attempted to isolate the message characteristics that enhance effectiveness (for a thorough discussion about message characteristics, as employed in road safety messages, see Lewis et al., 2009). This body of research suggests there may be drawbacks to employing anti-speeding

\* Corresponding author.

E-mail addresses: [bernice.plant@mq.edu.au](mailto:bernice.plant@mq.edu.au), [bernice.plant@gmail.com](mailto:bernice.plant@gmail.com) (B.R.C. Plant), [julia.irwin@mq.edu.au](mailto:julia.irwin@mq.edu.au) (J.D. Irwin), [eugene.chekaluk@mq.edu.au](mailto:eugene.chekaluk@mq.edu.au) (E. Chekaluk).

messages that evoke negative emotions, and particularly those including crash scenes (for examples of fear-pattern responses to anti-speeding messages, see [Rossiter and Thornton, 2004](#)). First, road safety advertisements that depict crash scenes appear to be susceptible to message broadening, such that drivers miss the “don’t speed” message, and instead broaden this to simply “don’t crash” (see [Redshaw, 2008](#)). Second, people appear to habituate to the effects of crash-based road safety advertisements with repeated exposure, as indicated by reduced levels of attention, evoked fear, and shock when exposed to the same message over consecutive weeks ([Thornton and Rossiter, 2001](#)). Third, drivers tend to think that anti-speeding messages containing these themes will have a relatively greater influence on *other* drivers (also see the third-person effect literature, e.g., [Duck and Mullin, 1995](#); [Innes and Zeitz, 1988](#)): This is concerning because perceived invulnerability to anti-speeding messages appears to predict lower reported intentions to monitor driving speeds and to stop speeding ([Lewis et al., 2007a](#)). Finally, after exposure to road safety advertisements containing crash-based themes (targeting drink-driving), young drivers have been reported to believe that they are even more skilled or cautious than other drivers ([Harré et al., 2005](#)). These findings suggest that anti-speeding messages that contain crashes or evoke negative emotions may not result in reductions to young drivers’ speeding behaviour. Worse still, in the case of enhanced crash-risk optimism (see [Harré et al., 2005](#)), road safety messages that depict crash scenes could result in young drivers taking greater risks while driving. Indeed a recent meta-analysis of the impact of road safety messages that evoke fear (including anti-speeding advertisements) revealed that although these messages have a significant impact on inducing fear, they do not appear to have a significant impact on changing subsequent behaviour ([Carey et al., 2013](#)).<sup>1</sup>

On the other hand, research into product advertising has shown that messages evoking positive emotions not only attract and hold attention (e.g., [Calvo and Lang, 2004](#)), but also increase the liking of the message and its products (e.g., [Strick et al., 2009](#)). This has practical implications in terms of simply getting viewers to watch an anti-speeding advertisement. Research does, in fact, suggest that road safety messages employing positive emotions may reduce maladaptive responses in viewers; conversely, viewers might actively ignore road safety messages that evoke negative emotions in a natural setting by changing the channel ([Lewis et al., 2008a](#); [Tay and Watson, 2002](#); also discussed in [Lewis et al., 2009](#)). Evoking positive emotions has been shown to have flow-on effects to cognitive mechanisms of persuasion: Positive feelings put us in a less vigilant mindset, whereby we rely on heuristics or peripheral cues when processing information (see the Elaboration Likelihood Model of persuasion, [Petty et al., 1983](#)). These processing differences impact persuasive outcomes, such that weak arguments are more likely to be accepted when the persuasive message evokes positive emotions (e.g., [Bless et al., 1990](#)).

Incorporating positive emotions in road safety messages has been reported to be effective with respect to self-reported measures of anti-speeding intentions ([Lewis et al., 2008b, 2010](#); [Parker et al., 1996](#)), and self-reported speeding behaviour ([Lewis et al., 2008b](#); [Parker et al., 1996](#)). However, the differential effects of positive and negative emotional appeals could be dependent on the viewer’s gender, as anti-speeding messages evoking positive emotions have been reported to have greater effects on male drivers,

<sup>1</sup> Although response efficacy has been identified as a key component of persuasion by fear-based road safety messages (see [Lewis et al., 2010](#); [Panić et al., 2011](#)), very few real-world anti-speeding advertisements that utilise threat appeals include specific information for drivers about how they can avoid the consequences depicted in these advertisements (fewer than 12%; see [Phillips and Torquato, 2009](#)). As such, response efficacy was not examined in the current research.

while those evoking negative emotions were reported to have greater effects on female drivers ([Lewis et al., 2008a](#)). This is concerning given that males are often the target group of road safety advertisements, and negative emotional appeals are most often used to try to influence the driving behaviour of this group (as noted in [Tay, 2005](#)). Importantly, little is known about the differential effects of these approaches on observable driving behaviour.

### 1.2. Empirical evaluation approaches

As mentioned, the evaluation of road safety advertisements is essential in order to justify the cost of executing these interventions and to develop effective approaches. Generally, however, very few empirical evaluations of road safety messages are conducted ([Wundersitz and Hutchinson, 2011](#); also see [Phillips and Torquato, 2009](#)). A review of the methods used to evaluate anti-speeding advertisements has revealed that experimental evaluations most often employ indirect measures of anti-speeding behaviour to assess advertisement effectiveness, including measures of: attitudes, intentions, and self-reported behaviour (see [Plant et al., 2011](#)). Empirical evaluations employing these measures have made important contributions to developing effective persuasive road safety messages, especially with regard to understanding psychological theory and persuasive processes, including the third-person effect, the Theory of Planned Behaviour ([Ajzen, 1991](#)), and models of fear-persuasion interactions (e.g., the Extended Parallel Process Model, [Witte, 1992](#)). While such research has important implications for road safety communications, it is important to know whether road safety messages have an impact on observable driving behaviour, as the effects of anti-speeding advertisements using self-report measures might not be representative of their effects on real-world speeding behaviour. Support for an intention-behaviour gap has been provided by an investigation into the effects of viewing a film showing road trauma on the intentions to drive recklessly and the simulated driving speeds of young male drivers ([Taubman-Ben-Ari et al., 2000](#)). This discrepancy between reported intentions to change behaviour and subsequent behaviour change suggests that the findings from evaluations using self-report measures might be limited and be lower in ecological validity.

Another common method used to evaluate anti-speeding advertisements—arguably higher in ecological validity—includes correlational methods in which direct measures of behaviour or behavioural outcomes are measured. Such evaluations have examined changes to young male driver crash rates over a five year period ([Tay, 2005](#)) or the effects of media campaigns on the free travelling speeds of drivers over a three year period ([Taylor et al., 2001](#)). Although measuring observable speeding behaviour or behavioural outcomes greatly enhances the ecological validity of these evaluations, the correlational nature of these studies presents limitations—in particular, causal connections cannot be made between the anti-speeding advertisement wave(s) and observed changes to behavioural outcomes. Similarly, these approaches make it difficult to isolate the relative impact of different message characteristics (e.g., the differential effects of positive and negative emotional appeals).

If a goal of anti-speeding advertisements is to modify driver behaviour, it follows that their effects on observable driver behaviour—rather than that intended by drivers—should be examined. Thus, it would be advantageous to conduct controlled experiments, where any observed effects can clearly be attributed to the advertisement condition, whilst measuring advertisement effectiveness in an ecologically valid manner (recommended in [Plant et al., 2011](#)). Driving simulators provide an, arguably, more ecologically valid and reliable method of measuring driving behaviour when compared to indirect measures. In particular,

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