LOSS & CONSEQUENCES
THE DRUNK DRIVING PROJECT

Maryland Highway Safety Office

urban1te

M I C A
February 1, 2011

Welcome MICA students!!!

Thank you for your interest in participating in this unique partnership between the Maryland State Highway Administration's Safety Office, Urbanite magazine, and the Maryland Institute College of Art's Office of Community Engagement. Dubbed "Loss & Consequences: The Drunk Driving Project", this endeavor is an opportunity to explore the talents of MICA students, like yourself, and apply those talents in a way that strives to produce positive social change, specifically by exploring and developing new and unique mediums and messages that highlight the consequences of driving drunk.

Each year over 150 people in Maryland die as a result of an impaired driver. The Maryland Highway Safety Office, through the use of federal highway safety grant funds, continues to seek new avenues and new media communications that will resonate with those that are statistically over-represented in drunk-driving crashes (in this case, males age 21-34). This art exhibition aims to utilize YOUR creativity and those of other MICA students to develop engaging visual communications that can then ultimately be widely distributed throughout the state (ie, outdoor billboards, bus advertising, print media, television Public Service Announcements, etc.).

The materials contained in this packet are designed to provide some insight to you about the enormous challenges faced when trying to modify driving behaviors, and the progress that research has provided in terms of Media Design, Message Development, and Public Health. There is a mix of research materials ranging from issues regarding the psychology of high-risk drivers, Maryland-specific alcohol-related crash issues, and specific marketing techniques utilized in Public Health campaigns. I've also thrown in some Creative products that have been used in Maryland campaigns and campaigns elsewhere. The hope is that these materials will help while you shape, and be incorporated into, your particular project.

Thank you again for your interest in this project. Should you need any additional materials or resources, please don't hesitate to contact me.

Sincerely,

Jeremy Gunderson
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An examination of message-relevant affect in road safety messages: Should road safety advertisements aim to make us feel good or bad?

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ABSTRACT

Drawing upon the multiple roles of affect posited by Elaboration Likelihood Model, the current paper examines the effectiveness of message-relevant affect. Specifically, humorous and fear-evoking anti-drink driving messages are examined in terms of perceptions of relative influence on self and others (i.e., the third-person effect) and their performance on a range of persuasion outcomes. The influence of involvement, response efficacy, and gender on persuasion outcomes is also examined. Participants (N = 201) viewed two advertisements and completed two questionnaires: the first, assessed pre-exposure attitudes and behaviour and immediate-post exposure attitudes and intentions; the second, 2-4 weeks later, assessed attitudes and behaviour. The results revealed, as predicted, interactions of the key variables and evidence of the greater persuasiveness of negative appeals immediately after exposure whilst greater improvement of positive appeals over time. The findings highlight the importance of continuing the exploration of positive appeals as a persuasive alternative to negative appeals.

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1. Introduction

This study examines message-relevant affect and, in particular, the relative effectiveness of negative and positive emotional appeals in the road safety advertising context. Message-relevant affect (or advertisement-induced affect) refers to affect that is evoked in direct response to an attitude object (i.e., persuasive message) and is part of the communication itself (Dillard & Wilson, 1993). It is a transient affective state that may be contrasted with message-irrelevant affect, or what is more commonly referred to as mood. Mood is considered an enduring, longer-lasting, diffused affective state that is not typically focused upon (or aware) of a specific cause (Dillard & Wilson, 1993; Jorgensen, 1998).

This research is informed by a number of practical considerations relating to the use of emotional appeals in road safety as well as contemporary developments in the persuasion literature. At a practical level, in many countries including Australia and New Zealand, there is a strong reliance on the use of negative, fear-based appeals in road safety. However, the empirical evidence relating to the use of such messages has been mixed. Furthermore, there is some evidence suggesting that community expectations may be shaped by advertising practice such that there may be circularity in public perceptions based on the frequency of use and perceived effectiveness. For instance, given that appeals to positive emotions are seldom used in the road safety context they may be considered relatively less effective than fear-based approaches simply because the latter approach is utilized more frequently (see Lewis, Watson, White, & Tay, 2007). It follows that individuals may hold specific expectations regarding what a road safety advertisement should incorporate including what types of emotions it should evoke.

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In relation to the persuasion literature, reflecting the complexity of the emotion-persuasion relationship, there has been a growing acceptance of the view that emotion (or affect) plays multiple roles as opposed to a single function in persuasion (see Petty, DeSteno, & Rucker, 2001). A key factor identified as influencing the particular role that affect does play in persuasion is an individual's level of involvement with the issue and/or message (see Petty et al., 2001; Petty, Schumann, Richman, & Strathman, 1993). Consequently, the involvement construct represents a key consideration when examining the emotion-persuasion relationship. Moreover, evidence has suggested that there are differences in the manner in which individuals of varying levels of involvement process persuasive messages. Specifically, prior research has established that highly involved individuals are likely to process persuasive messages systematically whereas individuals of low involvement are more likely to process the same message heuristically (see Petty & Cacioppo, 1986; Petty, Cacioppo, & Goldman, 1981). The Elaboration Likelihood Model of persuasion (Petty & Cacioppo, 1986) provides the theoretical foundation for each of these key considerations underpinning the current research.

1.1. The Elaboration Likelihood Model and affect

Much of the more recent evidence on the role of emotion (affect) in attitude change has been based upon the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986). As a multi-process theory of persuasion this framework better captures the complexity of the many roles of affect (Petty et al., 2001). The ELM proposes that attitude change via persuasion occurs through one of two processing routes: central or peripheral (Petty & Cacioppo, 1986). The processing enacted depends upon the extent of elaboration which ranges from limited thinking to extensive consideration of message arguments. The extent of elaboration is mediated by the individual's level of motivation and/or ability (Petty & Cacioppo, 1986; Petty & Wegener, 1999). When motivation/ability levels are high, elaboration is also high and the message is processed centrally. Conversely, when motivation/ability levels are low, elaboration is also low and the message is believed to be processed peripherally whereby individuals are persuaded by some peripheral cue(s) (e.g., the number, as opposed to the quality, of arguments presented; Petty & Cacioppo, 1984). Also, central processing is believed to produce attitudes that are more enduring than peripheral processing (Petty & Cacioppo, 1986; Petty, Hargrove, & Smith, 1995).

Whilst numerous factors have been shown to influence an individual's level of motivation and ability to elaborate, one key factor is an individual's level of involvement. Involvement, when conceptualised in terms of personal relevance, permits that an individual is highly involved with an issue when they perceive it as having some direct impact on their life (Petrih, 1993). Moreover, a substantial body of research supports the notion that involvement also influences the manner in which affect influences attitudes is believed to determine the particular role that affect will play in persuasion (Petty et al., 2001; e.g., Petty et al. 1993). Thus, there is an important interplay between levels of involvement and affect in determining persuasive outcomes as reflected by a substantial body of evidence supporting the notion that affect does influence attitudes in different ways under low- and high-elaboration conditions (Petty et al., 1993, 2001).

1.1.1. Affect under low involvement conditions

Under low involvement conditions, affect is believed to influence attitudes in a simple and direct manner with minimal cognitive effort (see Petty et al., 1993). Under such conditions, affect has been shown to operate as a peripheral cue, impacting upon attitudes in a manner consistent with its valence such that positive affect is more likely to result in favourable attitudes than negative affect (see Petty et al., 2001). Classical conditioning has been provided as one explanation of this effect (e.g., Zeama, Koster, & Pitikons, 1970). Alternatively, it has also been suggested that under low involvement conditions, affect may be more likely to provide informational value (Petty et al., 2001) consistent with the "how do I feel about it" heuristic (see Schwarz, 1990; Schwarz & Clore, 1983, 1988). According to this heuristic, individuals simply assess how they feel whilst evaluating the attitude object (i.e., the message) and base their evaluation on this assessment. If the affect is positive an individual will form a favourable evaluation however, if it is negative they will form an unfavourable evaluation (Schwarz, 1990).

Thus, immediately after exposure, for individuals of lower involvement, the positive appeals should be more persuasive than the negative appeals. This expectation is consistent with the "how do I feel about it?" heuristic and is based on evidence that individuals lower in involvement are more likely to rely on simple heuristic cues to process rather than engage in effortful processing (Petty, Gleicher, & Baker, 1991). More specifically, given that immediately after exposure, the cause of individual's feelings is salient (i.e., the persuasive message) individuals would attribute (correctly) their positive feelings to the effect of the message and thus would evaluate the positive messages more favourably.

Moreover, in relation to the interaction with other variables, analogous to evidence that under low involvement conditions, a number of weak arguments may be rated better than lower strong arguments (see Petty et al., 1981), it is expected that rather than the strength of the response efficacy present, individuals may be guided by a simple heuristic of strategy present versus strategy absent (as opposed to quality or appropriateness of the strategy recommended). Thus, response efficacy may interact with involvement and appeal type such that, for those individual's lower in involvement, the positive, high response efficacy appeal is most persuasive.

Hypothesis 1a. It is predicted that, immediately after exposure, for individuals who report lower involvement, the highest attitudes and intentions would be associated with the positive, high response efficacy appeal.

In contrast, after a time delay, for individuals lower in involvement, previous evidence would suggest that such individuals would process the messages less elaborately and, thus, could be expected to have less enduring attitudes formed overall.
Hypothesis 1b. At follow-up, for individuals who report lower involvement, no difference will be found between the mean attitudinal and intentional scores provided for the positive and negative appeals.

1.1.2. Affect under high involvement conditions

Under high involvement conditions, emotional states may be subject to careful scrutiny for their informational value similar to arguments included in a message (see Petty et al., 2001). The influence of affect upon attitudes under such conditions is likely to be mediated by other factors such as the valence of the thoughts generated (Petty et al., 1993) and the interpretations individuals make of their affective states (Bohner & Weisner, 2001: Martin, Abend, Sedikides, & Green, 1997; Petty et al., 2001). In relation to interpretations of affect, of particular relevance to the current research, is the view that affect may function in terms of an input-to-role-fulfillment evaluation process (Martin et al., 1997). This affect-as-input view posits that the more individuals experience feelings they expect to feel if the target object had fulfilled its role, the more favorable their subsequent evaluations of the target (Martin et al., 1997). Empirical evidence has been provided for this view of affect's role (see Bohner & Weisner, 2001: Martin et al., 1997). For example, Martin et al. (1997) found that the more individuals experienced the feelings that they had expected to from a given story (i.e., felt fearful or amused following either a sad or humorous story respectively), the more favorably they responded to the story.

When applying this view to persuasive messages, the view proposes that if an individual's expectations of how they expect to feel match the affect that was actually experienced, persuasion will likely be enhanced whereas in instances where there is a mismatch between expectations and experience, an aversive effect on persuasion is likely to ensue.

For instance, individuals cognizant of (or highly involved with) the road safety issue may have difficulty accepting positive emotional messages over traditional, negative, fear-based approaches because the former appeal type would likely evoke unexpected positive emotions. Thus, immediately after exposure, for individuals who score higher in involvement, the negative appeal should be the most persuasive. This expectation is consistent with the affect-as-input view of affect's role and is based on evidence that individuals higher in involvement are more likely to engage in systematic processing of the message (Petty et al., 1991). Moreover, to the extent that those higher in involvement would be more likely to consider the cognitive components of the message and, in particular, the level of response efficacy incorporated within the message, it is expected that high rather than low levels of response efficacy will be interacted with involvement and appeal type such that, for individuals higher in involvement, the negative, high response efficacy appeal is most persuasive.

Hypothesis 2a. It is predicted that, immediately after exposure, for individuals who report higher involvement, the highest attitudes and intentions will be associated with the negative, high response efficacy appeal.

In contrast, after a time delay, consistent with evidence that individuals of higher involvement would systematically process, it follows that such individuals would also be more likely to consider (and scrutinize) the affect that they experienced. Whilst this increased elaboration may lead individuals to favour negative appeals immediately after exposure, at follow-up, highly involved individuals may be likely to consider simply how they felt at the time in a more general sense. This suggestion is based on the notion that, as a transient affective state, message-relevant affect is likely to inform judgments immediately after exposure to a message whilst it remains salient; however, after a time delay, the affective state may become more diffused and consistent with a general mood (Schwarz, 1990). Consequently, in the case of positive emotional appeals, individuals may recall a more general sense of having felt “good”. This “feeling good” may be misattributed to the extent that it leads them to think that because they felt good about the message that it must have been a “good” message and to be a good message they must have been persuaded by it (i.e., the “how do I feel about it?” heuristic).

Hypothesis 2b. At follow-up, for individuals who report higher involvement, higher attitudes and intentions would be associated with the positive rather than the negative appeals.

1.2. Negative versus positive message-relevant affect: an overview of existing evidence

Despite the frequent use of fear-based health messages, a substantial body of literature attests to the contradictory findings between the level of fear evoked and the extent of subsequent persuasion achieved (for review of the use of fear in road safety campaigns, see Elliott, 2003; Lewis, Watson, Tay, & White, 2007). Although recent meta-analytical research has proposed a small but reliable positive linear relationship between fear and persuasion (e.g., Witte & Allen, 2000), the magnitude of this correlation suggests that fear arousal is neither the only nor the main explanatory factor of a message's persuasiveness. Indeed, the more contemporary fear appeal models, namely Rogers’s (1975) Protection Motivation Theory and Witte’s (1992) Extended Parallel Process Model have identified key cognitive factors/processes that influence the fear-persuasion relationship and consequently have afforded less focus upon the emotion of fear.

Of the factors examined in relation to the fear-persuasion relationship, particular significance has been placed upon the role of response efficacy (Witte & Allen, 2000). Response efficacy refers to the provision of coping strategies or recommendations within a message (Witte, 1992). Of note, recent meta-analytical evidence has identified response efficacy as one of the most important predictors of adaptive outcomes resulting from exposure to fear-evoking messages (Floyd, Prentice-Dunn, & Rogers, 2000).

In addition to response efficacy, a number of individual difference factors have been examined. Interestingly, whilst meta-analytical evidence has suggested that demographic characteristics such as gender and age have limited or no impact upon the
effectiveness of fear appeals (Witte & Allen, 2000), recent evidence, found in relation to gender, has challenged this conclusion (Goldenheld et al., 2008; Lewis, Watson, & Tay, 2007). For instance, Lewis, Watson, and Tay (2007) found that males were more likely to report appeals of high physical threats (i.e., appeals which depict death and/or injury as the consequences of unsafe/illegal behaviour) as having more influence on other drivers in general than themselves (the third-person effect [TPE]; Davison, 1983; Lewis, Watson, & Tay 2007). Moreover, males in this study were found to report significantly less intention to improve their future driving behaviour in relation to speeding and drink driving than females (Lewis, Watson, & Tay, 2007).

The concerning aspect of these findings is that males, as a high risk road user group, frequently represent the intended target of high physical threat (Tay, 2002). Compared with females, males are at much greater risk of being injured or killed in road trauma and are more likely to engage in risky behaviours such as speeding and drink driving (e.g., Hareh Field, & Kitwood, 1995). Thus, despite representing the intended target of many of the high fear-based appeals, it seems that males are not being persuaded by such messages (or, at least, relatively less so than their female counterparts; Lewis, Watson, & Tay, 2007). Arguably, any evidence suggesting that such appeals are not reaching their persuasive goals justifies the need for further exploration for more effective approaches.

Interestingly, the contemporary literature has identified humorous appeals as a more persuasive than non-humorous appeals for males for health appeals addressing AIDS and sunscreen use (Conway & Dubé, 2002; Struckman-Johnson, Struckman-Johnson, Gilliland, & Auman, 1994; see also Hastings, Stead, & Webb, 2004). Although not road safety messages, these findings are encouraging and suggest that, even for messages addressing serious health topics, positive message-relevant affect (i.e., humour) may be an alternative, effective persuasive strategy for one of the key high risk road user groups.

However, a concern that has been associated with the possible increased use of positive emotional appeals in road safety is that such appeals, relative to negative appeals, are less likely to be recalled and, thus, less effective over longer time intervals than negative appeals (Lewis, Watson, White, et al., 2007). However, other research, not from the road safety advertising context, has challenged this concern indicating that whilst negative appeals incorporating threats of physical harm may have a diminishing influence over time, positive appeals may actually become more persuasive over time. For instance, research based on messages promoting tooth brushing, found that high threats of physical harm had a persuasive advantage over other appeals (e.g., low threats of physical harm and social approval threats) on immediate post-exposure measures of intention. However, on longer-term measures of actual behaviour change, the persuasive advantage of such appeals disappeared (Evans, Rozelle, Laeter, Dembroski, & Allen, 1970). Whilst Lammers, Leibowitz, Seymour, and Hennessey (1983), utilising audio-taped advertisements for an industrial product, reported that a humorous appeal was more persuasive than a serious appeal after a delay. The authors concluded that the persuasive impact of humour cannot be measured immediately after exposure as to do so would typically reveal a persuasive disadvantage of humorous appeals relative to other messages. Rather, humour's positive impact on persuasion can only be detected after a time delay. Although not providing direct comparisons of positive versus negative emotional appeals, the Lammers et al. (1983) and Evans et al. (1970) studies, suggest that the relative effectiveness of the two appeal types may vary over time.

Although there is emerging empirical evidence supporting the potential use of positive emotion in appeals in road safety, it is important to note that compared with the substantial body of empirical and theoretical evidence that has amassed in relation to negative message-relevant affect in terms of fear-based messages, there is a relative paucity in theoretical explanations of the manner in which positive message-relevant affect influences persuasion (Nabi, 2002). Moreover, much of what is currently known about positive effect and persuasion is based upon studies of positive message-relevant affect (i.e., mood) (Petty et al., 1993). Of note however, much of this evidence has shown that positive mood may have advantageous effects for persuasion (Petty et al., 1993). Thus, the important aspect to be noted from this evidence is that experiencing a positive feeling state (albeit a diffused, long-lasting state rather than transient affective response) can evidence improved persuasive effects.

Thus, the evidence discussed suggests that there may be a persuasive advantage for using positive appeals with males. Consequently, an important contribution to the literature may be to examine the TPE (i.e., the perceived relative influence on self and others) in relation to both negative and positive emotional appeals and, in particular, to examine the extent that males may report being more influenced than others to positive appeals.

**Hypothesis 3.** In relation to the TPE and positive and negative emotional messages, it is predicted that a gender effect will be found such that males will report a classic TPE and females a reversal of the TPE in response to negative appeals. However, for the positive appeals it is expected that TPE reversals will be found for males and classic TPE's for females.

Finally, in addition to the expected gender effects in relation to the TPE, gender effects are also expected in relation to the persuasion outcomes utilised in the current study.

**Hypothesis 4.** Males will rate positive appeals as more effective in terms of the attitudinal and intentional measures than females.

In summary, the overarching aim of the current study is to explore the relative persuasiveness of positive (humorous) and negative (fear-evoking) emotional appeals for anti-drink driving messages. This aim includes examining effectiveness in terms of (i) a range of persuasive outcomes and (ii) with such measures assessed both immediately after viewing of the

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1 Conway & Dubé (2002) found this effect for high masculinity individuals. Evidence has suggested that males are typically higher in masculinity than females (Bem, 1974).
advertisements as well as after a time delay. Moreover, the study examines the extent that involvement, response efficacy, and gender influence the relative effectiveness of the different emotional appeals. Additionally, the study aims to support as well as extend upon previous evidence relating to the TIE, gender, and the relative influence of the emotional appeals.

2. Method

2.1. Participants

To participate, a current motor vehicle's licence was required. Overall, 201 (71 males, 130 females) drivers participated at Time 1. Approximately, half of the sample were aged 34 years or younger (N = 109, 54.2%). In an attempt to increase the representativeness of the participating drivers, two data collection strategies were utilised: participants completed the study on-line (N = 94, 46.8%) or with a pen and paper version (N = 107, 53.2%). The internet option was advertised through print and radio media and was intended to provide a more diverse representation of the general driving public compared with the sample offered by the pen and paper version given that the latter version was completed by students undertaking a psychology unit at a major Australian university. Some students received partial course credit for their involvement in the study.

Of the participants who completed the first questionnaire, 118 (Males = 30, Females = 88) completed the follow-up questionnaire. Of note, whilst the actual number of males and females who did not continue with the study was equal, proportionally more females (67.7%) were retained in the follow-up sample than males (42.3%). However, analyses revealed that participants who completed the second survey did not differ from participants who did not complete it on key dependent variables assessed in the first questionnaire (i.e., drink driving attitude and intentions).

2.2. Design

The study incorporated data collection via questionnaires administered at the time of exposure to the advertisements and 2-4 weeks later. At the first stage of data collection, a 2 x 2 x 2 mixed design was utilised with appeal type (positive, negative), involvement (low, high), and gender as between-groups variables and response efficacy (low, high) as a within-groups variable (to ensure that, at the end of exposure, individuals had been exposed to the same level of information and strategies provided). The dependent variables assessed in the first questionnaire were immediate-post exposure attitudes and intentions relating to drink driving whilst at follow-up, attitudes, intentions, and behaviour were assessed.

2.3. Materials

Four anti-drink driving advertisements (see Table 1) were identified from previous research (see Lewis, Watson, White, et al., 2007). These advertisements incorporated either a low or high level of response efficacy and evoked either positive emotions (i.e., the humorous advertisements evoked feelings such as being ‘amused’ and ‘happy’) or negative emotions (i.e., the fear-evoking advertisements evoked feelings such as being ‘afraid’ and ‘scared’).

2.4. Measures

2.4.1. First questionnaire

Prior drink driving behaviour was assessed using an item that asked participants whether they had driven when over the legal limit in the previous 12 months. Responses were coded into a scale of 1 (Never), 2 (Once), 3 (Twice), 4 (Three or more times).

To assess the TIE, participants indicated the extent that “you yourself would be influenced” and “other drivers in general would be influenced by the advertisement” on a scale of from 1 (Not influenced at all) to 7 (Extremely influenced). The items were derived from previous research (e.g., Lewis, Watson, White, et al., 2007; see also Duck & Mullin, 1995; Henrikson & Flora, 1999).

A composite scale of four items assessed response efficacy in terms of the effectiveness and usefulness of the information and strategies provided in the message (e.g., the advertisement provided information that would be useful to avoid situations involving drinking and driving). Responses were made on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree). The scale for both the high and low response efficacy advertisements was internally reliable (Cronbach alphas of .88 and .88, respectively).

To measure emotional responses to the advertisement participants were asked to rate, on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree), the extent that viewing the advertisement had made them feel mostly (i) positive feelings and (ii) negative feelings.

Attitude towards drink driving was measured pre-exposure and following each advertisement. Given the strong social disapproval that surrounds drink driving, participants would likely report ceiling effects if the items assessed driving after

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* Surveys submitted that were incomplete or that contained minimal missing data.
* The following instruction preceded the questions assessing emotions experienced: “the following section of questions relate to the feelings you experienced from watching the advertisement. Before continuing, please refer to the following information. NEGATIVE feelings – experiencing feelings such as sadness, anger, guilt, and fear. POSITIVE feelings – experiencing feelings such as happiness, excitement, contentment, cheerfulness.”
Table 1
Brief descriptions of ad-drink driving advertisements utilised in the study

<table>
<thead>
<tr>
<th>Ad Name</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasses</td>
<td>Negative appeal/low response efficacy</td>
<td>Empty beer glasses appear in front of the windshield one by one causing increasingly blurred vision. The car collides into the rear of a stationary truck. The wife of the driver is told by police that her husband has fallen asleep</td>
</tr>
<tr>
<td>Noser</td>
<td>Negative appeal/high response efficacy</td>
<td>&quot;Julie&quot; and her boyfriend are at her dad's birthday party. The boyfriend is shown drinking alcohol. &quot;Julie&quot; asks if she should drive because he has been drinking. Her boyfriend says that he is okay to drive. He collides with a stationary truck. Julie is shown covered in blood and lifeless. The boyfriend survives. Julie's dad has flashbacks of Julie at his party. The advertisement highlights the strategy of letting someone else, who has not been drinking, drive</td>
</tr>
<tr>
<td>Karaoke</td>
<td>Positive appeal/low response efficacy</td>
<td>Set in a bar with a karaoke machine. Intending to be humorous, the advertisement shows that the more people drink the more confident they become. The advertisement concludes, that unlike driving after drinking, singing after drinking will not kill anyone</td>
</tr>
<tr>
<td>Taxi</td>
<td>Positive appeal/high response efficacy</td>
<td>Shows the casual conversations a taxi driver experiences with intoxicated passengers. The advertisement concludes with, &quot;If you drink and drive and take a taxi, you're a bloody genius&quot;. The advertisement models an alternative, safe behaviour, namely, taking a taxi after drinking and is intended to be humorous</td>
</tr>
</tbody>
</table>

Table 2
Mean and standard deviations of self and other influence ratings by appeal type and gender for the high response efficacy advertisements

<table>
<thead>
<tr>
<th>Appeal type</th>
<th>Gender (N)</th>
<th>Self</th>
<th>Others</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>Male (39)</td>
<td>3.37</td>
<td>4.33</td>
<td>3.77</td>
<td>1.90</td>
</tr>
<tr>
<td>Positive</td>
<td>Male (32)</td>
<td>3.67</td>
<td>4.00</td>
<td>3.97</td>
<td>1.53</td>
</tr>
<tr>
<td>Female (60)</td>
<td>Self</td>
<td>5.14</td>
<td>5.00</td>
<td>5.20</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>2.04</td>
<td>2.04</td>
<td>2.04</td>
<td>1.36</td>
</tr>
<tr>
<td>Positive</td>
<td>Male (32)</td>
<td>3.67</td>
<td>4.00</td>
<td>3.97</td>
<td>1.53</td>
</tr>
<tr>
<td>Female (70)</td>
<td>Self</td>
<td>2.88</td>
<td>4.00</td>
<td>3.40</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>2.88</td>
<td>4.00</td>
<td>3.40</td>
<td>1.57</td>
</tr>
</tbody>
</table>

Table 3
Mean and standard deviations of self and other influence ratings by appeal type and gender for the low response efficacy advertisements

<table>
<thead>
<tr>
<th>Appeal type</th>
<th>Gender (N)</th>
<th>Self</th>
<th>Others</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>Male (39)</td>
<td>3.21</td>
<td>4.00</td>
<td>3.70</td>
<td>1.51</td>
</tr>
<tr>
<td>Positive</td>
<td>Male (32)</td>
<td>3.28</td>
<td>4.00</td>
<td>3.81</td>
<td>1.55</td>
</tr>
<tr>
<td>Female (70)</td>
<td>Self</td>
<td>2.53</td>
<td>4.00</td>
<td>3.57</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1.82</td>
<td>4.00</td>
<td>3.57</td>
<td>1.28</td>
</tr>
</tbody>
</table>

drinking when over the legal BAC limit. Thus, participants indicated the extent that it was unacceptable (1) to acceptable (7) and for us (1) to agree (7) to (i) drive after consuming a quantity of alcohol likely to leave you under the legal blood alcohol concentration (BAC) limit, and (ii) drive after consuming any quantity of alcohol. A composite measure was created from these four items. Cronbach's alpha ranged from 0.37 to 0.90 indicating that each scale was internally reliable. Responses were reverse scored such that higher scores indicated less favourable attitudes towards drink driving.

Intentions were measured after each advertisement. Participants were asked to indicate the extent that they intended to use strategies to reduce the risk of drink driving from 1 (Strongly Disagree) to 7 (Strongly Agree). Similar to the attitude items, it was thought that assessing participants' general intention to "do something" would be associated with less social desirability bias than items that assessed an intention such as "I intend not to drive after drinking".

Involvement was operationalised in terms of personal relevance. Specifically, participants were asked, "How relevant is the advertisement to you and your driving?". Responses were made on a scale from 1 (Not relevant at all) to 7 (Extremely relevant). This question was assessed after each advertisement and an overall measure of involvement was obtained by computing an average score of these two responses (i.e., r = 0.52, p < 0.001). A median split was then performed on the average score to form a dichotomous variable of low (M = 1.39, SD = 0.54) and high (M = 4.34, SD = 1.14) involvement.

2.4.2. Follow-up questionnaire

Attitude towards drink driving was assessed using the same items as those used in the first questionnaire and was again internally reliable (Cronbach's alpha = 0.80). Self-reported drink driving behaviour was also assessed. Participants were asked to indicate how many times, in the past 2-4 weeks, they had driven after consuming alcohol and possibly were over the legal
blood alcohol concentration (BAC) limit. Participants responded to this item on a scale of 1 (Never), 2 (Once), 3 (Twice), 4 (Three or more times).

2.5. Procedure.

All material describing the study (e.g., leaflets posted on noticeboards) including the information flyer provided to participants explicitly noted that the study was about road safety advertisements and that each participant would be viewing road safety television advertisements. Of note, the material also included a warning that some people may find the advertisements distressing and should consider whether they would feel comfortable continuing. Whilst this warning was real, it also would have contributed to the expectation that participants had of the advertisements that they were likely to see and thus, the feelings they were likely to experience. Participants in the pen and paper version completed the survey in groups with the researcher present throughout the study. All participants viewed two advertisements and viewed each advertisement once only. Participants were instructed to commence the first section of the survey immediately and once completed, then viewed the first advertisement and completed the relevant section of the questionnaire. This procedure was repeated for the second advertisement. The condition shown (i.e., appeal type) was alternated from session to session and the advertisement order (i.e., low or high response efficacy) counterbalanced.

The condition appearing on-line was rotated every few days and the advertisement order counterbalanced. For the follow-up survey, participants completed the same version of the survey that they had completed previously and surveys were matched via email addresses in the internet version and via a unique identifying code in the pen and paper condition. At follow-up, no advertisements were shown.

3. Results

3.1. Manipulation checks

To check the effectiveness of the response efficacy and appeal type manipulations, 2 (positive, negative) × 2 (low, high) mixed-design MANOVAs were conducted. For the response efficacy manipulation, a significant main effect for response efficacy was found (Wilks' $\Lambda = .90, F(1,198) = 22.15, p < .001, \eta^2_p = .10$). As expected, advertisements in the high response efficacy condition were significantly higher in response efficacy than advertisements in the low response efficacy condition ($M_s = 4.95$ and 4.43, respectively). Wilks' $\Lambda = .90, F(1,198) = 22.15, p < .001, \eta^2_p = .10$.

For the appeal type manipulation, a significant main effect for appeal type was found (Wilks' $\Lambda = .39, F(2,198) = 154.26, p < .001, \eta^2_p = .61$). As expected, participants exposed to the positive appeals reported a significantly higher level of positive feelings than participants exposed to the negative appeals ($M_s = 5.02$ and 1.70, respectively) and participants assigned to the negative appeals reported a significantly higher level of negative feelings than participants exposed to the positive appeals ($M_s = 5.98$ and 3.34, respectively).

3.2. Immediate persuasion outcomes

The effects of appeal type, response efficacy, gender, and involvement were tested in $2 \times 2 \times 2 \times 2$ mixed-design ANCOVAs with the appropriate pre-exposure variable for each respective analysis entered as a covariate. The use of a covariate avoids the use of difference scores given such scores have attracted criticism in relation to their poor psychometric properties (e.g., Humphreys, 1993; Peter, Churchill, & Brown, 1993). For each analysis, all significant results are reported in Table 4 whilst the results of all follow-up tests of significant interactions are reported in Sections 3.3.1, 3.3.2, 3.4, 3.4.1, 3.4.2. For follow-up tests, Bonferroni adjustments of alpha were made.

3.2.1. Attitude

Further examination of the significant three-way interaction (see Table 4) revealed a significant effect for individuals higher in involvement in the high efficacy condition. Subsequent pairwise comparisons revealed that the negative appeal condition was associated with significantly less favourable attitudes towards drink driving than the positive appeal condition ($M_s = 5.32$ and 4.77, respectively). The only other significant effect was the main effect for gender which revealed that males had significantly weaker (more favourable) views towards drinking and driving than females ($M_s = 4.19$ and 5.14, respectively).

3.2.2. Intentions to use strategies

The results revealed a four-way interaction approaching significance (see Table 4). Subsequent examination of this tendency revealed significant effects for males, lower in involvement, in the low efficacy condition ($F(1,112) = 7.78, p = .006$.

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4 For the analysis involving intention, consistent with evidence of the proximal relationship between intentions and behavior (i.e., Theory of Planned Behaviour; Ajzen & Fishbein, 1980) and evidence identifying past behavior as one of the best predictors of future behavior (Albarracín, Johnson, & Zanna, 2005), the pre-exposure measure of prior drink driving behavior was entered as a covariate.
as well as for females, higher in involvement in the low efficacy condition (F(1, 112) = 8.37, p = .003, η² = .08). Pairwise comparisons revealed males had significantly less intention to use strategies to avoid drinking after being exposed to the positive appeal than the negative appeal (Ms = 4.25 and 5.90, respectively) whilst females reporting higher involvement in the low efficacy condition also indicated significantly less intention to use strategies after viewing the positive appeal than the negative appeal (Ms = 4.63 and 6.73, respectively).

3.3. Follow-up persuasive outcomes

3.3.1. Attitude

The effects of appeal type, gender, involvement, and time (pre-exposure [Time 1], immediate-post [Time 2], follow-up post [Time 3]) were tested in a 2 x 2 x 2 x 3 mixed-design analysis of variance.

Further examination of the significant four-way interaction (see Table 4) revealed a significant effect for individuals who scored higher in involvement only. Subsequent pairwise comparisons revealed significant effects for both males and females in the positive appeals condition and for females only in the negative appeals condition. In the positive condition, males demonstrated a consistent and significant improvement in attitude scores over each of the three time periods with means scores at follow-up being significantly higher than scores at both pre- and immediate post-exposure (see Table 5). In contrast, whilst inspection of the means reveals that females demonstrated a similar trend of improvement over time, a significant difference was found between pre- and follow-up post-exposure only. In the negative condition, females' mean attitude scores at pre-exposure were found to be significantly lower than at immediate post- and follow-up post-exposure. Moreover, inspection of the means in Table 5 reveals that females' attitude scores at follow-up were lower than immediately after exposure indicating no further persuasive improvement over time than that achieved immediately after.

3.3.2. Driving after drinking when possibly over the limit

The effects of appeal type, gender and involvement were examined in a 2 x 2 x 2 ANCOVA with pre-exposure behaviour of driving when possibly over the legal limit entered as a covariate. Further investigations of the significant three-way interaction (see Table 4) revealed a significant effect for males reporting higher involvement only. Specifically, pairwise comparisons indicated that the positive appeal condition was associated with significantly less reported driving when possibly over the limit than the negative appeal condition (Ms = 0.96 and 1.26, respectively).

3.4. Perceptions of influence on self and others

To examine the perceived influence of the different appeals on self and others, a 2 (appeal type: positive or negative) x 2 (target of influence: self and others) x 2 (gender) mixed-design analysis of variance (ANOVA) with appeal type and gender as the between-groups variables and target of influence as a repeated-measures variable, was conducted. The dependent variable was the influence score. The high and low response efficacy appeals were analysed separately.

3.4.1. High response efficacy appeals

The results revealed significant main effects for target (F(1, 197) = 9.91, p = .002) and appeal (F(1, 197) = 8.81, p = .003), as well as the effect of gender approaching significance (F(1, 197) = 3.76, p = .054). Additionally, the 2-way interaction between

Table 4
All significant effects for immediate and follow-up persuasive outcomes by appeal, involvement, response efficacy (RE), and gender

<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>Significant Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Attitude</td>
<td>Appeal (F(1, 197) = 8.37, p = .004, η² = .08)</td>
</tr>
<tr>
<td></td>
<td>Gender (F(1, 197) = 5.70, p = .018, η² = .03)</td>
</tr>
<tr>
<td></td>
<td>Appeal x RE x Involvement (F(1, 197) = 4.33, p = .035, η² = .02)</td>
</tr>
<tr>
<td>Interventions</td>
<td>Appeal (F(1, 12) = 7.19, p = .002, η² = .06)</td>
</tr>
<tr>
<td></td>
<td>Appeal x RE (F(1, 112) = 7.54, p = .001, η² = .06)</td>
</tr>
<tr>
<td></td>
<td>Appeal x RE x Involvement (F(1, 112) = 6.31, p = .013, η² = .05)</td>
</tr>
<tr>
<td></td>
<td>Appeal x RE x Involvement x Gender (F(1, 112) = 3.78, p = .054, η² = .03)</td>
</tr>
<tr>
<td>Follow-up Attitude</td>
<td>Appeal (F(1, 112) = 8.62, p = .004, η² = .08)</td>
</tr>
<tr>
<td></td>
<td>Time (F(1, 12) = 10.31, p = .001, η² = .06)</td>
</tr>
<tr>
<td></td>
<td>Time x Gender (F(1, 12) = 4.20, p = .051, η² = .02)</td>
</tr>
<tr>
<td></td>
<td>Time x Involvement (F(1, 12) = 3.54, p = .025, η² = .03)</td>
</tr>
<tr>
<td></td>
<td>Appeal x Gender x Involvement x Time (F(1, 112) = 3.55, p = .043, η² = .06)</td>
</tr>
<tr>
<td></td>
<td>Gender (F(1, 112) = 7.55, p = .002, η² = .06)</td>
</tr>
<tr>
<td></td>
<td>Appeal x Involvement (F(1, 112) = 15.26, p = .001, η² = .12)</td>
</tr>
<tr>
<td></td>
<td>Appeal x Involvement x Gender (F(1, 112) = 8.43, p = .004, η² = .07)</td>
</tr>
</tbody>
</table>

Note: Table 4 summarises only the significant effects found for each analysis. The follow-up results for the significant interactions are reported in the relevant section of the body of results. η² or partial eta-squared is a measure of effect size, this measure of effect size is recommended when comparisons of an identical manipulation across studies that have different factorial designs are wanted and/or likely (Levine & Hullett, 2002; Pierce et al., 2004).
Table 5
Means attitudinal scores at follow-up post-exposure by appeal type, gender, involvement, and time

<table>
<thead>
<tr>
<th>Appeal type</th>
<th>Gender</th>
<th>Involvementa</th>
<th>Timeb</th>
<th>Mean</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Male</td>
<td>1.00</td>
<td>1</td>
<td>5.64</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>4.75</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>5.42</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.00</td>
<td>1</td>
<td>4.09</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>4.25</td>
<td>0.48</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4.88</td>
<td>0.44</td>
</tr>
<tr>
<td>Female</td>
<td>1.00</td>
<td></td>
<td>1</td>
<td>4.22</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>4.45</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4.54</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td></td>
<td>1</td>
<td>4.18</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>4.79</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4.68</td>
<td>0.27</td>
</tr>
<tr>
<td>Negative</td>
<td>Male</td>
<td>1.00</td>
<td>1</td>
<td>5.29</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>5.54</td>
<td>0.39</td>
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<td></td>
<td></td>
<td></td>
<td>3</td>
<td>5.48</td>
<td>0.36</td>
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<tr>
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<td>2.00</td>
<td></td>
<td>1</td>
<td>4.75</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>5.00</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>6.13</td>
<td>0.58</td>
</tr>
<tr>
<td>Female</td>
<td>1.00</td>
<td></td>
<td>1</td>
<td>3.82</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>5.46</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>5.75</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td></td>
<td>1</td>
<td>5.17</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>5.80</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>5.79</td>
<td>0.29</td>
</tr>
</tbody>
</table>

a 1 = low involvement and 2 = high involvement.
b Time 1 = pre-exposure; Time 2 = average of immediate post-exposure scores for the two advertisements; Time 3 = follow-up post-exposure.

appeal and gender was significant, \(F(1,197) = 7.12, p = .008\) which was clarified further by a significant three-way interaction between appeal type, gender, and target, \(F(1,197) = 5.42, p = .021\).

Follow-up tests revealed significant effects for influence ratings for both self \(F(1,197) = 9.77, p = .003\) and others \(F(1,197) = 7.73, p = .006\) for the negative appeal only. Pairwise comparisons revealed that males perceived significantly less influence on self than females \((M = 3.87; M = 5.12, \text{ respectively})\). Additionally, males perceived significantly less influence on others than females \((M = 4.33; M = 5.20, \text{ respectively})\). Moreover, of note, inspection of the mean scores (see Table 2) reveals that males perceived relatively greater influence on others than self (i.e., 4.33 versus 3.87) and thus, evidenced a classic TPE (subsequent significance tests revealed that this difference approached significance, \(p = .09\)). In contrast, the self and others ratings reported by females revealed no attenuation of the classic TPE (i.e., 5.12 versus 5.20, ns).

Although the univariate tests for both influence on self and others failed to reach significance for the positive appeal, some interesting and noteworthy trends emerged. The means in Table 2 show a reversal of the results found for the negative high efficacy appeal. Specifically, for males, minimal difference in perceived influence on self and others \((M = 3.57 \text{ versus } M = 4.09, \text{ respectively})\) was found indicating an attenuation of the classic TPE; however, for females, evidence of a classic TPE was found with self \((M = 3.40)\) and others' \((M = 4.33)\) influence ratings.

3.4.2. Low response efficacy appeals
The results revealed significant main effects for target \(F(1,197) = 20.58, p < .001\) and appeal \(F(1,197) = 12.25, p < .001\). Additionally, significant 2-way interactions of target x appeal \(F(1,197) = 6.14, p = .014\) and appeal x gender \(F(1,197) = 15.54, p < .001\) were found. However, these results were clarified further by a significant three-way interaction between target, appeal, and gender \(F(1,197) = 5.42, p = .021\).

Further examination of the significant three-way interaction revealed significant effects for influence ratings for self \(F(1,197) = 15.89, p < .001\) and others \(F(1,197) = 7.06, p = .008\) for the negative condition with the effect for influence on self for the positive condition approaching significance \(F(1,197) = 3.74, p = .054\). Pairwise comparisons revealed that, for the negative appeal, males perceived significantly less influence on self than females \((M = 3.21; M = 4.70, \text{ respectively})\). Additionally, males perceived significantly less influence on others than females \((M = 3.80; M = 4.60, \text{ respectively})\). Similar to the high efficacy negative appeal, inspection of the means (see Table 3) reveals that males perceived relatively greater influence on others than self \((i.e., 3.80 \text{ versus } 3.21, \text{ respectively})\) and, thus, evidenced a classic TPE (subsequent significance tests revealed that this difference was significant, \(p = .023\)). In contrast, the self and others ratings reported by females reveal no attenuation of the TPE with a non-significant difference \(p = .630\) between the mean perceived influence ratings for self and others \((M = 4.70 \text{ and } 4.63, \text{ respectively})\).

For the positive appeal, pairwise comparisons indicated that males perceived significantly more influence on self than females \((M = 3.28; M = 2.53, \text{ respectively})\). No other effects were significant. Although males reported significantly greater influence on self relative to females, inspection of the means in Table 3 reveals that, overall, males perceptions were
consistent with a classic TPE (i.e., mean scores of influence on self and others were 3.28 and 3.91, respectively and this difference approached significance, \( p = .029 \)) Similarly, the self and other influence ratings reported by females indicated a classic TPE (\( M = 2.53 \) and \( M = 3.57 \), respectively; a difference which was significant, \( p < .001 \)).

4. Discussion

The study aimed to examine the relative effectiveness of positive (humorous) and negative (fear-evoking) emotional appeals for anti-drink driving messages in terms of a range of persuasive outcome measures taken both immediately after exposure and after delay. It also aimed to investigate the impact of some key variables identified from theoretical and empirical evidence; namely, involvement, response efficacy, and gender on persuasiveness of the appeals. Finally, the study also aimed to examine the appeals in terms of their perceived influence on self and others; namely, the TPE.

4.1. Immediate persuasion outcomes

In relation to attitudes towards drink driving, the results supported the hypothesis that participants reporting higher involvement would associate the high response efficacy negative appeal with a more disapproving attitude towards drink driving than participants who viewed its positive counterpart (Hypothesis 2a). This finding may be explained by the affect-as-input explanation of affect's role (Martin et al., 1997). Because participants knew that they were going to view road safety advertisements from the outset, it could be argued that participants were expecting the advertisements to be similar to the typical negative, fear-based approach often utilised and, thus, expected to feel negative feelings such as fear and sadness. However, for those participants who viewed the positive advertisements and, thus, experienced more positive feelings, such feelings would not have been consistent with how they had expected they would feel. Consequently, they interpreted their positive affective state as indication that the advertisements had not been effective because they did not feel as they should (see Martin et al., 1997).

Whilst support was found for the affect-as-input view of affect's role in relation to individuals of higher involvement, no support was found for the hypothesis relating to the “how do I feel?” heuristic in relation to individuals of lower involvement (Hypothesis 1a). This hypothesis proposed that if participants enacted the simple “how do I feel about it?” heuristic, the positive appeals, which presumably would have made participants feel “good”, would have subsequently led them to believe that they should be persuaded by the message. It would seem that, for those individuals of limited involvement with the road safety issue, persuasion is not simply achieved by making such individuals feel good or that other peripheral cues predominated their responses to the message.

With intentions, consistent with expectations, a significant interaction was found between appeal type, involvement, and response efficacy. Additionally, gender also interacted to result in a significant four-way interaction between all the key variables. However, analysis of the simple main effects revealed findings that were inconsistent with Hypotheses 1a and 1e. Specifically, for males reporting lower involvement in the low response efficacy condition and females reporting higher involvement in the low response efficacy condition, the negative appeal was associated with significantly more intentions to use strategies than the positive appeal. The result found for males provides no support for the “how do I feel about it?” heuristic (and Hypothesis 1a) given that evidence of greater persuasion (i.e., higher intentions) was associated with the negative rather than positive appeal. In relation to response efficacy, for individuals reporting lower involvement, high response efficacy may not have been crucial to message persuasiveness given analogous evidence derived from earlier studies that weak arguments may be as effective as strong arguments (e.g., Petty et al., 1981). It is perhaps worthy to note that these persuasion outcome results appear consistent with the TPE results (see Section 4.3). The male respondents’ influence ratings for the low response efficacy, positive advertisement revealed a classic TPE whilst there appeared to be an advantage in using positive, high response efficacy appeals with males (i.e., where an attenuation of the TPE was found). Arguably, the broader implication of this finding is that, for individuals of low involvement, it would be ill-advised to rely on appeals that just aim to make males “feel good” as emotion alone is not sufficient to persuade: positive appeals with low response efficacy appear to be rated poorly by males whereas positive appeals with high response efficacy are more effective.

In relation to females reporting high involvement in the low response efficacy condition, finding stronger intentions not to drink and driving following exposure to the negative appeal relative to the positive appeal is consistent with the affect-as-input view (i.e., greater persuasion should be associated with the emotional appeal that evokes the expected negative emotions rather than an appeal that evokes the unexpected positive emotions such as humour). However, the fact that this persuasive advantage for negative appeals was found for the low rather than high response efficacy appeals is inconsistent with Hypothesis 2a and the previous literature. For highly involved individuals, elaboration on the quality of the information and arguments presented (which presumably would include consideration of the effectiveness of the strategies provided as either weak or strong) would be expected (e.g., Petty et al., 1981). Moreover, evidence derived from the fear appeal literature attests to the importance of response efficacy as one of the strongest predictors of message effectiveness (see Floyd et al., 2000). Thus, for a low response efficacy negative appeal to be regarded as more persuasive than a positive, low response efficacy alternative attests particularly to the poorer performance of the positive advertisement: a low efficacy negative advertisement should not be effective according to fear appeal theories (e.g., PMT and EPPM) and empirical evidence (e.g., Tay & Watson, 2002).
In sum, the affect-as-input view of affect's role may provide one possible explanation of the results obtained from the immediate post-exposure measures of attitudes and intentions. It appears that, immediately after exposure, there is a persuasive advantage for negative appeals. This result is consistent with previous empirical research (e.g., Evans et al., 1970). It appears that there is some support for the notion that individuals have grown to "expect" road safety advertisements to be a certain way and to make them feel certain emotions. Thus, the expectation to feel negative emotions, such as fear and sadness, were fulfilled with the negative appeals; however, with the positive, humourous appeals, feeling positive emotions was interpreted as inconsistent with expectations and, thus, the positive appeals were evaluated as less effective. This finding suggests that an important first step towards increasing the perceived effectiveness of positive appeals may be to simply increase the use of such appeals within road safety campaigns. Increasing their use may also increase individuals' expectations that positive emotions may be felt after exposure to a road safety message.

In contrast, the immediate-post exposure findings provide no support for the "how do I feel about it?" heuristic. For individuals reporting low involvement, some evidence counter to what was expected was found: the negative appeal was more effective than its positive counterpart for intentions to use strategies for males. It would seem that attempts to persuade low involved male drivers by appeals that simply aim to make them feel "good" are not sufficient to influence future driving intentions.

Other immediate exposure measures, however, such as the TPE, suggest that the positive high efficacy appeal was more effective than its low response efficacy counterpart. Thus, it would appear that not only emotional content of the message determines the effectiveness of positive appeals for males, but also the level of response efficacy incorporated within the message. The broader implication of this finding is that it appears that response efficacy is as important to positive emotional appeals as it is for negative, fear-based appeals.

4.2. Follow-up persuasion outcomes

Unlike immediate persuasion outcome measures, it was predicted that affect may function more according to the "how do I feel about it?" heuristic (Schwarz, 1990; Schwarz & Clore, 1983) for individuals reporting higher involvement (Hypothesis 2b). Support for this prediction was underpinned by previous evidence that found positive appeals are more likely to improve in persuasiveness over time (e.g., Lammers et al., 1983; see also Godart & Prigogine, 2001; Prigogine, 2004). It was predicted that, for individuals reporting higher involvement, because they could have been expected to have processed the message more centrally, these individuals would be more likely to have processed the message more elaborately. After a time delay, rather than simply recalling whether or not the emotion they felt at the time was appropriate or consistent with what they expected, perhaps it is the more general experience of having felt "good" at the time that may have been remembered (given the transient nature of message-relevant affect). The follow-up post exposure attitudinal and behavioural measures provide support for this explanation.

Consistent with predictions, the results revealed that the relative effectiveness of appeal type was influenced by the level of involvement, time, and gender as evidenced by a significant four-way interaction. Moreover, consistent with the attitude durability hypothesis of the 2LM (Petty & Cacioppo, 1986) and, as predicted, analysis of the simple effects revealed that all significant effects were found for individuals reporting high involvement only (Hypothesis 1b and 2b). These results suggest that those individuals who scored higher in involvement and whom, presumably, processed the messages centrally did have more enduring persuasive effects.

Additionally, consistent with the expectation that positive appeals would show improvement over time, evidence was found of positive appeals producing significant improvement in attitudes at follow-up. Moreover, this pattern of improvement differed by gender and appeal type. Specifically, for the positive appeals, males showed significant and consistent improvement from pre- to immediate post- to follow-up post-exposure, whereas females showed significant improvement only between pre- and follow-up post-exposure (Hypothesis 4).

In contrast, for negative appeals, the only significant effect was for females who were found to report higher attitude scores at immediate post- and follow-up post- than at pre-exposure. Of particular note, immediate post-exposure scores did not significantly differ from follow-up post-exposure and, in fact, the latter mean score was lower than the former score suggesting that the greatest improvement in attitudes was found immediately after exposure with no further improvement (in fact a decrease) over time. This finding is consistent with previous empirical research of the attenuated effects of negative appeals over time (Evans et al., 1970; see also Godart & Prigogine, 2001; Prigogine, 2004). Thus, consistent with previous research (e.g., Lammers et al., 1983) the current findings suggest that the persuasive effects of positive emotions are most likely to emerge after a time delay. The implication of this finding is that studies that examine the persuasiveness of positive appeals only in terms of immediate post-exposure measures are unlikely to provide a complete account of the persuasive effects of positive appeals.

With behaviour, consistent with predictions (Hypothesis 2b and 4), a significant interaction was found between appeal type, involvement, and gender. Specifically, males reporting higher involvement were less likely to have reported driving when possibly over the legal limit after having been exposed to the positive rather than the negative appeal. Thus, in relation

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5 A more definitive empirical test of this affect-as-input view of affect's role would be to incorporate a pre-test questionnaire in which participants would provide information on what they regard to be a "good" road safety advertisement in terms of the emotional content it incorporates and the emotional responses that it evokes. We thank an anonymous reviewer of our article for this suggestion.
to self-reported drink driving behaviour; a significant reduction was found from pre-exposure measures of past behaviour to behaviour reported at follow-up. The results obtained revealed a number of consistencies with predictions. First, the significant simple effect was found for individuals higher in involvement (i.e., those individuals more likely to engage in central processing and thus evidence more enduring persuasive effects). Second, consistent with the expectation that positive appeals would show improvement over time, the only significant effect was found for the positive appeal condition. Third, it was expected that males would show evidence of a persuasive advantage for positive appeals.

Arguably, this finding is particularly encouraging given that it is a behavioural outcome measure (albeit self-report). The inclusion of a behavioural measure reflects the attempt to assess more practically significant outcomes which is pertinent in the health advertising context given that most campaigns aim to motivate longer-term health behaviour change (Job, 1988). Indeed, it represents a notable strength of the current study that a measure of behaviour, as opposed to behavioural intentions, was obtained. Although intentions are significant predictors of behaviour, the existence of the "intention-behaviour gap" highlights the fact that intentions are not perfect predictors of behaviour (Sniehotta, Scholz, & Schwarzer, 2005). Further research is necessary to support this finding as well as to ascertain whether messages addressing other risky driving behaviours such as speeding, are able to report a similar persuasive advantage for behavioural outcome measures with males. In summary, at follow-up, the persuasion outcome measures of attitudes and behaviour provide evidence that the function of affect changes over time.

4.3 TPE results

As predicted (Hypothesis 3), the current study's results supported previous empirical evidence (i.e., Lewis, Watson, & Tay, 2007) with females demonstrating an attenuation of the classic TPE and males demonstrating a classic TPE, for negative appeals of both high and low response efficacy. Thus, similar to the conclusions drawn by Lewis, Watson, and Tay, 2007, the TPE results derived in the current study have significant theoretical and practical implications. Theoretically, the findings highlight that the TPE is a factor possibly mediating the effectiveness of fear-based appeals. Derived from the communication literature, the TPE has received limited attention in the fear-based literature. Whilst it has been acknowledged that a myriad of factors, including individual difference and situational factors, influence the effectiveness of fear messages (Witte & Allen, 2000), the TPE is demonstrating itself to be a robust phenomenon in relation to impacting upon the effectiveness of fear-based appeals.

In an applied context, these findings highlight that despite many physical threats being designed to target male road users (Tay, 2002), such appeals, whilst being rated as personally influential by females, are more likely to be regarded by males as more influential to some "other" third-person rather than oneself. Given that males are at a greater risk of being injured or killed in a road crash than females, it appears that current persuasive appeals may not be the most effective means of delivering road safety messages. The current study provides some evidence of alternative approaches that may be effective.

More specifically, the current study also extended upon the previous TPE research by examining the TPE in relation to road safety appeals incorporating positive emotion. To the authors' knowledge, few studies have examined the TPE in relation to humorous or positive emotional messages addressing a serious health topic. As predicted (based on previous empirical evidence not examining the TPE and positive messages but, positive messages and persuasion outcomes; e.g., Conway & Dubé, 2002) the results indicated that, for humorous appeals, males reported an attenuation of the TPE whilst females reported a classic TPE. This finding represents a reversal of the perceived self and other influence ratings reported by males and females for negative, fear-based appeals. In other words, in relation to self and others influence, there appears to be a persuasive advantage for using positive appeals for males.

Additionally, the current findings reflect the importance of response efficacy in relation to positive appeals. Specifically, evidence of the attenuation of the classic TPE for males was found only for the high response efficacy positive appeal. In the low efficacy condition, both males and females reported significant classic TPEs. To date, limited evidence is available in relation to what types of appeals response efficacy is important for and what types of additional information positive appeals may require (see Dillard & Nabi, 2006). Consequently, these TPE results provide important extensions to contemporary understanding by highlighting the importance of response efficacy for positive appeals and by identifying the third-person perceptions as an additional factor mediating the influence of not only negative appeals but also positive appeals.

4.4. Strengths, limitations, and future research

Overall, the current study offers a number of significant contributions to the literature. First, it provides further evidence of the gender differences in relation to the impact of the TPE in relation to negative, fear-evoking appeals. Further, the study extends current understanding of the impact of the TPE in relation to positive emotional messages for health advertising. Second, the current study provides a direct comparison of the relative effectiveness of positive, humour-evoking and negative, fear-evoking health messages over time rather than only immediately after exposure. As such, the current study provides insight into the relative duration of the persuasive effects of different emotional appeals in the health advertising context. Additionally, the comparison is based on a range of persuasion outcome measures including attitudinal, intentional, and behavioural change, thus providing insight into the manner in which emotional appeals exert their persuasive effects. Although previous studies have compared the effectiveness of positive and negative appeals, not all included outcome measures taken over time nor for a range of measures (e.g., Brooker, 1981). Moreover, the study represents one of only a limited
number of studies that have compared the persuasiveness of positive and negative messages addressing the same behaviour (i.e., drink driving) within the road safety advertising context.

Third, as noted previously, much of what is currently known on the role of emotion in relation to attitude change has been based on affect defined in terms of mood. In such mood studies, manipulations to mood are made prior to the exposure to a persuasive message and this methodology is distinctly different from the impact of affective responses generated from the persuasive message itself. Thus, the current paper furthers understanding of message-relevant affect beyond what is currently known and based predominantly upon negative (i.e., fear) message-relevant affect.

Finally, the study does provide further support for the need to consider the effect of gender when examining the persuasiveness of health messages. However, whilst the study does contribute to the growing body of evidence highlighting the importance of gender it does not provide explanation for the presence of this gender effect. Thus, an important aim for future research may be to better understand this effect through relevant theorising such as Eagley (1987) social role theory (see also Putrevu, 2001 for an review of the origins of behavioural and processing differences for males and females) or methodological approaches (see Fisher & Dubi, 2005; Putrevu, 2001). Such improved understanding may facilitate the development of more appropriately targeted messages for particular audiences.

The study has limitations that should be acknowledged. The first limitation relates to the lack of a neutral emotion condition (i.e., advertisements incorporating limited or no emotional content such as informational only advertisements). The inclusion of such a condition would improve the validity of the results through the provision of a baseline measure with which the relative effectiveness of positive and negative appeals could be compared. It should be noted, however, that considerable research already attests to the persuasive advantage of emotional appeals relative to non-emotional, fact-provoking appeals for health campaigns addressing various issues including road safety (Elliot, 1993) and AIDS/HIV (Hota & Malik, 1990). A second limitation relates to the fact that the study was based only on affect defined in terms of a positive versus negative dichotomy. A growing body of literature is supporting the need for emotion to be considered in terms of discrete emotions (see Dillard & Peck, 2000). To the extent that the current study attempts to raise research interest in relation to positive message-relevant affect, it is hoped that further studies are conducted that support or challenge suggestions of the manner in which message-relevant affect may function under different conditions of involvement.

A third limitation is that our results are based on two advertisements per participant. Consequently, it is possible that our results reflect specific responses to other characteristics of these advertisements that we did not anticipate or measure. A fourth limitation is that positive emotion was operationalised only in terms of humorous appeals and, thus, the extent to which the current results would generalise to other types of positive emotions, such as pride, is unknown. There remains much unexplored in relation to positive emotional appeals, not only in road safety, but within health campaigns more generally. Thus, future research should aim to examine different types of positive emotional appeals.

We also note that there are particular limitations associated with aspects of the study's measures as well as the nature of the sample and, in particular, how representative the sample is of the general driving population. In relation to the measure utilised, all were self-report in nature. Additionally, while the current study adopted one of the more common conceptualisations of the involvement construct in terms of personal relevance (see Roser, 1990), it is important to note that there is still debate surrounding how best to define involvement. Moreover, even when involvement has been conceptualised as personal relevance, evident disparity exists in relation to the actual measures adopted (see Roser, 1990). Indeed, criticism has been directed at the various conceptualisations of the construct that have emerged and which have resulted in numerous operationalisations (see Rossiter, Donovan, & Jones, 2000). The involvement measure would benefit from further refinement within the applied health advertising context. Also, the current study's measurement of the construct was limited due to the adoption of a single item measure. Despite the use of such a measure, the inclusion of the involvement construct was based on a substantive body of theoretical and empirical evidence which has identified the construct's importance for determining the role that affect may play in persuasive messages (e.g., Petty & Cacioppo, 1986; Petty et al., 1993).

A final limitation of the current study is that it focused more on the relative persuasive outcomes of positive and negative appeals as opposed to the persuasive process of such appeals. Thus, given the relative dearth of explanatory frameworks for the operation of positive message-relevant affect, future research should focus on explaining the persuasive process of positive appeals with the aim of explaining how and when (and why) humour and other positive emotions may work in health advertising.

The overarching aim of the current study was to provide an empirical comparison of the relative persuasiveness of positive and negative emotional health appeals. Overall, the study highlights that positive appeals may play a role within the array of strategies that advertising practitioners draw upon in future campaigns with a particular and notable advantage for males.

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6. Although our early sessions of the experiment included a neutral condition, this condition was discontinued after preliminary analysis indicated that the advertisements were evoking significant negative emotional responses. This finding emerged despite pre-testing which identified the advertisements as neutral.
advertisements in the study. The reader is reminded that each advertisement was designed as a component of a larger campaign composed of other strategies including advertising and traffic law enforcement. Support from the Motor Accident Insurance Commission of Queensland is gratefully acknowledged.

References


Research Results Digest 322

PUBLIC INFORMATION AND EDUCATION IN THE PROMOTION OF HIGHWAY SAFETY

This digest is an interim deliverable from NCHRP Project 17-33, "Effectiveness of Behavioral Highway Safety Countermeasures," which is being carried out under a contract with Preusser Research Group, Inc. under the direction of David F. Preusser (Principal Investigator). It was prepared by Allan F. Williams, Preusser Research Group, Inc. This digest assesses the role of public information and education programs in contributing to behavior change in the highway safety area, and indicates possible future directions.

INTRODUCTION

Public information and education (PI & E) programs have been used extensively in the highway safety field, although many programs have been of poor quality. Even high-quality programs rarely work by themselves in changing individual behavior; their contribution is greater when combined with other prevention efforts in support of law enforcement or as part of broader-based community programs. Money allocated to PI & E programs should be concentrated on high-quality programs incorporating elements likely to be successful in changing individual behavior. It is also important that PI & E programs be used to promote and support effective policies that, once implemented, have permanent effects on the population as a whole.

PI & E programs have been widely used to provide information about health issues and to encourage healthy behavior. Public information programs and education programs have the same goals. Public information programs are typically referred to as mass media programs, because that is their usual method of delivery—through television, radio, the Internet, and print (newspapers, brochures, and pamphlets). Most education programs involve direct, face-to-face contact with a specific audience. Both types of communications can be stand-alone efforts or part of broader programs, such as community-based programs or enforcement programs. Sometimes both public information and education messages are used in the same program.

Increased knowledge about a health issue often results in a more informed public and shapes attitudes. This is important in that it can help set the public agenda, establishing the problem as one of concern, and providing support and impetus for laws and other means for addressing the problem. An even more ambitious goal is to change individual behavior through public information and education; the subject of the present paper. An assessment will be made of PI & E programs that have been used in the highway safety field and their effects on behavior; suggestions for future directions will be offered.

Behavior change is a common goal in various health areas, including those dealing with tobacco, alcohol, and other drug use. In
addressing highway safety issues, it should be possible to learn from PI & E techniques that have been used in other health areas, even though each has its own characteristics that affect the approach and the likelihood of success. For example, regarding tobacco use, the desired behavior is not to smoke or to quit if you do. One technique is to try to inoculate pre-teens against social pressures they will soon face to take up smoking. However, virtually everyone drives, so it is a matter of how, not whether, you drive. The behavioral goals are to drive in ways that avoid crashes: paying attention, obeying traffic laws, driving “defensively,” not driving when fatigued or impaired by alcohol, and protecting oneself against injury through restraint and helmet use.

Motor vehicle crashes stem from multiple causes, but most involve some degree of driver error, and the relationship between driver behavior and crashes is clear and immediate. In other health areas—for example, tobacco use—the relationship between the behavior and unwanted health outcomes is not as clear and not as immediate. The obvious link between behavior and crashes is one reason there has always been an emphasis on changing driver behavior, although there are other ways to reduce crashes and their consequences through vehicle design enhancements and sound engineering/environmental practices. The latter are essential elements, and the field has evolved to incorporate a more balanced approach, guided by the Haddon Matrix, which includes behavioral, vehicle, and environmental factors, as well as pre-crash, during-the-crash, and post-crash options. However, behavior change approaches remain prominent and popular.

DRIVER BEHAVIOR DIFFICULT TO CHANGE

There are many factors that make driver behavior difficult to change. Safe driving practices and protective behaviors like seat belt use have to be done on each trip, so programs that have only a short-term life are basically worthless. Moreover, most people know how they are supposed to behave on the highways; it is not a matter of lack of knowledge. What people actually do, however, is governed by attitudes, motivations, lifestyle factors, and assumptions about risk, and veteran drivers have well-developed habits that pose a challenge to change.

Secondly, it is known from risk perception research that in very familiar activities there is a tendency to minimize the possibility of bad outcomes as a way of allaying personal concerns (7). People underestimate risks that are supposed to be under their control, insulating themselves by creating “illusory zones of immunity” around everyday activities (2). This sense of subjective immunity is bolstered by most people’s beliefs that their own driving skills are superior (3). Crashes happen, but they happen to other drivers. This helps to explain why communicating information about the statistical likelihood of being in a crash does not necessarily motivate people to change their driving behavior (4).

Drivers tend to underestimate the likelihood they will be in a crash, but if they collide with someone, most believe it will be the other driver’s fault (5). We want other drivers to behave on the highways so they do not threaten us, and in that context, safety messages are for others, not ourselves. People in general have an “optimistic bias,” thinking that they are less likely than others to suffer misfortunes (6). Not surprisingly, in a number of health realms, including highway safety (7), the so-called “third-person effect” is encountered—people viewing health messages as being for others but not themselves (8). This may be even more of a factor in regard to highway safety messages, due to the psychological tendency of people to protect themselves by minimizing the possibility of harm resulting from the everyday activity of driving.

Finally, crashes—especially serious ones—are rare events; therefore, speeding, driving while impaired, running red lights, and other dangerous and illegal behaviors generally have no downside. In this sense, people are rewarded every time they complete a trip involving these and other actions.

Taken together, these factors pose significant barriers to efforts to influence highway safety behavior through PI & E programs, and point to the importance of paying more attention to risk communication science in shaping messages to the public (9). Public information and education programs are intended to “inform” and to “educate,” but they are also usually meant to influence people to take specific actions. How successful are they at doing so?

IMPORTANCE AND USE OF EVALUATIONS

Many PI & E programs have been conducted in the highway safety area over the past several decades, so there should be a good basis for knowing how successful programs of various types have been in changing people’s behavior. Unfortunately, the vast majority have not been evaluated, so it is not possible to know if they work as intended. Unevaluated programs cannot contribute to the science of behavior
change programs. People may assume that if the program does not work, at least it will not do any harm. However, when proper evaluations have been conducted, some programs have been found to have negative outcomes. For example, a bicycle education program in Australia produced harmful effects, probably by inadvertently encouraging risk taking (10). This is unusual, but it makes clear the importance of evaluation in guiding the field away from programs that somehow encourage what they are intended to discourage.

A second problem is evaluations that are deficient in scientific quality, such as the simplistic "before-after" studies that dominated the early days of highway safety research. Such studies fail to control for the many factors that can influence any changes found. Some studies involve comparisons of a self-selected group with a non-participating one. Biased comparisons of this sort can produce positive outcomes, because those volunteering to participate are often a lower crash-risk group to begin with. Volunteers also are sometimes people who are motivated to get help and introduce some change in their lives. Programs are more likely to work with people who want to attend, or want to change.

Positive outcomes resulting from inadequate evaluations are invariably interpreted as proof of effectiveness and used to promote the program. These self-serving exercises persist, although guides for the proper conduct of highway safety research have been available for many years (11, 12). Recently, an excellent guide for evaluation of driver education programs has been made available to state administrators and operators of driver education programs, and this deserves wide circulation (13).

When competent evaluations have been done, it is not difficult to find examples of programs that have either had no effect, or short-term effects that dissipate quickly. This is the case for education programs as well as public information and mass media programs, and for both highway safety behavior and behavior in other health areas (14–22). This situation is disappointing, but it provides a body of knowledge and a basis for determining how programs might be improved, instead of merely repeating variations of programs that have failed in the past.

**WHY SHOULD I CHANGE MY BEHAVIOR?**

One important factor in persuading people to change their behavior is the message delivered to them. Fear messages have been a staple in the health education field, used extensively to try to convince drivers to take appropriate actions. It seems natural to use a fear or threat approach. People obviously do not want to be in a serious motor vehicle crash or be injured or killed, and these are possible consequences of not performing recommended behaviors on the highway. So why not try to use this as a motivation to shape behavior?

There is divergence of opinion on the use of fear or threat messages in health education. For example, Job (23, p. 163) stated, "Evincing today, a large number of health promotion campaigns are based on a simple strategy: get behind people with a big stick (lots of threat and fear) in the hope that this will drive them in the desired direction. Unfortunately, in the case of health promotion, this strategy has met with little success." On the other hand, others have concluded that some level of induced fear is an important, even essential motivator, and a review of the recent literature on fear messages yielded the conclusion that "The single most important finding is that threatening messages have their greatest effect on behavior or intentions if they convince the audience that they are personally vulnerable to the negative consequences if they continue to adopt risky behaviors" (24). The challenge is to identify the optimal type of threat that is personally relevant. Witte and Allen (25, p. 591) note: "Although considerable laboratory research has shown that fear appeals (persuasive messages that arouse fear) motivate behavior change across a variety of behaviors, public health researchers and practitioners continue to contend that fear appeals backfire."

There is a vast literature on the effects of messages that aim to arouse fear, and the results are mixed. Fear appeals seem to work best when combined with high-efficacy messages such as, "Here is something concrete you can do right now to alleviate the danger." However, fear messages can also produce defensive responses, motivating people to do things to avoid the fear but not the danger. This is especially the case when fear appeals are combined with low-efficacy, generalized messages—"drive defensively" is one example. One way to dodge the fear message is to judge that it is more appropriate for someone else (the third-person effect), and there is concern that rejecting fear messages may make people even more resistant to changing their behavior in the future, especially if they perceive the fear message to be exaggerated (26).

There are other types of behavior change messages that have been used. It has been suggested that an
alternative to fear messages, more appropriate in some cases, is positive appeals that model safe behavior and evoke such emotions as humor (27). One example tested was an ad set in a karaoke bar in which the influence of drinking on singing is illustrated. The message was that the more people drink the more confident and louder they become, but that unlike drinking and driving, drinking and singing will not kill anyone. Focus groups tended to support this approach (27). In general, attempting to motivate people with current rewards, including social approval, in preference to holding out the prospect of (often distant) negative consequences, is recommended (28, 29). However, there do not seem to be many examples of this approach in the highway safety area (30). Other messages include fear of harm to others, attempting to stigmatize people who put themselves and others at risk, and the threat of legal sanctions, a special case that will be discussed later. Unfortunately, there is not enough comparative research that would support conclusions as to what type of message is most persuasive for various target groups. To date, there has been limited investigation of the relative effectiveness of the modeling of "safe" driving with the modeling of negative "unsafe/illegal" driving in the highway safety context (31).

PUBLIC INFORMATION PROGRAMS

Limitations

Many have pointed out the limitations of public information or mass media programs in changing behavior when used alone. DeFonj and Wallack (1999) note, "Although mass media can be used to raise awareness and set the public agenda, producing meaningful changes in behavior is usually dependent on the more intensive application of resources at the community and interpersonal level." Public information programs obviously have their place, and the literature is full of recommendations for producing quality programs, including careful pre-testing of the message, delineation of the target group, designing appropriate messages, making sure the messages actually reach the target group (which usually involves paid advertising), and delivering the messages in sufficient intensity over time (32, 33, 34, 35, 29, 28, and 26). These principles are incorporated in "social marketing," to be discussed later.

Many public information programs in the highway safety field, however, have not addressed these criteria, and generally have been of poor quality, consisting of passive messaging, sloganeering, exhorting people to do or not do some behavior, and delivered to an undifferentiated audience over the short term. The simplistic assumption is that if individuals are made aware of behaviors that will enhance their personal health and safety and they are urged to adopt these behaviors, they will do so. Although seemingly logical, this sequence of events is unlikely to happen; nevertheless, the message may reinforce or increase awareness of the health issue being addressed. It is well established that information-only programs are unlikely to work, especially when most of the audience already knows what they are supposed to do (35, 36, 37, and 29). Thus highway safety messages conveyed in signs, pamphlets, brochures, and buttons may reinforce social values, but are unlikely to have any effect on behavior.

Cases in which Public Information Programs Are Effective

There are cases in which public information programs have changed behavior, particularly in situations where there is "new" knowledge. The best example is the changeover in child seating positions in vehicles to avoid air bag inflation injuries. This was a new knowledge situation, and it also involved fear of injury plus a concrete step to reduce the fear. The dramatic shift of children to rear seats was largely driven by public information programs (38).

In other cases of public information successes, the amount of gain has been small and fleeting, and the cost often high. For example, an intensive public information program in Greece increased seat belt use, but the overall gain was only from 5 percent to 10 percent use, at an estimated cost of three million U.S. dollars (39). A public information program in Tennessee, following all of the recommended guidelines for the conduct of mass media programs, found a decrease in at-fault crashes for teenage drivers, but only for the very brief period when the program was up and running (40).

Public Information in Combination with Other Behavior Change Elements

Public information programs have an important role to play in producing behavior change when combined with other elements, as a part of broader-based community programs, or in support of law enforcement. Much progress has been made in the highway
safety field using public information programs to publicize intensive law enforcement efforts. The best examples are from restraint use programs, both child restraints (41) and particularly adult seat belt use, through “Click It or Ticket” programs. The original “Click It or Ticket” program in North Carolina featured an aggressive enforcement campaign and an intensive paid advertising campaign focused on the likelihood of getting a ticket for nonuse of seat belts. This combination was credited with producing substantial increases in belt use (42). Subsequent research has confirmed that it is the combination of publicity and enforcement that maximizes gains, and that enforcement used alone has lesser effects (43). Experience with seat belt enforcement programs across the country has provided empirically based guidelines for message clarity and optimal intensity, placement, and timing of media efforts in conjunction with enforcement (44).

A recent review by the Centers for Disease Control (CDC) indicated that high-quality mass media programs addressing alcohol-impaired driving can work in reducing alcohol-related crashes, when implemented in conjunction with other ongoing prevention activities (45). This conclusion was based on eight studies done in Australia, New Zealand, and the United States that met minimum criteria for study design. Included was a study based on the Australian Transport Accident Commission’s ads displaying grisly crash scenes, considered by many to be the ultimate in scare tactics (46). However, it has been pointed out that these ads are far different from typical fear messages because they do not focus on fear of harm to oneself, but on the remorse of individuals who have injured others, and on the distressing effects on others as a result of the driver’s injury or death (30). Interestingly, CDC found no differences in effectiveness measures in terms of the type of message used, whether it was based on legal or social and health consequences. The authors caution that the media campaigns represented a highly select sample, that the results cannot be generalized beyond the high-quality, high-intensity campaigns examined, and that there is no evidence that they will be effective if implemented in environments where strong existing programs such as enhanced law enforcement are not present.

There have been several programs that have successfully induced behavior change through focused efforts involving a coalition of community groups (47-51). Program activities vary, but they typically involve a broad range of groups, including health care professionals, educators, law enforcement, government agencies, private industry, and service clubs. Public information programs have been an integral part of these efforts and are considered essential in making known the rationale, goals, and activities of the campaign; keeping the campaign in the limelight; and reporting on progress.

Good examples of community-based highway safety programs involving mass media (and education programs) come from areas involving children—addressing booster seat and bike helmet use (52, 53). Programs were aimed at both parents and children. Both were multifaceted community coalition programs involving extensive public information programs using all available media outlets. The booster seat program was described as an example of social marketing. The booster seat program included education programs for parents; the helmet campaign involved school-based education for children as well as education for adults. Both programs included mechanisms for reducing the cost of the booster seats and bicycle helmets. The booster seat program was aided by the fact that it included “new” knowledge; focus groups conducted prior to the program indicated a substantial lack of information or even misinformation about booster seats. Other studies of booster seat promotion, based on education sometimes combined with free seats or significant discounts, have also reported increases in booster seat use (54).

The two community-based programs were successful in achieving higher use rates. However, in both cases, the vast majority were not performing the desired behavior. Bicycle helmet use increased from 5 percent to 16 percent, compared with an increase of 1 percent to 3 percent in comparison non-program communities; booster seat use rose from 13 percent to 26 percent, versus 17 percent to 20 percent in comparison communities.

**EDUCATION PROGRAMS**

**The Importance of Context**

A face-to-face encounter allows the relevant audience to be engaged directly. This offers a more promising opportunity to change behavior than public information approaches. There is no question that under the right conditions, educational programs can change behavior. One of these conditions is that the communicator has control over something of importance to the audience. The classic example of this in the highway safety field is the alcohol education
program at Lackland Air Force Base, conducted in the early 1960s, featuring educational messages depicting driving after drinking as sick behavior (55). Some powerful sanctions were available for noncompliance, including psychiatric referral or discharge, which no doubt accounts for the program's success in reducing crashes. Employer situations in general are fertile ground for introducing education programs. There is evidence, for example, that some such programs have increased seat belt use, at least in workplace locations (36, 37). However, almost all such programs were conducted in pre-law, lowbelt-use environments, and the effect of workplace programs on belt use in today's environment has not been determined.

**Limited Success when Change Is Voluntary**

Usually, behavior change is more voluntary and thus more difficult to influence. Education programs in the highway safety field have addressed drinking and driving, seat belt use, and general driving styles. As in the case of public information programs, success has been limited. Reviews of traditional drinking and driving programs have found no evidence of positive effects (38). A review of educational programs addressing seat belt use—most taking place in health care settings—found some evidence of increased use, but the median gain was only 4 percentage points found right after or during the program (59).

**Shaping Driving Styles through Driver Education**

The bulk of health education programs take place in schools, where students are a captive audience; this approach also provides access to a population that does not have well-developed health-related habits. This is true in the case of driving, where most do not begin until they obtain a learners permit, generally at age 15 or 16. Driving behavior typically is not included in school-based health education curricula. Thus, driver education programs in school (or commercial programs) have had the dual purpose of teaching young people how to drive and pass the driving test and inculcating safe driving attitudes and practices, all over a limited time period. Understandably, the latter goal often gets short shrift in this process. Although driver education instructors try to influence safe driving, the lecture format has been the traditional approach and there has been an absence of theory-based behavior change approaches. It is quite clear from the literature that rational/information programs do not work well in inducing behavior change, and that successful programs have to be interactive in nature (35, 37).

**Fear Approaches with Young People**

There are some special issues using fear/threat/scare tactics with young people. The fear approach has been a tradition in driver education, with films depicting serious car crashes and injuries. It also has been used extensively in anti-drinking and driving programs, typically centered around proms and graduations. Some of these programs use extreme scare tactics featuring fake deaths, mock death notifications, and mock funerals. Programs of this type have been referred to as "health terrorism" (60). They have not been evaluated but are unlikely to have any effect other than a short-term emotional response (36, 24, and 61). Adolescents are particularly likely to react to severe threats by discounting the likelihood of the negative outcome occurring to them, inculcating themselves, and high-risk youth are most likely to reject such messages (24). Moreover, risk communications to young people are difficult because risk has attractions for them, and they tend to assess risk in terms of opportunity for gain rather than opportunity for loss (24). Focus groups and interviews with young drivers suggest that many are tired of fear messages, have heard it all before, think these messages are condescending to youth, and are inured to shock messages, given the media they are routinely exposed to (27).

**Advances in Health Education Programs**

As noted earlier, many traditional, short-term, school-based programs dealing with tobacco, alcohol, and other drug use have not worked well. However, there have been significant enhancements in such programs in recent years. There are modern health education programs that are successful in influencing young people, although the gains are usually modest, not necessarily long lasting, or the duration of effects is unknown because only short-term follow-up is done. Many of these are longer-term, comprehensive programs, contrasting with traditional programs that focus on the individual and put the burden of change on the individual, while overlooking influences from family, peers, and the community. Successful programs also tend to be based on behavior change theories, and take into account the steps thought to compose the behavior change process: precontempla-
tion, contemplation, preparation, action, and maintenance (62). Project Northland is illustrative of these approaches, where a school-based program intended to reduce alcohol misuse featured education starting in grade 6 and continuing through grade 12. It included refusal skills training, a parent involvement component, peer leadership opportunities, and community level changes in terms of alcohol availability (63). Other studies using variations of this model have also successfully reduced alcohol misuse (64). In these programs, school-based education is but one component of a broader program that taps into community resources.

There also has been a trend away from information-only, lecture-oriented programs in favor of interactive methods. What generally seem to work are longer-term programs that teach skills needed to resist social influences to smoke, misuse alcohol, or take illegal drugs; involve active social learning methods, including role play, behavior rehearsals, and group discussion; involve peer opinion leaders; and include parents in the influence process (65–68, 47, 69, 37, and 70). The effectiveness of using peers in program delivery is not totally clear, although it appears that peers alone are more effective than when teachers and peers share this task (69).

Social Norming

Social norming programs have most frequently been used in college settings to attempt to reduce alcohol use. The premise is that students drink more than they would otherwise because of the misperception that other students drink heavily (71). Providing more objective information about consumption patterns is expected to provide motivation to reduce drinking. This is a promising approach, taking advantage of the strong peer influences that exist among young people. Evidence is building that the social norming approach can reduce alcohol consumption on college campuses (72, 73, and 74), although there is some evidence to the contrary (75).

Directions for Highway Safety Education

The highway safety field can learn from advances in health education programs in other areas. As pointed out earlier, there are important differences between health education and safety education. In health education, the goal is to teach young people what not to do (such as not smoking or using drugs), whereas many of the relevant highway safety programs teach young people what to do (such as driving defensively). Still, resistance skills training would be appropriate regarding drinking and driving, peer pressure not to use seat belts, and in dealing with the various factors that make teens traveling with other teens such a high-risk activity. In 2005, 53 percent of 14-year-old vehicle passengers killed and 66 percent of 15 year olds were traveling with teenage drivers, indicating early onset of this problem. A strong argument could be made that driving styles and seat belt use might be profitably addressed in earlier years, before a person starts to drive.

In one study of social norming, a small decline was found in the percentage of drivers who had positive blood alcohol concentrations (72). The applicability of the social norming technique to drinking and driving among young people, and other driving behaviors such as speeding and risk taking, needs further exploration.

Driver education courses are required in many states in order to obtain a license prior to age 18; even where not required, it is thought that most beginners should take the courses. A basic foundation of driver education is driver skills training, but those who design driver education programs are well aware of the importance of attitudes and motivations in crash involvement. There are programs developed in Scandinavia and elsewhere that focus on attitudinal-motivational skills, known as "insight" training programs (76). However, these programs tend to be short term, often just one session, and thus far programs that have tried to change driving behavior by addressing lifestyle factors have not been successful (77, 78). It may be necessary to fold driver education into a broader community-based program, as has been done in other health areas. One approach would be (a) to integrate skills and insight training programs (or other behavior change programs based on social learning theory) into a program that would include well-publicized programs involving parents and police to encourage proper driving and (b) to enforce graduated licensing rules, with involvement of teens in this process (79). So far this has not been tried.

Modern Drinking and Driving Educational Programs

Advances in health education programs in the broader health education field have begun to be incorporated in drinking and driving programs. In a
recent review of the literature by the CDC, it was noted that “many of the more recent school-based programs... are either explicitly theory-based, or incorporate theory-based concepts, such as peer intervention, social deviance, education inoculation, and risk skills training” (80). This is a step forward.

The adoption of modern behavior influence techniques in drinking and driving programs has led to limited success. One program dealing with alcohol misuse, which included resistance skills training, was also evaluated for its effects on highway safety outcomes. Reductions in drinking offenses were found that were marginally statistically significant, although only for the first year, and there were no effects on crashes (81). A program that included brief, personalized group discussions found positive effects on self-reported drinking after drinking, but the effects were not maintained beyond 6 months (82). The CDC identified nine studies aimed at reducing drinking and driving that met standard criteria for scientific evaluations, and concluded that there was insufficient evidence to determine their effectiveness (80). CDC also evaluated programs intended to influence riding with a drinking driver and found evidence of effectiveness, based on self-reported behavior.

Programs for Parents

Another developing area for highway safety education programs involves programs targeting parents. The approach is to try to help parents become more involved in the driving behavior of teens, in terms of enforcing and supplementing graduated licensing rules and monitoring their teens. One promising technique is the Checkpoints Program, which uses modern behavior change theory to attempt to convince parents to adopt and maintain restrictions on teen driving during the first year of licensure. The program has been successful in influencing parents’ reported behavior, although there has been no direct effect on crash involvement (83). Another novel program, involving two 90-minute home meetings with families before and after teens were licensed, attempted to improve communication between teens and parents about driving issues, to improve driving-related decision skills, and to assist in developing parent-teen contracts about driving rules and consequences. Teens subsequently reported fewer risky driving incidents than a comparison group, and were more likely to have negotiated contracts about driving, although there were no effects on crashes (94).

SOCIAL MARKETING

Social marketing has been in vogue for many years and is highly regarded. For example, Maibach and Holtgrave (6, p. 220) state, “Social marketing is perhaps the most developed approach to public health communication.” They also note how social marketing has resisted simple definition by quoting Ling et al. (85, p. 342), who describe social marketing as “a social change management strategy that translates scientific findings into action programs.” It is further explained that social marketing “attempts to persuade specific target audiences to adopt an idea, practice, and/or product through a variety of approaches and channels of communication combined in an integrated, planned framework.” The lack of specificity in these definitions and descriptions leaves many unclear as to what exactly social marketing is and how it is differentiated from other behavior change approaches. This uncertainty is compounded by the use of the term to describe some programs not ordinarily thought of as social marketing, for example, the “Click It or Ticket” seat belt enforcement program (86).

Social marketing basically involves the application of commercial marketing strategies to the promotion of social goals—selling health behavior. Its concepts, methods, and terminology are drawn from the marketing literature. It is a consumer-driven strategy, based on the perceived wants and needs of the target audience, and requiring considerable information on characteristics of the target audience (87, 88). Maibach and Holtgrave (6) attribute its attractiveness to the fact that it is consumer driven; in contrast with traditional, paternalistic approaches to public health, and takes into account the self-interested perspective of the target group. The idea is to create benefits and reduce barriers that matter to a specific group. This involves not so much an attempt to change people as to build an offering around their wishes, based on the notion that there is competition among behaviors. As Smith (86, page 39) elucidates, “Perhaps social marketing’s principal contribution to social change is the notion that voluntary human behavior is achieved through an exchange of value. It argues that people change not only because they are well informed or forced into action, but also because they get something in return. The process of behavior change in social marketing attempts to reduce the cost and increase the benefits of the new behavior.”

Social marketing has its critics. For example, Job (23) argues that little can be expected from social marketing in the health area, because in com-
mercial marketing, already existing motivations need to be channeled, whereas in attempting to change health behavior—for example, to encourage proper driving—the motivation must be induced as well as channeled.

In simplest terms, social marketing is an approach for developing consumer-oriented programs. It makes extensive use of mass media and behavior change principles in delivering the message. The term “social marketing” is in vogue in the highway safety field and is used to describe a wide variety of public information efforts, some of which have little to do with social marketing. In practice, social marketing is a highly sophisticated behavior change program, involving a carefully profiled and segmented audience, based on demographics, geography, psychographics, and behavioral variables; consumer testing and feedback; and carefully honed messages—often innovative and creative—intended to resonate with the target audience. Incorporating these elements to the extent possible will benefit any program designed to persuade people to change their behavior. The social marketing movement has led to increased sophistication in the design and execution of behavior change programs, whether or not those programs use social marketing jargon. One example of its use in the highway safety field has been in increasing the use of alternative transportation by young, male bar patrons (89).

DISCUSSION

PI & E programs have been used extensively in the highway safety field. What is their appropriate role and what should be done to maximize their impact? Many programs have been of poor quality. These include mass media programs that are short term and simplistic—basically, exhorting people to take some recommended action—and education programs based on lecture format, without any behavior change theory. Such programs may reinforce social values, but they are unlikely to affect individual behavior. Highway safety education programs are only beginning to adopt modern behavior change principles that have been used in other health education areas. Thus, high-quality PI & E programs are a goal.

Used alone, even high-quality programs have had little success in changing individual behavior. An exception is when they have been used to promote “new knowledge”; for example, putting children in rear seats to avoid air bag inflation dangers. PI & E programs best contribute to behavior change and play an essential role when combined with other ongoing prevention activities, in support of law enforcement, or as one element of broader-based community programs. There are unrealized opportunities in the highway safety field to use some of the techniques that have proved successful in other health areas, such as resistance skills training and integrating driver education programs addressing skills, motivations, and attitudes with broader-based programs involving parents, police, and teen peers.

Notably, even when PI & E programs contribute to individual behavior change, the effects are typically modest and not necessarily long lasting. Moreover, many successful behavior change programs are one-time events applied to a single community or other discrete population, which limits effects. This contrasts with policy-level changes (such as taxes, laws, and environmental changes) that once instituted apply permanently to wider populations. Money allocated to PI & E programs should be spent on those likely to contribute to individual behavior change, but PI & E programs also have a critically important role in promoting effective policies that have permanent effects on the population as a whole.

CONCLUSIONS

Never assume that a PI & E program will be successful. In fact, most PI & E programs do not lead to a measurable reduction in crashes or injuries.

Never assume that a PI & E program will do no harm. Some well-meaning educational programs, albeit a very few, actually lead to more crashes and injuries. Moreover, the implementation of a program that does not work will limit the amount of resources available for programs that can make a difference.

Too often, PI & E programs have been implemented on the naive assumption that merely urging people to adopt health-enhancing behaviors for their own good will lead them to do so. We now have substantial research and evaluation evidence to indicate that this approach will fail, although it allows program organizers to think that they are dealing with the problem and to take credit for doing so. Rather, we should implement only those programs that follow the research evidence with regard to unsuccessful versus successful PI & E programs.

Characteristics of unsuccessful programs include the following:

- Passive messaging that is communicated by signs, pamphlets, brochures, and buttons.
Slogans that give simple exhortations for people to behave in certain ways to avoid undesirable outcomes.

- Education programs that are lecture-oriented, information-only in nature.
- Short-term programs that have low-intensity messages.
- Use of extreme fear or scare techniques, especially when directed at adolescents. Fear messages are given without communication of concrete steps that can be taken to avoid the danger.

Here are some characteristics of successful programs:

- Public information programs that involve careful pre-testing of messages, delineation of the target group, and making sure the messages reach the target group.
- Longer-term programs that deliver messages in sufficient intensity over time.
- Public information programs that communicate health knowledge not previously well known.
- Public information implemented in conjunction with other ongoing prevention activities—for example, in combination with law enforcement programs—publicizing the enforcement presence and results of the enforcement.
- Public information and education included as part of broader-based, longer-term community programs.
- Education programs based on behavior change models, using interactive methods to teach skills to resist social influences through role playing, behavior rehearsal, and group discussion.
- Fear messages combined with concrete steps people can take to avoid the danger.

REFERENCES


A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns

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The fear appeal literature is examined in a comprehensive synthesis using meta-analytical techniques. The meta-analysis suggests that strong fear appeals produce high levels of perceived severity and susceptibility, and are more persuasive than low or weak fear appeals. The results also indicate that fear appeals activate adaptive change decisions such as message acceptance and maladaptive fear control actions such as defensive avoidance or counterattack. It appears that strong fear appeals and high-efficacy messages produce the greatest behavior change, whereas strong fear appeals and low-efficacy messages produce the greatest levels of defensive responses. Future directions and practical implications are provided.

Although considerable laboratory research has shown that fear appeals (persuasive messages that arouse fear) motivate behavior change across a variety of behaviors, public health researchers and practitioners continue to contend that fear appeals backfire.7-9 Given these conflicting viewpoints,7-9,16 the purpose of this article is to provide a comprehensive review and update of the fear appeal research. The focus in this work will be on the empirical analysis and synthesis of more than 100 fear appeal articles. This analysis updates Stetson's7 and Butter and Mongeon's9 (and Mongeon's10 limited update) fear appeal meta-analyses and examines several variables previously unexamined in meta-analyses (such as threat and efficacy interactions and fear control outcomes). An update of previous work is needed because there has been a tremendous increase in the number of fear appeal articles in the past dozen years.

FEAR APPEAL THEORY: 1953 TO THE PRESENT

Across the nearly 50 years of research on fear appeals, three key independent variables have been identified: fear, perceived threat, and perceived efficacy. Fear is defined as a negatively valenced emotion, accompanied by a high level of arousal.18 Fear was the primary focus of research from 1953 to about 1975. Perceived threat and perceived efficacy are two variables that are essential for fear to function as a fear appeal. The literature suggests that fear appeals are most effective when they are perceived as threatening and efficacious. These two variables interact to produce the desired behavior change.

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were first identified as important variables by Rogers in 1975 and 1983. Perceived threat is composed of two dimensions: perceived susceptibility to the threat (i.e., the degree to which one feels at risk for experiencing the threat) and perceived severity of the threat (i.e., the magnitude of harm expected from the threat). While fear and threat are conceptually distinct (the former is emotion, the latter is cognition), they are intricately and reciprocally related, such that the higher the perceived threat, the greater the fear experienced. Perceived efficacy also is composed of two dimensions: perceived self-efficacy (i.e., one's beliefs about his/her ability to perform the recommended response), and perceived response efficacy (i.e., one's beliefs about whether the recommended response works in averting the threat). Typically, fear appeal researchers manipulate the strength of a fear appeal in at least two different messages (one strong, one weak), validate the different strengths of fear appeals through manipulation checks (items that assess fear arousal, to be a successful manipulation, these fear arousal items must differ significantly between the strong vs. weak fear appeals), and assess whether the stronger fear appeal produces stronger outcomes than the weaker fear appeal. The outcomes studied in fear appeals appear to fall into two general classes: (1) outcomes related to acceptance of the messages' recommendations (i.e., attitudes, intentions, behaviors in line with the recommendations) and (2) outcomes related to rejection of the message (i.e., defensive avoidance, reactance, denial). Fear appeal studies have addressed the most pressing public health issues by focusing on a wide variety of disease prevention/health promotion behaviors such as condom usage to prevent HIV/AIDS, smoking cessation, reduction of alcohol usage while driving, promotion of flossing for dental hygiene, tractor safety behaviors, using sunscreen to prevent skin cancer, breast self-examinations, exercise promotion, and so on.

Throughout the years, there have been several fear appeal reviews and theories offered. Appendix A provides a brief description of the major reviews of the literature. The appendix shows that early reviews tended to be critical essays that identified conceptual, operational, and methodological issues, which might account for the disparate results in the literature. Whereas later reviews applied quantitative methods to analyze the fear appeal literature, as in the meta-analyses of Boster and Mongeau, Stiff, and Mongeau. Several reviews discussed the effective use of fear appeals within a disciplinary framework such as marketing and public health. Recent reviews have concentrated on extending previous theoretical perspectives, distinguishing between different models, or broadening the scope of fear appeals to include other emotions.

Appendix B provides a brief description of the fear appeal theories. Fear appeal theories have tended to build one upon another and reflect the major perspectives of the time period in which they were developed. For example, early fear appeal theories tended to be grounded in learning theory perspectives, which were popular at the time. Beginning in the 1970s, cognitive/behavioral theories gained favor in fear appeal theories, mirroring the cognitive revolution in the social sciences. More recently, there has been a return to the study of emotion as a driving force in behavior change theories and a concurrent return to a focus on emotion in fear appeal theories. Overall, fear appeal theories can be classified into three major groups, according to Dillard: drive theories, parallel response models, and subjective expected utility (SEU) models. Each group of theories will be briefly reviewed in order. In addition, Witte's extended parallel process model (EPPM), which integrates these three previous perspectives into one theory, will be discussed separately.
Drive Theories

The earliest fear appeal research used variations of drive theories to explain results. Drive theories (i.e., Haviland et al.'s fear-as-acquired drive model, Janis's family of curves, and McGuire's nonmonotonic models) suggest that the level of fear arousal produced by a fear appeal acts as a drive to motivate actions. However, it was argued that fear could have both facilitating (e.g., motivate appropriate self-protective responses) and interfering (e.g., avoidance) effects. Overall, drive theories suggested an inverted U-shaped relationship between fear and attitude change in which a moderate amount of fear arousal was thought to produce the most attitude change. This class of theories was rejected during the early 1970s due to a lack of support for the inverted U-shaped model. Additionally, the most prominent of these theories—the fear-as-acquired drive model—was rejected because the model's central hypothesis, that acceptance of the message occurs when fear is reduced, was not supported. Attention then turned to explaining emotional versus cognitive responses to fear appeals.

Parallel Response Models

In 1970, Leventhal proposed, but never explicitly tested, the parallel response or process model. The parallel process model suggests that fear appeals produce two separate and potentially interdependent processes: danger control processes (efforts to control the threat/danger) and fear control processes (efforts to control one's fear about the threat/danger). While Leventhal failed to explicitly state when danger control and fear control processes would be initiated, and while the model was subsequently criticized as lacking specificity and being untestable, the model did change current thinking about fear appeals and separated emotional from cognitive processes. Wite later returned to Leventhal's framework as the basis for her theory (to be discussed later). Beginning about the mid-1970s, other researchers continued to examine the "danger control" or cognitive/rational side of the model.

SEU Models

SEU models, such as Rogers's protection motivation theory (PMT), Beck and Pinesel's threat control explanation, and Sutton's SEU model, attempted to assess in a logical manner what made a fear appeal effective. These models were noted for their cognitive focus. The original and revised versions of Rogers's PMT were the first to identify the components of a fear appeal and the cognitive mediators leading to message acceptance. Fear was given a tangential role in Rogers's work (it was thought to be related to perceptions of severity only). Rogers proposed a four-way interaction between the dimensions of threat and the dimensions of efficacy (i.e., Severity x Susceptibility x Response Efficacy x Self-Efficacy) but ultimately failed to find support for this hypothesis. However, studies testing PMT typically found that at least one threat variable (i.e., severity and/or susceptibility) interacted with at least one efficacy variable (i.e., self-efficacy and/or response efficacy) to influence message acceptance outcomes such as attitude, intention, and behavior change. Overall, if one examines the threat variables and efficacy variables as a whole instead of by their separate dimensions (e.g., threat = susceptibility + severity; efficacy = response efficacy + self-efficacy), PMT appears to do a good job of explaining when and why fear appeals work (i.e., perceptions of high threat...
and high efficacy appear to produce the most message acceptance. However, PMT fails to explain when and why fear appeals fail.

While fear was accorded a trivial role in PMT (it was thought to be related to perceptions of severity only), it was virtually ignored in Sutton’s SRU model.3 In this model, Sutton argued that people choose from competing alternatives a course of action that has the greatest SLEU. Tests have produced little support for the SRU model.21,22 For example, Sutton and Eiser concluded in one study that there appeared to be “no evidence for the multiplicative combination of utilities and subjective probabilities” (p. 14).21 Furthermore, they found that across studies, fear offered the most reliable influence on intentions, even though it was not an explicit part of the model.

EPPM

The most recent fear appeal theory, Witte’s EPPM,43 traces its lineage through the classic fear appeal theories. Leventhal’s model forms the basis of the theory.44 PMT explains the danger control side of the model (i.e., when and why fear appeals work),44,45 and portions of Janis and McGuire’s explanations can be accounted for under the fear control side of the model (i.e., when and why fear appeals fail).46–48 The EPPM explains both successes and failures of fear appeals, and fear is reincorporated as a central variable in the model.

According to the EPPM, the evaluation of a fear appeal initiates two appraisals of the message, which result in one of three outcomes. First, individuals appraise the threat of an issue from a message. The more individuals believe they are susceptible to a serious threat, the more motivated they are to begin the second appraisal, which is an evaluation of the efficacy of the recommended response. If the threat is perceived as irrelevant or insignificant (i.e., low perceived threat), then there is no motivation to process the message further, and people simply ignore the fear appeal.

In contrast, when a threat is portrayed as and believed to be serious and relevant (e.g., “I’m susceptible to contracting a terrible disease”), individuals become scared. Their fear motivates them to take some sort of action—any action—that will reduce their fear. Perceived efficacy (composed of self-efficacy and response efficacy) determines whether people will become motivated to control the danger, to control their fear about the threat. When people believe they are able to perform an effective recommended response against the threat (i.e., high perceived self-efficacy and response efficacy), they are motivated to control the danger and consciously think about ways to remove or lessen the threat. Typically, they think carefully about the recommended responses advocated in the persuasive message and adopt these as a means to control the danger. Alternatively, when people doubt whether the recommended response works (i.e., low perceived response efficacy) and/or whether they are able to do the recommended response (i.e., low perceived self-efficacy), they are motivated to control their fear (because they believe it’s futile to control the danger) and focus on eliminating their fear through denial (e.g., “I’m not at risk for getting skin cancer, it won’t happen to me”), defensive avoidance (e.g., “This is just too scary, I’m simply not going to think about it”), or reactance (e.g., “They’re just trying to manipulate me, I’m going to ignore them”).

In sum, the EPPM suggests that perceived threat contributes to the extent of a response to a fear appeal (i.e., how strong the danger or fear control responses are) whereas perceived efficacy (or lack thereof) contributes to the nature of the response (i.e., whether danger or fear control responses are elicited). If no information with regard to the efficacy of the recommended response is provided, individuals will rely on past experiences and
prior beliefs to determine perceived efficacy. It is critical to note for the purposes of the meta-analysis that the dimensions of threat (i.e., severity and susceptibility) are additive, as are the dimensions of efficacy (i.e., response efficacy and self-efficacy), but the relationship between threat and efficacy is multiplicative.

Previous Meta-Analyses

At least three meta-analyses have been conducted on the fear appeal literature. Boster and Mongeau\(^4\) and Mongeau\(^5\) examined the influence of a fear appeal on perceived fear (the manipulation check; i.e., did the strong vs. weak fear appeals differ significantly in their influence on measures of reported fear), attitudes, and behaviors. They found that on average, fear appeal manipulations produced moderate associations between reported fear and strength of fear appeal \((r = .36\) in Boster and Mongeau and \(r = .34\) in Mongeau\)) and modest but reliable relationships between the strength of a fear appeal and attitude change \((r = .21\) in Boster and Mongeau and \(r = .20\) in Mongeau\)) and the strength of a fear appeal and behavior change \((r = .10\) in Boster and Mongeau and \(r = .17\) in Mongeau\)). Surmen\(^6\) used a different meta-analytic statistical method (\(z\) scores) and reported significant positive effects for strength of fear appeal on intentions and behaviors. None of the meta-analyses found support for a curvilinear association between fear appeal strength and message acceptance. Overall, the previous meta-analyses suggested that fear appeal manipulations work in producing different levels of fear according to different strengths of fear appeal messages. Furthermore, the meta-analyses suggest that the stronger the fear appeal, the greater the attitude, intention, and behavior change.

The present meta-analysis will update and expand on these results by assessing the relative fit of the data to each fear appeal model and examining the influence of fear appeals on both intended (i.e., attitudes, intentions, behaviors) and unintended (i.e., defensive avoidance, reactance) outcomes.

META-ANALYSIS

Rationale

Meta-analysis is a quantitative method that synthesizes the results of a particular group of studies. Researchers gather all available studies on a topic and then combine these studies statistically to produce an average effect for different variables across the literature. It allows one to see the "big picture." \(^8\) Meta-analysis provides a thorough and objective synthesis of the literature that is needed as the literature becomes larger and the issues become more complex. For example, a quantitative analysis not only allows one to establish that one message strategy (or even a level of a message strategy) is more persuasive but also suggests certain explanations as to why some message designs are more effective than others. Furthermore, meta-analysis allows one to examine combinations of message features in a systematic way. Meta-analysis, by establishing consistency in research, can eliminate some possibilities and point out ways of assessing or comparing theories, determine future research agendas by identifying areas of weak or insufficient literature that require additional exploration, and call attention to areas that need further theorizing to explain conflicting results.
Conduct

Literature Search

A complete search of all relevant fear appeal articles was conducted. First, computer databases (e.g., PSYCHLIT, Social Sciences Index, Dissertation Abstracts, etc.) were searched for fear appeal articles with the following keywords: fear appeal, threat appeal, scare tactic, shock tactic, risk message, risk perception, risk communication, negative message, protection motivation, fear, and threat. Second, reference lists of all manuscripts were examined and missing works collected. Third, personal letters were sent to fear appeal researchers across the nation asking for any recent works on the topic (>40 letters). Articles that cited fear appeal work, used traditional fear appeal methods and measures, and varied the level of either fear or threat in a message were retained for analysis.

To be included in this meta-analysis, fear appeal studies needed to manipulate fear or threat in a fear appeal message (i.e., there had to be at least two levels of a fear appeal in an experimental or quasi-experimental design so that one could assess whether the stronger fear appeal produced significantly stronger fear arousal than the weaker fear appeal). Cross-sectional surveys that simply measured perceptions and correlated them with persuasive outcomes were not included in the meta-analysis. The goal of this meta-analysis was to examine how people reacted (both perceptually and persuasively) to fear appeal messages. Ninety-eight studies met the criteria for inclusion in the meta-analysis. (All coding information for the main effects and the interaction effects for each study are available from the authors upon request.) Ninety-three studies were included in the main effects analysis. Twenty-three studies were used in the interaction analysis. Finally, thirteen studies were used in the fear control response analysis (note that Jepson and Chaiken (1995) is a two-study report).

Several studies were excluded from the meta-analysis for the following reasons: (1) features of the message not were manipulated (i.e., nonexperimental design); (2) false physiological feedback was used to manipulate arousal instead of message feature; (3) attitude- or behavior-dependent measures were not used; (4) data were reported in other studies used in the meta-analysis (i.e., did not want to count a single study's effects twice); (5) the study did not vary the level of fear/threat; (6) manipulation check failed (e.g., the items checking perceived threat and/or fear did not differ significantly for strong vs. weak fear appeals); and (7) data were presented in a manner in which the effects were not statistically recoverable.

Coded Features

First, each study was coded for sample size and topic by two independent coders. Second, the definitions presented in the introduction were used to classify whether a study assessed perceived fear, perceived severity, perceived susceptibility, perceived response efficacy, and perceived self-efficacy. Third, effect size was extracted from each study by two independent coders for (1) message effects on perceived fear, perceived severity, perceived susceptibility, perceived response efficacy, and perceived self-efficacy; (2) message effects on attitudes, intentions, and behaviors; (3) effects from perceived fear, perceived severity, perceived susceptibility, perceived response efficacy, and perceived self-efficacy on attitudes, intentions, and behaviors; and (4) interaction effects between perceived severity, perceived susceptibility, perceived response efficacy, and perceived
Table 1. Effects of Fear Appeal Message Features on Perceptions

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</table>

NOTE: k = number of studies, N = number of research participants. *p < .05.

Self-efficacy on attitudes, intentions, behaviors, defensive avoidance, and derogation/criticism. Disagreements were virtually nonexistent because the terms used above are fairly standard across fear appeal research and because investigators tend to use similar, if not identical, measures of these constructs. However, it is important to note that we a priori defined our variables and then classified each variable in the individual studies according to our definitions, even though the investigator may have called the variable something different. For example, “reassurances” might be measured with items such as “Brushing my teeth effectively prevents tooth decay” or “Flossing prevents tooth decay.” These items are consistent with our definition of response efficacy (i.e., ascertaining beliefs about whether the recommended response works in preventing the threat) and would be classified as such in the meta-analysis. Thus, instead of simply using the label provided by the investigator, we examined the operationalizations of each variable to assess which variable was actually being measured according to our definitions. Most studies reported an F or t statistic, which was converted to r or f for analytical purposes. All individual effect sizes were corrected for artifacts, specifically attenuated measurement, dichotomization of variables, restriction in range, and regression to the mean (formulas found in Hunter and Schmidt15). Investigators comparing their specific results to our meta-analytic estimates should first correct their results for the same artifacts to get an accurate comparison between their data and our results. Those using the meta-analysis to generate sample size and power estimates should take into account the above-mentioned artifacts as well. In extracting effects, a 0 was entered in a data column when there was no significant effect and no directional data given and 1/2 p, or p = .50 was entered when the results were not significant and the direction was known.

RESULTS

Main Effects of Message Features on Perceptions

This section reports the main effects obtained for each message feature due to the level of fear appeal. The results in Table 1 indicated that the stronger the fear appeal, the greater the fear aroused, the greater the severity of the threat perceived, and the greater the susceptibility to the threat perceived. Similarly, the stronger the efficacy message, the stronger the perceptions of response efficacy and self-efficacy.
Table 2. Effects of Message Feature on Attitudes, Intentions, and Behaviors

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Severity</th>
<th>Susceptibility</th>
<th>Response Efficiency</th>
<th>Self-Efficacy</th>
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<td>Attitudes</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>$k$</td>
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<tr>
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<td>34.28*</td>
<td>22.23*</td>
<td>16.74</td>
<td>20.46</td>
</tr>
</tbody>
</table>

**NOTE:** $k$ = number of studies, $N$ = number of research participants.

*p < .05.

These results indicate that fear appeals produce moderate effects for fear arousal, large effects for perceived severity, and moderately large effects for perceived susceptibility. The results also indicate that efficacy messages produce fairly large effects (efficacy manipulations are similar to fear manipulations in that fear is a successful efficacy message manipulation, there must be significant differences between the efficacy items on a survey for a strong vs. weak efficacy message). The heterogeneity found in these results is expected given that individual investigators vary widely in their fear appeal manipulations. Further tests indicated a significant correlation between year of study and the size of the manipulation such that newer studies obtained larger manipulation effects than did older studies ($r = .13, p < .05$). This finding suggests the possibility that later studies more carefully and specifically constructed and manipulated their messages, with the result being stronger manipulations, presumably leading to stronger effects.

### Main Effects of Message Features on Message Acceptance Dependent Variables

Table 2 shows that all of the message feature manipulations—fear, severity, susceptibility, self-efficacy, and response efficacy—result in greater positive levels of attitude, intentions, and behavior change. Response efficacy and self-efficacy exhibit heterogeneous effects; all other observed effects are heterogeneous. This heterogeneity indicates that one should cautiously interpret the average correlation because a moderator variable influencing acceptance of a message may exist. This caution may be tempered by the fact that the effects of the variables are all positive, indicating that the moderator variable moderates between a higher and a lower positive correlation rather than between a positive and a negative correlation. Thus, the expected relationship between the theoretical
variables of interest and the outcome variables should be in the same direction even if significant moderator variables are discovered.

No evidence was found for any kind of curvilinear relationship between fear appeals and outcomes. The shape of the effects is most consistent with a positive linear-shaped function ($\gamma = .509, p < .0001$). There is no support for hypothesized negative linear effects ($\gamma = .509, p = .999$), a U-shaped function ($\gamma = .554, p = .957$), or an inversed U-shaped function ($\gamma = .554, p = .999$).

In sum, the stronger the fear appeal, the greater the attitude, intention, and behavior changes. Similarly, the stronger the severity and susceptibility in the message, the more attitude, intention, and behavior changes. Finally, the stronger the response efficacy and self-efficacy in a message, the stronger the attitudes, intentions, and behaviors toward the recommended response.

**Interactions Between Variables**

Interactions between threat and efficacy were examined in a two (high and low threat) by two (high and low efficacy) design. PMT and the EPPM consistently collapse severity and susceptibility into a single variable called threat, and consistently collapse response efficacy and self-efficacy into a single variable called efficacy. At least two studies have demonstrated with factor analyses that severity and susceptibility are separate dimensions that combine to compose a higher order factor of threat, and that response efficacy and self-efficacy are separate dimensions that combine to compose a higher order factor of efficacy. Therefore, studies were included in the analyses only if they used at least one type of threat (i.e., susceptibility and/or severity) and one type of efficacy (i.e., self-efficacy and/or response efficacy) variable. Studies using more than one type of threat or efficacy had the effects averaged. This approach yielded 23 studies appropriate for the interaction analysis.

Four cells were created: high threat-high efficacy (HTHE), high threat-low efficacy (HTLE), low threat-high efficacy (LTHE), and low threat-low efficacy (LTLE). A z score was calculated for each cell mean compared with the grand mean. A positive z score indicated a value greater than the overall mean, and a negative z score indicated a value less than the grand mean. (The representation of the values for each of the cells of the studies is available from the authors upon request.)

The next step was to conduct a standard 2 x 2 analysis of variance. The analysis indicated a significant main effect for threat, $F(1, 117) = 32.75, \eta = .468, \eta^2 = .22, p < .05$, and efficacy, $F(1, 117) = 16.17, \eta = .357, \eta^2 = .13, p < .05$, and a nonsignificant interaction effect, $F(1, 117) = 1.17, p > .05$. The use of the least squares distribution and Tukey's post hoc tests ($p < .05$) for significant differences between cells found that the HTHE group ($M = .40, SD = .49$) had a significantly greater persuasive effect than the HTLE ($M = .07, SD = .31$) and the LTLE ($M = .03, SD = .30$), which did not differ significantly from one another. The LTLE ($M = .27, SD = .44$) resulted in significantly less persuasive effects than all of the other groups.

Additionally, two effects-coded models were examined: an additive model and the EPPM model. The additive model treated the effect of threat and efficacy as separate and independent, such that higher levels of each would produce greater means. The HTHE group was coded as having the highest mean, the HTLE and LTLE groups were coded as having means equal to each other but lower than the HTHE mean, and the LTLE group was coded as having the lowest mean. The additive effects-coded model fit the data, $F(11, 12) = 6.83, \eta = .542, \eta^2 = .394, p < .05$. 


The second model used effects coding consistent with EPPM predictions (note that these tests also may be appropriate for the PMT model, except that the PMT does not make specific predictions about what causes fear appeals to fail). According to both the EPPM and PMT, the HTHE group should have the highest mean. The other three groups should produce lower means that are relatively similar. Specifically, the EPPM suggests that low-threat messages with any level of efficacy produce weaker responses to fear appeals when compared to HTHE messages, since low-threat messages fail to motivate action. HTHE messages also are hypothesized to have weaker effects on attitudes, intentions, and behaviors, since they motivate qualitatively different actions (such as defensive avoidance) that interfere with attitude, intention, or behavior changes. Therefore, HTHE conditions often mimic the low-threat responses to the fear appeal—even though they may be producing strong fear control responses such as defensive avoidance. In addition, the HTLE group may even produce boomerang effects, although this is less common. The EPPM effects-coded model fit the data, $(112) = 5.47, \eta = .459, \eta^2 = .211, p < .05$.

In sum, both the additive model and the EPPM model appear to fit the data. An examination of the cell means tends to favor the additive model over the EPPM, however. Specifically, the additive model suggests that higher levels of each variable would lead to more persuasiveness. Indeed, the means indicate that higher levels of both threat and efficacy, in their various combinations, lead to more persuasion (e.g., the high-high groups are more persuasive than the groups with high-low combinations, which are more persuasive than the low-low groups). The EPPM suggests that HTHE would be the most persuasive and that the low-threat groups should not be significantly different from each other. The EPPM also suggests that the HTLE group would either be no different from the low-threat groups or even result in negative effects. The results indicate only partial support for the EPPM. Specifically, the HTHE group is the most persuasive and the low-threat groups (LTIE, LTLE) are the least persuasive. However, while the HTLE group is not significantly different from the LTIE group (as expected), it is significantly more persuasive than the LTLE group (which is not expected). Overall, the additive model receives the greatest support in these analyses.

Moderator Analyses—Trait Anxiety

A wide variety of variables have been studied in connection with fear appeals. However, typically no more than three to four studies exist for each variable. Similarly, no key moderator variable has emerged as theoretically important when examining the effects of fear appeals (except perceived efficacy). A search for moderator variables without theoretical guidance would be unwise because of the large numbers of variables studied in connection with fear appeals; we would simply be capitalizing on chance for our analyses. However, there does appear to be at least one variable with a critical mass of studies that has the potential to be theoretically important in the persuasive effect of fear appeals: trait anxiety. Trait anxiety, or one's characteristic level of anxiety with regard to personal threats, has also been variously labeled repression-sensitization or avoider/cooper in the literature (for a thorough review of this literature, see Witte and Muisson). One's characteristic level of anxiety has been hypothesized to affect how one processes fear appeals, such that one's trait level of anxiety may influence how one reacts to strong fear appeals (if one is scared and characteristically anxious, then the fear appeal may backfire).

The effect of trait anxiety directly on persuasive outcomes, as well as a moderator of persuasive outcomes, was examined. The results indicate that trait anxiety is unrelated to persuasive outcomes ($r = .015, n.s., k = 9, N = 2,729, \chi^2 = 15.21, 95\%$ confidence interval
(CI) = ±1.16). That is, one's level of trait anxiety is not associated with attitudes, intentions, or behaviors toward recommended responses. Similarly, the interaction between trait anxiety and fear appeal does not significantly influence persuasive outcomes ($\tau = 0.07$, n.s., $k = 8$, $N = 2,645$, $\chi^2 = 3.78$, 95% CI = ±1.16). Thus, it appears not to matter whether individuals are anxious or repressors by nature; their response to fear appeals is not affected by their level of trait anxiety.

Fear Control Responses

The analyses heretofore have focused on danger control responses (i.e., attitudes/intentions/behaviors leading to message acceptance). Previously, no meta-analysis has assessed the degree to which fear appeals produce fear control responses. Fear control responses are defined as those reactions that occur when an individual uses psychological defense tactics to resist a message. Previous studies have called psychologically based motivated resistances to messages “defensive avoidance,” “issue derogation,” “minimization,” “denial,” “perceived manipulation,” “wishful thinking,” and so on. Fear control responses appear to be highly intercorrelated and have been treated as a single construct in Witeck and more recently in Smulec. In each of these studies, reliability of the overall fear control (defensive responses) measure was good.

Thirteen studies could be found that assessed the relationship between strength of a fear appeal and defensive/resistant responses (note that Jepson and Chaiken is a two-study report). (The studies used in this analysis, their effects, and the type of fear control/resistant response measured is available from the authors upon request.) The results indicated that as the fear appeal increases in strength, so do defensive responses ($r = 0.195$, $p < 0.05$, $k = 13$, $H_0 = 1.431$, $\chi^2 = 8.59$, n.s., 95% CI = 0.155). In addition, the weaker the efficacy message, the greater the fear control (response ($r = -0.105$, $p < 0.05$, $k = 8$, $H_0 = 1.035$, $\chi^2 = 7.22$, n.s., 95% CI = 0.595). Furthermore, defensive responses are negatively correlated with danger control responses ($r = -0.18$, $p < 0.05$, $k = 7$, $N = 955$, $\chi^2 = 0.0$, n.s., 95% CI = 0.19). These findings tell us that fear appeals appear to produce one of two competing responses—either self-protective actions (such as attitude, intention, and behavior changes) or defensive responses—and that these responses are inversely related. Because these two responses cancel each other out (i.e., if one is defensively responding to a fear appeal and rejecting it, one is not making attitude, intention, or behavior changes), it is difficult to tell whether danger control or fear control processes are dominating unless one has measured and/or manipulated perceived efficacy.

DISCUSSION

Consistent with previous meta-analyses, this study suggests that the stronger the fear aroused by a fear appeal, the more persuasive it is. For example, the fear manipulation-attitude correlation was .12 in Boster and Mongeau, .20 in Mongeau, and .14 in this study (Stawin's study used a different type of analysis with a combined z score that is not comparable to the correlation). Similarly, we found a correlation between the fear manipulation and behavior at .13, compared with Boster and Mongeau's .10 and Mongeau's .17. While Boster and Mongeau did not assess the influence of fear manipulation on intentions, our study indicates that the relationship is within the range of the other danger control responses at .11. Overall, fear appears to have a relatively weak but reliable effect on attitudes, intentions, and behaviors. The differences between the findings of
our meta-analysis and the previous meta-analyses may be accounted for by the more consistent and careful operationalizations of attitudes and behaviors in recent studies. For example, the early studies measured attitudes in a wide variety of ways. These measures may not have been comparable, and some attitude measures may actually have measured intentions. More recent research has consistently defined attitudes as evaluations of certain behaviors, intentions as one's intentions to perform a certain behavior, and behaviors as self-report indicators of the degree to which one did what the recommended response advocated. It is interesting to note that in this meta-analysis, the effects of the fear manipulation on attitudes, intentions, and behaviors were relatively consistent (i.e., .44, .11, .15, respectively).

The specific message features in fear appeals also appear to have moderately low but reliable effects on attitudes, intentions, and behaviors in this meta-analysis. Specifically, severity and susceptibility manipulations produced effects on persuasive outcomes in the range of .11 to .17. Response efficacy and self-efficacy manipulations produced slightly stronger effects on persuasive outcomes, in the range of .13 to .18. These findings indicate that specific attention should be given to these message features in future fear appeal studies because each produces positive persuasive effects.

It should be noted that the strength of each of these correlations is rather low and that significant heterogeneity exists for nearly all of the findings. This heterogeneity suggests that there is a significant moderator variable that may explain why some fear appeals work better than others. However, the results indicate that all of the defined message features in fear appeals produce positive results. Thus, any moderators will only further explain the differences between two types of positive outcomes (i.e., strong and weak), not between positive and negative outcomes. Future research should focus on identifying plausible moderators.

Individual differences do not appear to have much influence on the processing of fear appeals, given the results of this meta-analysis and other studies. This meta-analysis tested trait anxiety both for its persuasive impact and as a moderator with fear (i.e., a fear by anxiety interaction). In both cases, trait anxiety was completely unrelated to persuasive outcomes. Many other fear appeal studies have been conducted with individual difference variables, with inconclusive findings. Generally, studies have found no effect on acceptance of fear appeal recommendations due to gender, age, ethnicity, or group membership.

However, at least two other studies have found significant interacting effects between need for cognition and strength of fear appeal and uncertainty orientation and fear appeal. Most often, however, individual difference variables directly influenced persuasive outcomes without interacting with the level of the fear appeal. Overall, the effect of individual differences on persuasive outcomes in the context of fear appeals appears highly unique to the specific individual differences examined and rarely interacts with the level of fear appeal in its effects on outcomes.

Fear appeal manipulations appear to have improved over the years, given the correlation of .13 between year of study and manipulation effect. This improvement probably stems from more precise message definitions and more careful message construction. Severity manipulations in fear appeals appear to produce the strongest effects on perceptions (.44). Fear, susceptibility, response efficacy, and self-efficacy manipulations all produce moderate effects at .30, .30, .36, and .36, respectively. The stronger severity manipulations can probably be accounted for by the vivid and often gruesome pictures accompanying fear appeals (as part of the manipulations). These gruesome pictures are likely to be novel and attended to more carefully than other less striking features of the message. Thus, they are likely to have a stronger effect on perceptions. The fear manipu-
Theoretical Implications

The remaining results have strong theoretical implications and will be discussed with reference to each theoretical approach. First, there was no support for the drive model’s curvilinear hypothesis. Specifically, the results provide absolutely no evidence supportive of any kind of quadratic effects (either U shaped or inverted U shaped). Similarly, there was no support for any hypothesized negative effects from fear appeals. Thus, the drive model’s theoretical predictions do not appear to be consistent with the data.

Second, the fear control/danger control data appear generally consistent with the parallel process model (and the subsequent EPDM) in that the stronger the fear appeal manipulation, the stronger the danger control and fear control responses. In fact, the results indicate that as fear appeal increases in strength, it produces stronger fear control/danger responses ($r = .20$) than danger control responses such as change in attitude ($r = .14$), intention ($r = .11$), or behavior ($r = -.15$). Furthermore, fear control responses are inversely correlated with danger control responses ($r = -.18$) such that the more one is defensively resisting a recommendation, the less one is making appropriate changes in line with the message’s recommendations. These findings confirm Leventhal’s and Witte’s suggestion that fear appeals produce two competing responses that interfere with each other. Furthermore, consistent with the EPDM’s predictions, the weaker the efficacy message, the greater the fear control/danger responses ($r = -.11$), such that messages that fail to make people believe the recommended response is effective and/or that they are able to perform the recommended response produce stronger fear control/danger responses. In sum, the EPDM’s specifications with regard to fear control and danger control outcomes appear to be consistent with these data.

Third, the interaction data suggest mixed support for the SEU models and the EPDM model. Specifically, the interaction analysis indicated only main effects for threat and efficacy on outcomes such that the higher levels of each, the greater the persuasive impact. No significant interaction emerged in these analyses between threat and efficacy. However, the tests for interactions were inconclusive in that both the additive and the EPDM (interactive) effects coded models fit the data. Theoretically, all three models (SEU, FMT, and the EPDM) state that the HTHU group should result in the greatest persuasive impact, which was true in the current study. However, support for the additive model probably is most consistent with Sutton’s SEU model. Sutton argues that increases in subjective utilities (e.g., the degree to which one cares about being harmed appears to be related to perceived severity), increases in probability differences (e.g., the difference between experiencing the health threat minus the decrease in the perceived probability of experiencing the health threat if the recommended response is adopted appears to be a combination of perceived susceptibility and response efficacy), and increases in confidence (e.g., whether one thinks she or he can succeed in performing the recommended response appears to be related to self-efficacy) result in greater persuasive
Thus, the main effect and additive model findings appear to be most consistent with the SEU model. However, other results in the study offer support for PMT and the EPPM (both suggest threat by efficacy interactions; recall that PMT is contained within the EPPM and that PMT explains the danger control portion of the model but does not address the fear control side of the model). Again, it is not clear whether interactions exist in the literature. While the analysis of variance interaction test in this study indicated no significant interaction, the effects-coded model testing for PMT/EPPM type interactions was significant. Because interactions need more power to emerge as statistically significant, there may have been a power problem given the low number of studies included in the analyses.

The cell means, while consistent with an additive model in their order of effects (i.e., HTHE > HTLE and LTHE > LTLE), are not entirely inconsistent with EPPM predictions. The EPPM states that when individuals perceive low threat, they do not process the message any further. Indeed, this study showed that the two low-threat groups had the least persuasive impact. Furthermore, the EPPM predicts that the HTHE group would have the most persuasive impact, which it did. The unexpected finding was that the HTLE group was more persuasive than the LTLL group. A plausible explanation for this finding is that individuals are motivated to process all high-threat messages regardless of efficacy level. The EPPM suggests that threat motivates action while efficacy appraisal determines the direction of that action—either danger control or fear control. The data suggest that any high-threat message—regardless of what it was combined with—produces greater effects than any low-threat message.

Overall, the evidence is not conclusive for one model over another. What is clear is that there is no quadratic effects, so the drive model does not offer an adequate explanation of the data. There is evidence supportive of Sullin’s SEU model in the main effects and additive model tests. There also is evidence supportive of the EPPM (and, by extension, PMT) in that fear appeals produce both danger and fear control responses, and the stronger the threat in a message, the more motivated individuals appear to be to process the message. There is some support for trait anxiety as a moderator variable.

In sum, fear appeals appear to be effective when they depict a significant and relevant threat; (to increase perceptions of severity and susceptibility) and when they outline effective responses that appear easy to accomplish (to increase perceptions of response efficacy and self-efficacy). Low-threat fear appeals appear to produce little, if any, persuasive effects. Thus, regardless of which theoretical model is advocated, the advice to message designers is the same: A persuader should promote high levels of threat and high levels of efficacy to promote attitude, intention, and behavior changes.

Future Directions

The areas for future research in fear appeals are numerous. For example, much more information is needed on how people process fear appeals, as well as what triggers danger control and fear control responses. Additionally, future research should measure both fear control and danger control responses to determine the potentially interfering and competing effects on each other. Recent research suggests that fear appeals produce multiple affective responses beyond fear. For example, Dillard et al. found that while the strongest emotion produced by fear appeals was fear, fear appeals also produced significant levels of surprise, puzzlement, anger, and sadness. Other affective outcomes produced by fear appeals include irritation, disgust and feelings of impotence, tension and energy, and varying degrees of emotional instability including anxiety, loss of plea-
The exact relationship between these other emotions and persuasive outcomes is unknown.

The majority of fear appeal studies have been conducted in laboratory settings or in experiments where study participants are forced to process fear appeals. Naturalistic studies are desperately needed to assess selective exposure, attention, and comprehension issues. We have no idea, for example, whether the average television viewer actually watches a fear appeal if exposed, or whether she or he immediately changes the channel. Most of our fear appeal results come from contrived, artificial settings. Future research should examine the effects of fear appeals in more realistic, natural settings.

One relatively new way to look at fear appeals is through the message-processing models of Chaiken (systematic-heuristic model) and Petty and Cacioppo (elaboration likelihood model). Although there are differences between the models, each model suggests two general routes to persuasion. Thus far, the research testing these dual-process models with fear appeals has been mixed. Some scholars have found that strong fear appeals promote systematic/central processing, whereas others have found that strong fear appeals promote heuristic/peripheral processing. A possible explanation for the inconsistency in these results is that strong fear appeals may promote biased defensive systematic/central processing and not the "normal" kind of systematic/central processing tested for in the two studies that found support for heuristic/peripheral processing. For example, Lerman and Chaiken found that fear appeals were processed in a defensively biased manner such that threatening information was critically evaluated but reassuring information was not. For high-relevance participants (those at risk for harm by the health threat), the defensive systematic processing was even more pronounced. Other researchers have found selective and biased processing of fear appeals. Theoretically, the greatest degree of biased defensive systematic processing should occur in the HTLE condition (according to the EPPM). Unfortunately, none of the studies using Chaiken's or Petty and Cacioppo's models have examined how combined threat (defined as severity and susceptibility) and efficacy (defined as response efficacy and self-efficacy) messages influence message processing and subsequent outcomes. Gleser and Petty examined only response efficacy and not overall efficacy.) One avenue for future research, therefore, is to examine message-processing routes to assess how individuals process fear appeals and why they respond to them the way they do.

Methodologically, future research should carefully define and operationalize fear appeal constructs and assess fear control responses such as defensive avoidance, denial, and reactance, in addition to traditional change control outcomes (i.e., attitudes, intentions, behaviors). Additionally, thought-listing tasks should be included in fear appeal studies, since they allow one to examine message-processing issues and to validate one's fear control response measures (i.e., look for defensive avoidance, reactance in thoughts). Finally, to enable future researchers to extract generalizable data from studies, it would be useful if researchers could include correlation matrices and report standard deviations in their articles.

**Practical Implications**

Fear appeals motivate attitude, intention, and behavior changes—especially fear appeals accompanied by high-efficacy messages. Therefore, they can be quite useful to practitioners. However, fear appeals should be used cautiously, since they may backfire if target audiences do not believe they are able to effectively avert a threat. Following are specific recommendations for practitioners based on the results of this meta-analysis:
1. Practitioners can develop effective fear appeal messages by increasing references to the severity of the threat (i.e., the magnitude of harm) and references to the target population's susceptibility to the threat (i.e., their likelihood of experiencing the threat). Vivid language and pictures that describe the terrible consequences of a health threat increase perceptions of severity of threat. Personalistic language (e.g., "You risk a 30% chance of experiencing the threat") that emphasizes the similarities between victims of a health threat and the target audience increase perceptions of susceptibility.

2. Messages that make a health issue seem serious and likely to happen will be the most motivating (i.e., strong severity and susceptibility messages). The results indicate that weak fear appeals do not promote behavior change and suggest that fear motivates attitude, intention, and behavior changes.

3. Strong fear appeals work only when accompanied by equally strong efficacy messages. Efficacy messages must make target populations believe they are able to perform a recommended response (i.e., strong self-efficacy perceptions) and that recommended responses work in averting or minimizing a threat (i.e., strong response efficacy perceptions). To increase perceptions of self-efficacy, practitioners should identify barriers that inhibit one's perceived ability to perform a recommended action and directly address these in a message (i.e., skills, costs, beliefs, emotions, etc.). For example, if individuals lack the skills to negotiate condom use to prevent HIV infection, it may be useful for practitioners to offer role-playing sessions in which audience members successfully negotiate condom use. To increase perceptions of response efficacy, practitioners should clearly outline how, why, and when a recommended response eliminates or decreases the chances of experiencing the health threat.

4. Individual differences such as personality traits or demographic characteristics (e.g., gender) do not appear to influence processing of fear appeal messages, except on rare occasions. In general, the results of this meta-analysis suggest that practitioners do not need to address individual differences for fear appeal campaigns.

5. Both danger control responses such as attitude, intention, and behavior changes and fear control responses such as denial, defensive avoidance, and reactance should be assessed in evaluations. It is important to measure unintended outcomes (such as fear control responses) because in the event of campaign failure, one can determine whether a campaign simply had no effect (which means that perceptions of threat need to be increased to motivate action) or a strong effect of undesired fear control outcomes (which means that efficacy messages need to be strengthened to promote danger control outcomes).

In sum, practitioners should always ensure that a high-threat fear appeal is accompanied by an equally high-efficacy (or greater) message (given the findings that low-efficacy messages produce greater fear control responses). Messages should always be carefully tested to ensure they are producing high-threat and, more important, high-efficacy perceptions. If fear appeals are disseminated without efficacy messages, or with a one-line recommendation, they run the risk of backfiring, since they may produce defensive responses in people with low-efficacy perceptions. Fortunately, practitioners can easily make their fear appeals effective by providing high-efficacy messages.
Conclusion

Fear appeals have been used since antiquity by preachers and teachers alike. They are used by doctors, parents, police officers, and politicians—all in an effort to get individuals to think or act in a certain way. This study provided supportive evidence for the persuasive effects of fear appeals accompanied by high-efficacy messages. Fear appeals tend to be a great motivator as long as individuals believe they are able to protect themselves.

APPENDIX A
Fear Appeal Reviews

Miller identifies conceptual, operational, and methodological problems in previous research. Miller points out a lack of conceptualization problem in what constitutes a fear appeal (the stimulus) and how one measures fear or anxiety, and suggests that violations of expectations may account for increases in anxiety. Higher reviews fear appeal research from 1953 to 1968 in five areas: nature of communication, personality characteristics, source credibility, learning, and interest value. Higher proposes a unilinear explanation to reconcile findings. Ray and Wilkie summarize and discuss fear appeal research through 1969 for a marketing audience. Stempel and Craig review fear appeal literature through 1973. They address methodological issues and examine the effects of fear appeals on consumer behavior. Foster and Mongeau perform a meta-analytic review of fear appeal literature. They investigate the relationships between message manipulations—perceived fear, perceived fear attitudes, and perceived fear behaviors—as well as the variables of sex, age, and social desirability. Foster and Mongeau propose fear by age and fear by anxiety models to explain attitudinal and behavioral responses to fear appeals. Prentice-Dunn and Rogers compare and contrast protection motivation theory with the health belief model. Taber reviews fear appeal theories with a primary critique of protection motivation theory and concludes that fear appeals should be used with caution and only when an efficacious response accompanies them. Mongeau updates and replicates the Foster and Mongeau meta-analysis. Mongeau reviews a few of Rogers's protection motivation articles and stresses the role of topic vs. explanatory variable. Dillard extensively reviews fear and emotion literature and makes a case for studying multiple emotions when assessing the effects of fear appeals (e.g., anger, sadness, joy, etc.). cigarettes and Dillard perform an applied analysis of how public health practitioners should generate and use fear appeals to achieve maximum effectiveness. Finally, Witte reviews research testing the extended parallel process model. Witte identifies parts of the model that need further study and proposes modifications and future research directions.

APPENDIX B
Fear Appeal Theoretical Approaches

Fear-as-required-driven model—Developed out of learning theory approaches, states that first people have to learn to fear a threat (usually through a persuasive message). Fear arousal then acts as a drive to motivate action. Once in a drive state, recommended responses are given to decrease the drive (or fear). Anything that decreases one's fear (drive) acts as a reinforcing the habitual response (because it is rewarding) and becomes the habitual response to a threat. If the recommended response decreases fear, it becomes the habitual response. If defensive avoidance reduces fear, it becomes the habitual response. James extended the drive model with the family-of-curves model (representing inverted U shapes). According to James, there is an optimal fear arousal level at which fear will facilitate vigilant action, but beyond that optimal point emotional tension becomes so high that motivated resistances will set in and, subsequently, interfere with the effectiveness of a fear appeal.
Noncompliance model—Advances a two-factor theory. Argues that when fear acts as a drive, it motivates acceptance of recommendations. When fear acts as a cue, it elicits habituated responses that interfere with message acceptance. Proposes that these two factors (i.e., cues and drives) combine to yield an overall inverted U-shaped relationship between fear arousal and attitude change, where a moderate amount of fear arousal would produce the most message acceptance.

Parallel process model—Identifies two separate processes that occur in response to fear appeals: an emotional fear control response and a cognitive danger control response. Argues that protective behavior stems from attempts to control the danger or threat (cognitions), not from attempts to control the fear (emotions).

Protection motivation theory (PMT)  

Protection motivation theory (PMT) specifies the components of a fear appeal to be magnitude of nonresponse (severity), probability that an event will occur (vulnerability), and response efficacy. These fear appeal components result in corresponding cognitive motives that combine multiplicatively to produce some level of protection motivation (a variable that arouses direct action). The more protection motivation elicited, the greater the attitude, intention, or behavior change. In a revised PMT, self-efficacy was added to severity, vulnerability, and response efficacy, and the variables were said to work together in either threat or coping appraisals. In threat appraisal, multiple behaviors were said to be functions of one's perceived severity and susceptibility to a threat, subtracted from one's perceived rewards of performing a multiplicative behavior. For coping appraisal, adaptive behaviors were said to be a function of the response costs of performing the adaptive behavior subtracted from perceived response/self-efficacy. Also, the former multiplicative relationship between variables was modified to be additive within threat and coping appraisals, and multiplicative between threat and coping appraisals. In both the original PMT and the revised PMT, fear is predicted to "only indirectly" affect message acceptance "through the appraisal of severity" (p. 169).

Threat control—Expands on protection motivation theory by distinguishing the difference between response efficacy and personal efficacy (also known as self-efficacy). Argues that both threat and threat control (i.e., response and personal efficacy) issues need to be addressed in a fear appeal.

Subjective expected utility (SEU) model—Stands off as meta-analytic review of the relationships between fear incentives, fear behaviors, fear response efficacy, specific instructions, position of recommendations, communication factors, and recipient factors. Culminates in presentation of an SEU model that states people choose from competing alternatives a course of action that has the greatest SEU. An SEU is "a function of the subjective values or utilities attached to the possible outcomes of the alternative and the subjective probabilities that the alternative will lead to those outcomes" (p. 325). Fear has no causal role and is regarded as merely a by-product of cognitions about a threat.

Extended parallel process model—Returns to the parallel process model as a base and integrates previous perspectives into an expanded version of the model. States that message depictions of threat (severity and vulnerability) and efficacy (response efficacy and self-efficacy) produce corresponding perceptions of threat and efficacy, which interact to produce either danger control actions (self-protective attitudes, intentions, behaviors) or fear control actions (defensive avoidance, denial, inaction). Fear arousal is caused by perceived threat and may reciprocally influence perceptions of threat under certain conditions. Suggests that threat (and corresponding fear) motivates a response and efficacy determines the nature of that response (either danger or fear control actions). If perceived threat is low, then there is no further processing of the fear appeal (and thus no response) because people lack motivation to do so. Under high perceived threat conditions, high-efficacy perceptions result in danger control actions and low-efficacy perceptions result in high levels of fear leading to fear control actions. Thus, cognitions about the threat and efficacy are the direct causes of danger control actions and the emotion fear is the direct cause of fear control actions.
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Drinking and driving “safely”: Who uses a breathalyzer and when?

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ABSTRACT

Breathalyzers are often promoted on the grounds of safety. However, drivers who use them to avoid illegal blood-alcohol levels inadvertently expose themselves to sleepiness-related risks following alcohol intake. Personal breathalyzers may even be counterproductive if they make more drivers engage in more frequent or habitual drinking and driving. This study explores the extent to which and how drivers use the breathalyzer. We contacted nine major breathalyzer importers in Finland and found out that the estimated number of devices delivered during 2008 was almost 50,000, equaling approximately one percent of population and one-and-a-half percent of driving-license holders. Survey data on a representative sample of Finnish active drivers (N = 1121) showed that 11.5% owned a breathalyzer. More men than women own and use a breathalyzer, and most often the men are aged 36–55 years. These men also use it more often after acute drinking (32% vs. 20% in the whole sample). Seventy-nine percent of breathalyzer use occurs the following day after evening or night drinking. Therefore, while in a smaller percentage of cases the risk involves the additive and interactive effects of alcohol and sleepiness in the evening, most users expose themselves to risks related to daytime sleepiness due to drinking the previous night.

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1. Introduction

Some time ago we conducted some pilot roadside tests on drowsiness-detection methods in cooperation with the Finnish traffic police. We positioned ourselves close to a popular rock festival site where police were stopping drivers and taking breath tests from those leaving the festival. A gleeful grin spread over some drivers’ faces when they saw the breathalyzer in the hand of the policeman. Picking up their own they said with confidence that they were below the limit. Yes, they did indeed show BAC (blood alcohol concentration) below the legal limit of 0.05%, but were they safe drivers on that hot summer afternoon?

Breathalyzers, even connected to mobile phones, are being sold efficiently, and the industry is promoting their devices on safety grounds (WinterGreen Research, 2003). However, drivers who intend only not to break the “magic” (legal) line of 0.05% BAC may still be at risk given that impairment of many driving-related skills begins with any departure from zero BAC (Moskowitz & Fiorentino D. A., 2000). Especially, such drivers may take risks in that they may not be aware of the additive and interactive negative effects of even minimal alcohol consumption and increased sleepiness on performance (e.g. Annest, Wilde, Mant, & McLean, 2000; Howard et al., 2007). As a consequence, breathalyzers may indeed help drivers not to break the law, but they add to the risk of falling asleep and attention problems while driving (Radun & Summala, 2007).
In the worst case, breathalyzers may be counterproductive to safety if they make more drivers adopt more frequent or habitual drinking and driving. Although some estimations exist regarding the breathalyzer sales (Lisaö, 2008), it is unknown who buys them and when are they used. Therefore, we conducted a survey aimed at estimating the prevalence of breathalyzer ownership and use, and assessing the circumstances of use.

2. Method

Two sources of data were used. First, we contacted all major breathalyzer importers in Finland during spring/summer 2007 and asked them to estimate how many devices they delivered to retailers in the year 2006. The second set of data came from the annual driver survey of the Central Organization for Traffic Safety in Finland. The main content of the survey is always about traffic climate, while an additional topic differs from year to year: in autumn 2007 survey, the additional topic was related to driver fatigue. A full report on fatigue-related issues has been recently published (Radun & Radun, 2008). The data collection was carried out by a professional marketing research company, TNS Gallup, Finland. The participants were interviewed face-to-face.

The sample is representative of the Finnish active driving population; it was stratified according to age, sex and municipality. Altogether 1563 people were initially contacted and inclusion was based on whether the person drove a motor vehicle at least sometime. After applying this inclusion criterion, 1125 participants remained. Another five subjects were excluded due to missing values. The final sample therefore consisted of 1121 drivers who drove a motor vehicle at least sometime.

3. Results

All of the nine importers contacted responded to our request. The estimated number of devices delivered in Finland during 2006 was almost 50,000, equivalent to approximately one percent of the population and one-and-a-half percent of driving-license holders (Statistics Finland, 2007).

According to the results of the drivers' survey, up to 14.5% of Finnish households have a breathalyzer: 11.5% (N = 129) of the respondents in this study owned one, and an additional three percent reported that somebody else in the household owned one.

Not only do fewer women than men own a breathalyzer (men OR = 3.25, CI = 2.12–5.71), those who do own one also use it less often than men (men OR = 4.22, CI = 1.51–11.8). Age also turned out to be a significant predictor of breathalyzer ownership and usage (Fig. 1): men aged 36–55 were the most likely to own and use such a device (usage OR with reference to the rest of men 2.24, CI = 1.38–3.62). Overall, 24% of drivers owning a breathalyzer did not use it.

Of those who reported using a breathalyzer, 79.6% used it the day/night following evening/night drinking. This was much more common than using it after acute drinking (just after drinking a few units of alcohol – 18.4% or when driving back home after being out in the evening – 6.1%). Compared with the rest of the men sample, middle-aged (36–55) men used a breathalyzer more often (32% vs. 14%) after acute drinking ($\chi^2 = 3.89$, d.f. = 1, $p < 0.05$).

4. Discussion

The increased sales of breathalyzers and the surprisingly high proportion of Finnish drivers owning one is of course primarily due to the availability of reasonably priced personal devices. The market for personal breathalyzers has opened up

![Fig. 1. Percentage of drivers owning and using a breathalyzer by age and sex.](image-url)
quite recently, and it is now saturated with a variety of models. Strong marketing campaigns, evident especially around the Christmas period, might have boosted sales. These marketing campaigns often advertise breathalyzers as a traffic safety tool and a nice gift for your loved ones; the latter might explain why many people own a breathalyzer but do not use it (24% in our study). Furthermore, breathalyzers need to be calibrated every year or two, and this is relatively expensive given the price of the device itself. Therefore, some people might not be willing to pay that much. Unfortunately, we were not able to explore the reasons behind not using an owned breathalyzer.

At the same time, the proportion of drivers with a legal BAC level has markedly increased in the early 2000's according to systematic sobriety checks carried out by the police, while the number of people above the level has remained constant (Penttilä, Puutinen, Korpela, & Nissila, 2004; Rajalin, 2004). This probably reflects increased alcohol consumption at the individual level and an attitude change toward drinking and driving. For example, a study comparing the habits of young novice drivers of years 1978 and 1991 revealed that driving while slightly intoxicated (below 0.05% BAC) was more common in 2001 (Laupotti, Keskinen, & Rajalin, 2002).

The present data show that only a small proportion of drivers who own a breathalyser use it just after acute drinking. Nevertheless, about one third of men aged 36–55 owning a breathalyser do use it in such circumstances. A large majority of drivers use it the next day after evening drinking, probably concerned that their BAC has not fallen below the legal limit. However, such concern suggests that they must have been drinking heavily. Given the residual sedating effects of alcohol, and its effects on sleep quality and duration (Roehrs, Bone, Zorick, & Roth, 1994; Roehrs, Hiard, Jourdain, & Roth, 1994; Roehrs, Zorick, Zorick, & Roth, 1994), these drivers might still be at risk of falling asleep behind the wheel the next morning, or even during the whole day. A previous study (Radin & Radin, 2006) showed that eight out of 41 drivers who fell asleep and caused a fatal accident during a summer afternoon were poly-drinking and consuming alcohol on the night preceding the accident, although their BAC was zero at the time. This example directly supports our hypothesis that drivers whose BAC reaches zero after a heavy drinking night undermine, neglect or even be completely unaware of increased risk of falling asleep behind the wheel. This might not be an unusual situation given the high prevalence of episodic heavy drinking in Finland, as well as in other Nordic countries (Makela et al., 2001).

To our knowledge, this is the first study dealing with breathalyser use and its possible safety implications. On the other hand, there is plenty of research showing the effectiveness of alcohol ignition interlocks (alcolocks) in reducing driving-while-impaired among multiple (recidivist) (e.g., Bjørke, 2005) and even first offenders (Roeth, Voas, & Marques, 2007). Although alcolocks and breathalyzers differ according to the usage motivation (imposed vs. voluntary) and the consequences of being intoxicated (driving prevented vs. the decisions left to the driver), both devices are promoted on safety grounds.

Most US states and many European countries have legislation that allows the use of alcolocks, however, with a large variation in the level of mandatory use for (only) convicted drunk drivers (Behrens & Marques, 2004). The biggest step toward widespread implementation of alcolocks was taken in Sweden. The Swedish government has set two ambitious goals; the installation of alcoocks in all buses and trucks by 2010, and in all new cars by 2012 (Bjørke, 2005). A recent survey data shows that 82% of Swedish drivers agree that an alcoock should be standard equipment in all new cars (Bjørke & Roseda, 2005). But could it indeed be cost-effective? We are even afraid that such an all-inclusive alcoock use may share some negative aspects of breathalyzers.

Our present data indicate that almost nine percent of active Finnish drivers own and use a personal breathalyser. Although the data did not allow us to test it explicitly, we hypothesize that the sedative and performance impairment effects of alcohol, even when BAC is below the legal limit, or even zero, may compromise at least some of the benefits of such devices. What is more, breathalyzers may encourage people to adopt a more liberal attitude towards drinking and driving, and even to develop habitual alcohol use in the driving context. They possibly get people not only drink and drive more often but drink more before (and during) trip, keeping BAC closer to the legal limit. A commercial device produced and sold in big quantities with a safety argument may therefore compromise one of the biggest road safety challenges, alcohol in traffic. We may even ask whether the alcoock, if installed in all cars, would have similar effect. Will the forced blowing into the alcoock before every trip, at least if allowing BAC up to the legal limit of 0.05%, finally make a drink or two an acceptable aspect of driving, even in countries in which strict abstinence was the norm some years ago?

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Examining the effectiveness of physical threats in road safety advertising: The role of the third-person effect, gender, and age

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Abstract

Threatening advertisements have been widely used in the social marketing of road safety. However, despite their popularity and over five decades of research into the fear-attraction relationship, an unequivocal answer regarding their effectiveness remains unattained. More contemporary “fear appeal” research has explored the extent other variables moderate this relationship. In this study, the third-person effect was examined to explore its association with the extent male and female drivers reported intentions to adopt the recommendations of two road safety advertisements depicting high physical threats. Drivers (N = 132) first provided responses on pre-exposure future driving intentions, subsequently viewed two advertisements, one anti-speeding and one anti-drink driving, followed by measurement of their perceptions and post-manipulation intentions. The latter measure, post-manipulation intentions, was taken as the level of message acceptance for each advertisement. Results indicated a significant gender difference with females reporting reverse third-person effects (i.e., the messages would have more influence on themselves than others) and males reporting classic third-person effects (i.e., the messages would have more influence on others than themselves). Consistent with such third-person effects, females reported greater intention not to speed and not to drink and drive after being exposed to the advertisements than males. To determine the extent that third-person differential perceptions contributed to explaining variance in post-manipulation intentions, hierarchical regressions were conducted. These regressions revealed that third-person scores significantly contributed to the variance explained in post-manipulation intentions, beyond the contribution of other factors including demographic characteristics, pre-exposure intentions and past behaviour. The theoretical and applied implications of the results are discussed.

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1. Introduction

Road trauma remains one of the most significant global public health issues of the 21st century (Pedon et al., 2004). Of the factors contributing to road trauma, speeding and drink driving continue to feature prominently, thus reflecting the perennial contribution of human factors to road traffic injury. Given the major role of human factors in road trauma, it follows, that many improvements in health (i.e., reduction in injury) will ultimately be brought about by changing people’s attitudes and persuading them to adopt healthier, safer lifestyles. To this end, mass media and health communication will play a crucial role. Therefore, it is imperative that researchers and practitioners of health promotion continue to evaluate different advertising strategies to increase the persuasive influence of future mass media campaigns. Consistent with this aim, we examine the extent that threat-based advertisements incorporating threats of physical harm represent effective persuasive strategies for drivers of different age and gender.

Fear appeals, or more accurately, threat appeals' present viewers with the negative outcomes that they may experience as a result of engaging in the depicted unsafe and/or illegal behaviours. It is expected that the threat will evoke fear at the prospect of experiencing the aversive outcomes which will in turn motivate audience members to align their attitudes and/or behaviours with those recommended in the message (Maddux & Rogers, 1983; Witte, 1992). Of the health issues that have utilised threat appeals, road safety is particularly renowned for its use of physical threats in which drivers and passengers are injured and killed as a result of unsafe and/or illegal behaviour (Donovan & Henley, 2003; Elder et al., 2004). Typically, these advertisements, in a graphically explicit manner, portray the crash scene and victims.

Surprisingly, despite the frequency with which threat appeals are utilised in health advertising, a substantial body of literature spanning over five decades attests to contradictory findings regarding the manner in which fear is related to persuasion (for a range of reviews and empirical studies see, Bennett, 1996; Boster & Mongeau, 1984; Elliott, 2003; Higbee, 1969; Insko, Arkoff, & Insko, 1965; Janis, 1967; Janis & Fechbach, 1953; King & Reid, 1990; Kohn, Goushaei, Cook, Sheppard, & Chan, 1982; LaTou & Rotfeld, 1997; Leventhal, 1970; Leventhal & Watts, 1966; Ray & Wilkie, 1970; Siervogel & Craig, 1974; Sutton, 1982; Sutton, 1992; Witte, Berkowitz, Cameron, & McKean, 1998). More specifically, early fear-persuasion studies provided empirical support for a direct positive relationship between fear and persuasion (e.g., Higbee, 1969; Insko et al., 1965; Leventhal & Watts, 1966) as well as a direct negative relationship (e.g., Hefner, 1956; Janis & Fechbach, 1953). Given the apparent irreconcilability of these disparate research findings, the curvilinear, or 'inverted u,' view of the fear-persuasion relationship was proposed. According to this view, increasing the level of fear induced would increase message persuasiveness up until some critical point at which, once exceeded, the level of fear becomes excessive, resulting in avoidance and rejection of the message (Janis, 1967; Quinn, Meenanagh, & Braimick, 1992; Ray & Wilkie, 1970). Some empirical support exists for the curvilinear view with studies indicating that fear is positively associated with both message acceptance and message rejection (Lewis, 2002; Tay & Watson, 2002). Arguably, such findings highlight the particularly ambiguous nature of the fear-persuasion relationship.

Due to the ambiguities associated with the fear-persuasion relationship, contemporary fear appeal research has tended to focus on the extent other variables moderate this relationship. For instance, prominent, contemporary fear appeal models, the protection motivation theory (Maddux & Rogers, 1983; Rogers, 1983) and the extended parallel process model (Witte, 1992) have focused on the extent that cognitive factors influence processing of threat appeals. In particular, these models identify two processes as preceding attitudinal, intentional, and/or behavioral change (i.e., message acceptance; threat appraisal and coping appraisal). Threat appraisal is comprised of two variables, namely, perceived severity and perceived susceptibility which refer to an individual's perceptions of how severe and how personally susceptible they feel a particular threat is. Whilst, coping appraisal is comprised of response efficacy and message self-efficacy which refer to the incorporation of strategies or recommendations and the belief that one can enact such strategies (Rogers, 1975; Witte, 1992).

\footnote{The more accurate term is threat appeals because fear is one possible emotional reaction individuals may have in response to a threatening stimulus (Donovan, Henley, Jukle, & Slater, 1995).}
Of these variables, we focus particularly on the notion of threat susceptibility and more specifically, how personally relevant individuals perceive a particular threat to be and the influence that such perceptions have upon the persuasiveness of a health message. One explanation proposed for such inconclusive findings in the fear appeal literature is that individuals differ in how personally relevant they perceive a particular threat to be (Burnell & Oliver, 1979; Quinn et al., 1992). It follows, then, if individuals differ in their perceptions of personal relevance to a threat then the nature and intensity of the emotional response(s) they experience to that threat are also likely to differ (LaTour & Rotschild, 1997). Indeed, there is research suggesting that threat-based health messages, despite assumptions based on the message content and structure that such messages represent "fear appeals", may not even successfully evoke any reported changes in the level of fear experienced following exposure (Dillard, Plutchik, Godbold, Prinault, & Edgar, 1996; LaTour & Rotschild, 1997). In the absence of the necessary and intended fear, it is likely that a threat appeal will not function as anticipated and thus, may be less likely to persuade. Consequently, determining a threat's relevance for a particular target audience would be an important first step in ultimately designing an effective persuasive appeal.

Given that young male road users, relative to their female counterparts, are at much greater risk of being killed or injured in a road crash (Tay, 2002, 2005), it is imperative that persuasive appeals targeting this group of road users are designed with the greatest likelihood of being effective. Surprisingly, however, the impact of gender on the acceptance of physically threatening road safety advertising, has received limited empirical attention (Elliott, 2003; see Witte & Allen, 2000). This limitation in the literature exists despite some suggestion that males, and more specifically young males, may be more threatened by social threats such as the threat of losing their licence and the social stigma attached with licence loss (Rotschild, 1999). In other words, for male road users, a social threat may be more relevant and fear-inducing than the traditional and frequently utilised physical threats. Arguably, given that many road safety advertisements intended to target this particular group of road users continue to incorporate physical threats of death and injury (Rotschild, 1999; Tay, 1999, 2002), two key issues that research must establish are: first, how relevant drivers of different gender and age regard physical threats and second, whether perceptions of relevance indeed influence the relative effectiveness of such appeals.

In determining the relevance of a persuasive message it appears that individuals not only hold perceptions regarding how relevant and influential they perceive messages are for themselves but also how relevant and influential they perceive the message to be for other people. This suggestion is based on a phenomenon derived from the communication literature known as the third-person effect (TPE) (Davison, 1983). More specifically, according to the classic TPE, individuals exposed to a persuasive message will tend to perceive the communication as being of greater influence on others (third persons) than on themselves (Davison, 1983). Beyond being an interesting perceptual phenomenon, empirical studies have found that such perceptions also influence an individual's subsequent behaviour (e.g., Muiz, 1989). Results of such studies indicate that when individuals perceive persuasive messages as being of more relevance to and influence on others than themselves, they are less likely to adopt a message's recommendations. In other words, the perceptions of relevance on self and others appear to have specific implications for related behaviours.

Whilst the TPE has been demonstrated to be a robust phenomenon, one evident limitation of the literature is that the existence of the TPE is based predominantly on research involving messages that denote negative content. Negative content refers to content that would be considered undesirable or unbeneficial for an individual to be persuaded by Duck, Terry, and Hugg (1995). Common examples of negative content in the research literature are messages incorporating violence and pornography. Given the focus on messages incorporating negative content, most studies examining the behavioural consequences of third-person effects have explored the extent that individuals report a willingness to censor such negative material (e.g., Gunther, 1995; Gunther & Thorson, 1992). In contrast, only a small number of recent studies have examined the TPE's operation in messages denoting positive content. Positive content is content that would be desirable to be influenced by and which would be expected to have beneficial outcomes for the individual (Duck et al., 1995). Thus, generally, health messages which ultimately aim to improve the quality and longevity of individuals' lives could be considered examples of such positive content (Duck et al., 1995).

In a study based on health messages addressing the issue of AIDS/HIV, Duck et al. (1995) found that individuals perceived some of the advertisements as having greater influence on themselves than others in general; a phenomenon known as the reversed third-person effect. The initial conclusion would appear to be that positive messages are associated with third-person reversals. However, although all the advertisements were
addressing the same health issue and promoting the same message, reverse third-person effects were not associated with all the messages. Thus, a priori definitions of a message as denoting negative or positive content appear not to accurately predict the direction of the TPE. Arguably, this problem would apply particularly to threatening health messages given that such messages represent an interesting paradox in relation to the definitions of positive and negative content provided previously. That is, whilst threat-based health messages espouse positions that could be considered beneficial to be persuaded by (e.g., drive safely and avoid being injured or killed in a crash) thus reflecting positive content, such messages also incorporate images (e.g., graphic crash scenes) that may be considered negative content. Given such definitional ambiguity, it would seem that other factors may moderate the direction of third-person effects for threat appeals. Indeed, Duck et al. (1995) concluded that a message factor (i.e., the quality of the advertisements) moderated the direction of third-person effects associated with the threat-based advertisements in their study. More specifically, they reported that the threat appeals were considered the highest quality advertisements and were associated with the strongest third-person reversals.

Additionally, some individual factors have been found to moderate the direction of third-person effects associated with messages of positive content (see Duck & Mullin, 1995). However, of the individual differences variables that have been examined, few studies have explored the extent that demographic characteristics such as gender and age moderate the direction of third-person effects associated with health messages. Arguably, such factors may be particularly significant in relation to the use of physical threats in road safety advertisements, given that it has been suggested that males, and more specifically young males, may regard such advertisements as less relevant than their female counterparts (e.g., Rottfeld, 1999).

Similar to classic third-person effects, whilst reverse third-person effects represent an interesting perceptual phenomenon, arguably, what is of particular interest is the influence such third-person reversals have on subsequent behaviour. Unlike classic third-person effects which have been found to decrease the likelihood that an individual adopts the recommendations of a persuasive message, reverse third-person effects may potentially increase persuasion. This increase in persuasion may occur because, presumably, individuals would be more likely to adopt the recommendations of an advertisement that they perceive as relatively more personally relevant and influential. In other words, reverse third-person effects may act to predispose individuals to accept messages (Duck et al., 1995). Although Duck et al. (1995) identified the potential positive implications of reverse third-person effects they did not empirically test this assertion. Thus, presently, whether reverse third-person effects have positive implications for persuasion and ultimately behaviour remains an unanswered empirical question.

In sum, we will examine the third-person effect in relation to two road safety television advertisements: one an anti-drink driving message and the other an anti-speeding message. First, it will be ascertained whether physical threat-based road safety advertisements are associated with classic or reverse third-person effects. To the extent that males perceive such physical threats as less relevant than females, we expect that males will report classic third-person effects whilst females will report reverse third-person effects (Hypothesis 1a). Moreover, we expect this to be the case particularly for young males (Hypothesis 1b). Second, we will examine age and gender differences in relation to the behavioural intentions reported for each advertisement (with such behavioural intentions utilised as a measure of message acceptance). To the extent that males will regard the advertisements as less relevant, we expect that males will report significantly less desirable speeding and drink driving intentions than females (Hypothesis 2a). Again, we expect that this effect (i.e., less desirable intentions) will be greatest for young males (Hypothesis 2b). Finally, we will explore the extent that third-person effects explain the variance in post-exposure behavioural intentions beyond the contribution of other factors likely to influence the acceptance of messages including pre-exposure intentions as well as past behaviour (see stead, Tagg, MacKintosh, & Eidic, 2005). Whilst we will make no specific hypothesis pertaining to the relative importance of each factor, to the extent that reverse third-person effects will act to predispose an individual to being persuaded, it is expected that third-person differential perception scores (see Section 2) will be associated with a negative weighting in the regression models (Hypothesis 3).

\[\text{Measure of third-person perception and is based on perceived influence on other drivers in general score minus perceived influence on self-score. Thus, negative scores indicate third-person reversals.}\]
2. Method

2.1. Participants

The only criterion for participation in the study was that individuals held a current Australian drivers' or motorcyclists' licence. Overall, 152 drivers volunteered to participate in the study. Approximately half the sample was comprised of first year psychology students from the Queensland University of Technology. These participants were recruited via a university notice-board (58%) and received partial course credit for their participation. The remaining participants were approached directly and invited to participate by the researchers. These participants were comprised of university students from various year levels, colleagues and acquaintances of the researchers, as well as persons who had heard of the study being conducted from other participants and who permitted their contact details to be provided to the researchers. Consequently, this latter group of participants consisted of drivers recruited from both on and off the university campus. Unlike the first year students, these latter participants received no incentives for taking part in the study.

The sample consisted of 102 females (67%) with an age distribution as follows: under 20 years (21.7%), 20–29 (28.9%), 30–39 (20.4%), 40–49 (13.2%), 50–59 (10.5%), and 60 years and over (5.3%). Thus, over half of the sample was comprised of drivers aged 29 years or younger and two-thirds of the sample was female.

The prior speeding and drink driving offence histories of participants in the sample revealed that in the 12 months prior to the study, 23 (15.1%) drivers had received a speeding fine and no drivers had been convicted of drink driving. Whilst, in the previous 2–3 years, 30 (19.7%) drivers had been fined for speeding and 2 (1.3%) had been fined for drink driving.

2.2. Stimulus materials

2.2.1. Advertisements

Two 60-second road safety television advertisements incorporating high physical threats were selected. To minimize previous viewing exposure, advertisements not aired in the Australian state in which the study was conducted, were selected. For each advertisement, an item was included in the questionnaire to assess previous viewing exposure. As anticipated, the majority of participants reported not having seen either the speeding (N = 109, 71.7%) or the drink driving advertisement (N = 99, 65.1%) prior to the study. One advertisement focused on drink driving whilst the other focused on speeding. Brief descriptions of each advertisement are provided in Table 1. In both advertisements, a passenger was killed. Participants from previous research reported these particular advertisements as highly threatening (Harrison & Sensarick, 1999).

2.2.2. Measures

The questionnaire was comprised of three sections: Parts A–C. Part A gathered demographic details as well as information about the driving histories of the participants in relation to their prior speeding and drink driving behaviour. Four items were used to assess prior speeding behaviour: "I often drive greater than 10 km/h over the speed limit on urban roads", "I often drive greater than 20 km/h over the speed limit on urban roads", "I often drive greater than 10 km/h over the speed limit on open roads/highways", and "I often drive greater than 20 km/h over the speed limit on open roads/highways". Participants responded to these items on a 7-point scale of Very Strongly Disagree (1) to Very Strongly Agree (7). A composite scale was created from these four items that was internally reliable with a Cronbach alpha of .85 computed. Prior drink driving behaviour was measured by two items: "I always stop drinking before my driving is impaired" and "I will never ride in a car driven by someone over .05". Although the latter item does not assess the individual's drink driving behaviour specifically, it does provide indication of an individual's experience of drink driving behav-

---

1 Of the 23 drivers who indicated having been fined in the 12 months prior to the study, 14 (60.9%) also indicated having being fined in the previous 2–3 years.
2 A pattern of non-random missing data was detected with responses to the previous exposure items. Specifically, 31 and 22 participants did not respond as to whether they had previously seen the anti-speeding and anti-drink driving advertisement respectively. The non-response rate may be due to the fact that many road safety advertisements looked alike and some participants may be unsure if they had seen them before or not.
Table 1
Brief descriptions of the advertisements used in the study

<table>
<thead>
<tr>
<th>Advertisement name</th>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Tracy&quot;</td>
<td>Speeding</td>
<td>A young girl is driving and her best friend, Tracy, is a passenger in the car. A text plate is clearly visible. The driver is shown changing a tire and speeding (i.e., flashing the speedometer and the posted speed limit indicate that the driver is speeding). They crash into a tree with the crash scene shown. The young driver, a 16-year-old, is shown to be extremely distraught with blood on her face and repeatedly saying, &quot;Where's Tracy?&quot; She is being restrained by emergency workers before being taken to the vehicle. The passenger side of the vehicle has sustained most of the damage. Tracy is stuck in the vehicle. The advertisement concludes with the driver saying, &quot;She's my best friend and I've killed her.&quot;</td>
</tr>
<tr>
<td>&quot;Joey&quot;</td>
<td>Drink driving</td>
<td>Two brothers are shown having a party. As they are walking towards the car, the older brother, Joey, keeps asking to drive but the older brother does not hand over his car keys. Once in the car and driving, the younger brother, Joey, is seen to be drunk. The older brother begins swerving the vehicle as though showing off to his younger brother. He lines control and the car is shown colliding a number of times with scenes of the crash shown from outside the vehicle as well as from within. The advertisement concludes with the older brother shown in a hospital bed in traction. He begins to call out &quot;Joey,&quot; and he cries repeatedly, &quot;I killed my brother.&quot;</td>
</tr>
</tbody>
</table>

...more generally. These items were measured on 7-point scales of Very Strongly Disagree (1) to Very Strongly Agree (7). The items were reverse-scored and a composite score created. This scale was internally reliable with a Cronbach alpha of .79 computed.

Additionally, Part A also assessed the participants' pre-exposure future driving intentions in relation to speeding and drink driving. Two items were used to assess speeding intentions, "I intend to obey the speed limits" and "I intend to monitor my speed when driving" and two items were used to assess drink driving intentions, "I intend not to drive when I have had too much to drink" and "I am likely to monitor my drinking when I have to drive". Participants reported their responses to these items on a 7-point scale ranging from Very Strongly Disagree (1) to Very Strongly Agree (7). Composite scales of speeding intentions and drink driving intentions were created from the appropriate two items. These scales were internally reliable, with Cronbach alphas of .90 and .87 for the speeding and drink driving scales respectively. Post-exposure speeding and drink driving intentions were measured with the same items. The scales were internally reliable with Cronbach alphas of .93 for speeding intentions and .95 for drink driving intentions. These post-exposure intentions were taken as representing the level of message acceptance for each advertisement.

Overall, Parts B and C of the questionnaire contained the same items except phrasing on relevant questions was altered so as to either the speeding or drink driving advertisement. Among other measures, the one of particular relevance to the current paper is the measure of the TPE (i.e., the third-person differential perception score). The TPE, as discussed previously, comprised perceptions of influence on self as well as others, thus two scales measuring each of these perceptions were required. Consistent with previous research (e.g., Duck & Mafhlin, 1993; Gruen & Muncy, 1993), the resultant TPE score was calculated by subtracting the score obtained for "Perceived influence on yourself" from the score obtained for "Perceived influence on other drivers in general". Since both of these ratings were measured on a 7-point scale ranging from Not influenced at all (1) to Extremely influenced (7), the third-person differential perception score created, could range from 6 to 6 with positive scores denoting greater perceived influence on others than self (i.e., a classic TPE) and negative scores denoting greater perceived influence on self than others (i.e., a reverse TPE).

2.3. Procedure and design

Prior to conducting the study, ethical clearance was applied for and granted from the University Human Research Ethics Committee. At the commencement of the study sessions, participants were provided an information sheet. This sheet described the study as an examination of the effectiveness of different road safety
television advertisements. The information sheet also detailed the voluntary nature of participation, the participants' right to withdraw from the study at any time without explanation or penalty, and the confidentiality of all responses provided. All participants were required to sign a consent form prior to the study's commencement.

A within-groups design was utilized such that all participants viewed both the speeding advertisement and the drink driving advertisement. Testing was conducted in groups and the same researcher was present for the entirety of every testing session. Once provided with the questionnaires, participants were instructed to immediately commence Part A. Once Part A was completed, participants would view the first advertisement and subsequently provide their responses to that advertisement. This procedure was then repeated for the second advertisement. Participants viewed each advertisement once only. To minimize the impact of a potential order effect, in half of the viewing sessions the speeding advertisement was shown first followed by the drink driving advertisement, whilst in the other half of the sessions, the drink driving advertisement was shown first and the speeding advertisement second.

3. Results

3.1. Preliminary analyses

3.1.1. Order effects

To check for the presence of any order effects, four chi-square tests were performed. These analyses tested whether the scores obtained for two of the study's major variables; the third-person differential perception score and post-exposure behavioural intentions (i.e., the message acceptance measure) differed as a function of advertisement exposure order. These tests indicated that participants who saw the speeding advertisement first did not significantly differ from those participants who saw the speeding advertisement second in terms of their respective third-person differential perception scores ($\chi^2 = 6.17, p = .72$) and post-exposure intention scores ($\chi^2 = 12.58, p = .40$). Similarly, there was no significant difference in third-person differential perception scores or post-exposure intention scores between participants who saw the driving advertisement first and those who saw it second ($\chi^2 = 16.76, p = .16$ and $\chi^2 = 9.46, p = .58$, respectively). Based on these analyses, no order effects were detected.

3.1.2. Pre-exposure speeding and drink driving intentions

Analyses were conducted to determine whether there were any significant differences in the pre-exposure behavioural intentions of male and female drivers. Two independent groups $t$ tests were conducted to compare the pre-exposure speeding and drink driving intentions reported by males and females. The results indicated that females speeding intentions ($M = 5.89$) prior to advertisement exposure did not significantly differ ($t(150) = -0.54, p = .59$) from males pre-exposure speeding intentions ($M = 5.72$). Similarly, females drink driving intentions ($M = 6.53$) prior to advertisement exposure did not significantly differ ($t(150) = -0.02, p = .99$) from males pre-exposure drink driving intentions ($M = 6.53$).

Additionally, two ANOVAs were conducted to compare the pre-exposure speeding and drink driving intentions reported by young (i.e., $<$29 years), middle-age (i.e., 30-49 years), and older drivers (i.e., $>$50 years). The analyses revealed no significant differences between the three age groups in relation to their mean pre-exposure speeding intentions ($F(2, 151) = 0.07, p = .93, \eta^2 = .00$) or their mean pre-exposure drink driving intentions ($F(2, 151) = 1.84, p = .15, \eta^2 = .02$). Therefore, based on these analyses, no significant pre-exposure differences between drivers of different gender or age were detected.

3.2. Main analyses

3.2.1. Gender, age, and third-person differential perception scores

Analyses were conducted to determine whether the perceptions of influence reported for self and others differed according to the age and gender of the drivers. With third-person differential perception scores particu-
ing to the speeding and the drink driving advertisement as separate dependent variables, a 2 x 3 analysis of variance was conducted for each dependent variable with gender and age groups as the independent variables. With third-person differential perception score pertaining to the speeding advertisement as the dependent variable, the results indicated a significant main effect for gender \((F(1, 151) = 13.33, \ p < .001, \ \eta^2 = .08)\). The gender main effect indicates that the males' mean third-person differential perception score significantly differed from the females' mean third-person differential perception score. Due to the nature of the TPE measure this study (i.e., the magnitude of the third-person differential perception score can be equally large in either the positive or negative direction), interpretation of this result is clarified through inspection of the direction of the means. The mean third-person differential perception score for males is positive \((M = 0.03)\) indicating classic third-person effects whilst the mean third-person differential perception score for females is negative \((M = -0.99)\) indicating reverse third-person effects. No other effects were significant.

A similar result was found when the analysis was conducted with third-person differential perception scores pertaining to the drink driving advertisement as the dependent variable. A main effect for gender was found \((F(1, 151) = 9.94, \ p = .002, \ \eta^2 = .06)\), indicating that the mean scores for females and males do differ significantly. Again, inspection of the means clarified the interpretation of this result. The mean third-person differential perception score for males was positive \((M = 0.44)\) indicating classic third-person effects whilst the mean third-person effect scores for females was negative \((M = -0.67)\) indicating reverse third-person effects. No other effects were significant. Table 2 reports the means and the standard deviations of third-person effect scores for each age group and gender. Inspection of the means reveals a consistent pattern of results with females of all age groups reporting reverse third-person scores whilst, males of all groups reported classic third-person effects with only one exception; the 30-49-year age group reported a negative and thus, reversed third-person effect for the speeding advertisement.

### 3.2.2. Gender, age, and post-exposure intentions (i.e., message acceptance)

Analyses were conducted to determine whether the drivers of different gender and age differed in their post-exposure intentions (i.e., message acceptance). With post-exposure intentions pertaining to the speeding and drink driving advertisement as separate dependent variables, a 2 x 3 analysis of variance was conducted with gender and age groups as the independent variables. The relevant prior behaviour (i.e., speeding or drink driving) was entered into the appropriate analysis as a covariate.

With speeding intentions as the dependent variable, the analysis revealed a significant main effect for gender \((F(1, 151) = 8.96, \ p = .003, \ \eta^2 = .06)\). Pair-wise comparisons revealed that males \((M = 4.09)\) reported significantly less intention to monitor their speed and to stop speeding than females \((M = 5.03)\). No other effects were significant.

<table>
<thead>
<tr>
<th>Advertisement</th>
<th>Gender</th>
<th>Age group</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-speeding</td>
<td>Male</td>
<td>&lt;29</td>
<td>6.29</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-49</td>
<td>-4.27</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;=50</td>
<td>0.87</td>
<td>1.77</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>&lt;29</td>
<td>-1.21</td>
<td>1.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-49</td>
<td>-0.82</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;=50</td>
<td>-0.30</td>
<td>1.20</td>
</tr>
<tr>
<td>Anti-drink driving</td>
<td>Male</td>
<td>&lt;29</td>
<td>0.33</td>
<td>1.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-49</td>
<td>0.33</td>
<td>2.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;=50</td>
<td>0.64</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>&lt;29</td>
<td>0.70</td>
<td>1.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-49</td>
<td>-0.91</td>
<td>2.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;=50</td>
<td>-0.74</td>
<td>1.73</td>
</tr>
</tbody>
</table>
With drink driving intentions as the dependent variable, a significant main effect for gender was once again detected \((F(1, 149) = 8.91, p = .003, \eta^2 = .06)\). Pair-wise comparisons revealed that males reported significantly less intention to both monitor and not to drive after drinking than females \((M_s = 4.43 \text{ and } 5.52 \text{ respectively})\).

3.2.3. The prediction of post-exposure intentions (i.e., message acceptance)

To determine the extent that third-person effects influenced post-exposure behavioural intentions (i.e., speeding and drink driving), two hierarchical regressions were conducted. To control for past behaviour, pre-exposure intentions, age and gender, these items were entered in the model as step one. To determine the extent that third-person differential perception scores contributed to post-exposure intentions beyond the contribution of the other four independent variables, they were entered into the model in step two.

With speeding intentions as the dependent variable, the overall model accounted for 31.2\% (28.9\% adjusted) of the variance in post-exposure speeding intentions \((F(4, 151) = 11.31, p < .001)\). As Table 3 shows, the linear combination of the four independent variables entered as step one accounted for 24.3\% of the variability in post-exposure speeding intentions. When third-person differential perception scores pertaining to the speeding advertisement were entered in step two, they accounted for a further 5.9\% of the variance in post-exposure speeding intentions \((F(5, 146) = 14.76, p < .001)\). At step one, gender \((\beta = .28, p < .001)\) and pre-exposure speeding intentions \((\beta = .40, p < .001)\) were the only significant predictors. With all five variables entered in step two, third-person differential perception scores was the second strongest predictor \((\beta = -.28, p < .001)\) with pre-exposure speeding intentions being the strongest predictor \((\beta = .38, p < .001)\). Additionally, gender remained significant in step two \((\beta = .19, p = .012)\).

With drink driving intentions as the dependent variable, the overall model accounted for 23.4\% (20.7\% adjusted) of the variance in post-exposure drink driving intentions \((F(4, 148) = 4.31, p = .003)\). As Table 4 shows, the linear combination of the four independent variables entered as step one accounted for 10.7\% of the variability in post-exposure drink driving intentions. When third-person differential perception scores pertaining to the drink driving advertisement were entered in step two, they accounted for a further 12.7\% of the variance in post-exposure speeding intentions \((F(5, 143) = 14.76, p < .001)\). At step one, gender was the only significant predictor \((\beta = .26, p = .002)\). With all five variables entered in step two, third-person differential perception scores was the strongest and only significant predictor \((\beta = -.37, p < .001)\) although gender could be considered to be marginally significant \((\beta = .16, p = .052)\).

Hence, in both models (i.e., post-exposure speeding and drink driving intentions), the third-person differential perception score significantly added to the variance explained in such intentions over and above the other variables. In the case of drink driving post-exposure intentions, it represented the strongest predictor of intentions, exceeding the importance of pre-exposure drink driving intentions.

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchical regression analysis predicting post-exposure behavioural intentions of the speeding advertisement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>(B)</th>
<th>(\beta)</th>
<th>(R^2)</th>
<th>(R^2) change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-exposure intentions</td>
<td>.43</td>
<td>.40***</td>
<td>.24</td>
<td>.24***</td>
</tr>
<tr>
<td>Past behaviour</td>
<td>.02</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.07</td>
<td>-.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.08</td>
<td>.28***</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-exposure intentions</td>
<td>.41</td>
<td>.38***</td>
<td>.31</td>
<td>.07***</td>
</tr>
<tr>
<td>Past behaviour</td>
<td>.06</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.03</td>
<td>.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.07</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third-person differential perception score</td>
<td>-.31</td>
<td>-.28***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \(p < .05\).  
** \(p < .001\).
Table 4
Hierarchical regression analysis predicting post-exposure behavioural intentions of the drink driving advertisement

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th></th>
<th></th>
<th></th>
<th>Step 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$R$</td>
<td>$\beta$</td>
<td>$R^2$</td>
<td></td>
<td>$R$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Pre-exposure intentions</td>
<td>.22</td>
<td>.15</td>
<td>.41</td>
<td>.11**</td>
<td></td>
<td>.20</td>
<td>.14</td>
</tr>
<tr>
<td>Past behaviour</td>
<td>.62</td>
<td>.02</td>
<td>.85</td>
<td></td>
<td></td>
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<td>.02</td>
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<tr>
<td>Age</td>
<td>-.13</td>
<td>-.05</td>
<td></td>
<td></td>
<td></td>
<td>-.11</td>
<td>-.04</td>
</tr>
<tr>
<td>Gender</td>
<td>1.86</td>
<td>.26*</td>
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<td></td>
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<td>.63</td>
<td>.16*</td>
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<tr>
<td>Third-person differential perception score</td>
<td>-.37</td>
<td>-.37**</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

** $p < .01$

4. Discussion

Overall, several key findings emerged from the results of this study. First, an individual's acceptance of threat-based road safety advertisements, as measured by post-exposure intentions, was associated with their perceptions of the advertisement's influence on both themselves and others (i.e., a third-person effect). In fact, third-person effects emerged as the most important predictor of post-exposure drink driving intentions and the second most important predictor of post-exposure speeding intentions. Furthermore, as predicted by Hypothesis 3, our results showed that as third-person effects reversed, indicating that individuals perceived themselves as being more influenced by a message than other drivers in general, the more desirable future driving intentions they reported following exposure to the advertisements. The finding is consistent with Duck et al.'s (1995) suggestion that third-person reversals could act to predispense individuals to persuasion. Additionally, our finding supports the notion that the TPE is not just an interesting perceptual phenomenon but one with important behavioural implications. Only a limited number of previous studies have empirically examined the behavioural outcomes of the TPE (e.g., Matz, 1989) and thus by examining the impact of third-person effects on behavioural intentions, our study represents an important contribution to the literature. Moreover, of the limited number of studies that have examined behavioural implications of the TPE, the majority have focussed upon behaviours pertaining to censorship (e.g., Gunther, 1995; Gunther & Thorson, 1992). By examining the TPE and its behavioural consequences in the context of health messages, our study also represents an important contribution to the social marketing and health promotion literature.

The second key finding revealed a significant gender effect. Supporting our Hypothesis 1a, males in this study reported classic third-person effects whilst females reported reverse third-person effects. This finding suggests that messages incorporating threats of physical harm are regarded less relevant and influential by males than females. The absence of an age and gender interaction meant that we found no support for Hypothesis 1b which predicted that young males would have significantly greater classic third-person effects. Moreover, the absence of any age effects suggests that the key factor modulating third-person effects in the context of road safety advertisements incorporating physical threats is an individual's gender.

The third key finding pertained to post-exposure intentions (i.e., extent of message acceptance). As predicted by Hypothesis 2a, males reported significantly less desirable speeding and drink driving intentions after viewing the advertisements than females. Indeed, results of the regression analysis revealed that gender remained a significant predictor of post-exposure driving intentions for both speeding and driving when all variables had been entered into the model. However, we found no support for Hypothesis 2b which proposed that adaptive intentions would be lower for younger males. The absence of any significant effects for age is somewhat surprising given that there is considerable evidence that suggests that threat appeals are least effective with adolescents and young people (Boster & Mongeau, 1984; de Meyrick, 2001; Peckham, Zhao,
Goldberg, & Reisling, 2003). However, the results are consistent with Witte and Allen's (2000) finding that most individual difference variables such as age generally do not have any effect on the acceptance of fear appeal recommendations.

In contrast to Witte and Allen (2000) suggestion however, we found gender to be an important consideration when designing as well as when evaluating the effectiveness of threat-based road safety messages. Our results also highlight the fact that although males represent a major high-risk group for road trauma (Tay, 1999, 2002), it appears that they are being less persuaded than females by current threat-based advertisements that incorporate threats of physical harm/injury. Thus, it follows that identifying the most effective threat type for male drivers remains a key task for future research pursuits.

The fourth key finding to emerge from this study was that the main results were found to be consistent across two different driving behaviors, namely speeding and drink driving. This finding reflects the robustness of third-person effects as well as gender differences in relation to physical threats in the road safety advertising context. The consistency of the findings also highlights that the results may well generalize to physical threats used to promote other health issues. This study therefore has important policy implications not only for the road safety advertising context but for health promotion campaigns in general.

The current study contains limitations that should be acknowledged. Two main limitations pertained to the study's sample and specifically, the extent to which the findings could be generalized from our sample to the broader driving population. First, university students comprised only half of the study's sample. The use of student samples, representing a relatively homogeneous group of highly educated and often young individuals has been a long-standing criticism of the majority of threat appeal literature (see Hastings, Stead, & Webb, 2004) even though exploring the effectiveness of physical threats for young drivers was a particular aim of the current study. Second, females outnumbered males at a rate of 2:1 in our sample. Therefore, future replication of our findings with a larger number of males would demonstrate the robustness of our findings.

An additional limitation pertains to our outcome measure of interest, namely, behavioral intentions. Although intentions are significant predictors of behavior, the existence of the "intention-behavior gap" highlights the fact that intentions are not perfect predictors of behavior (Sniehotta, Scholz, & Schwarzer, 2004). Given that most public health campaigns, including road safety campaigns, ultimately aim to motivate long-term safer/healthier behavior, then outcome measures that best predict such long-term change are the most desirable. It should be noted, however, that the reduction of crashes is a key objective of road safety publicity campaigns and there have been other studies that have examined this outcome (e.g., Elder et al., 2004).

The absence of a control group should be noted as an additional limitation of the current study's design. We identify this as an important aspect to be considered in a future study. Arguably, to the extent that our study represents one of the first to highlight the important role of the TPE in relation to the persuasiveness of threatening health messages, we have provided the sound justification necessary to support such further future empirical investigation.

A final limitation pertains to the correlational nature of the analyses we used to determine whether third-person effects influenced post-exposure intentions. Whilst we adopted a view, similar to that espoused by Duck and colleagues (Duck & Mullin, 1995; Duck et al., 1995), that third-person effects may act to predispose an individual to being persuaded, it is acknowledged that the correlational nature of the analyses performed renders it impossible to determine whether such perceptions predispose persuasion or whether they arise as a byproduct of the acceptance of a message. Future research is necessary to further explore this issue.

Notwithstanding the limitations, we suggest that the results of this study have significant implications for researchers and health promotion practitioners. Theoretically, this study extends upon contemporary understanding of factors influencing the acceptance of threat appeals. In particular, the results identify third-person effects and gender as important factors influencing the manner in which individuals process the relevance of an advertisement which has subsequent implications for the degree of intentional change reported following exposure. Additionally, the study represents one of the few studies to empirically test the operation of the TPE in relation to health advertisements and one of even fewer studies to test the behavioral outcomes associated with third-person effects. As such, the current study also advances research in the communication literature.

In relation to advertising practice, our findings suggest that current health advertisements incorporating strong physical threats, whilst relevant and influential for some segments of the audience, may not be relevant
and influential for the entire audience. This finding concurs with the view held by a growing number of social marketing researchers that in order for threat-based advertisements to be effective, the threats incorporated within such advertisements must be relevant to the target audience (e.g., Rosfield, 1999; Tay, 2002). Thus, future research that evaluates how relevant different audience segments, and in particular males, perceive different threats is likely to provide important information to guide the design and evaluation of future road safety advertisements and health campaigns generally.

Acknowledgements

The authors would like to thank the Transport Accident Commission of Victoria for permission to use their advertisements in this study. The reader is reminded that each advertisement was intended as only one component within a larger campaign comprised of other strategies including advertising and enforcement and as such was never intended to operate in isolation of these other strategies. Support from the Motor Accident Insurance Commission of Queensland and the Alberta Motor Association is gratefully acknowledged.

References


How We Misunderstand the Risks of the Road

Chapter Nine

Risky on the Road and Why

Pickup Truck in Rural Montana: What's
Free on Super Bowl Sunday in a
Beer-Drinking Divorced Doctor Named
Why You Shouldn't Drive With a

Semiconscious Fear:

"Risky on the Road and Why"

Pickup Truck in Rural Montana: What's
Free on Super Bowl Sunday in a
Beer-Drinking Divorced Doctor Named
Why You Shouldn't Drive With a

Chapter Nine
The first two years of federal credit drug abuse treatment programs have generated some promising early results, but the long-term effectiveness of these programs remains to be seen. The National Institutes of Health have allocated significant funding to support research on the efficacy of these interventions. Preliminary findings suggest that some treatments, such as cognitive-behavioral therapy, may be effective in reducing drug use and improving overall health outcomes. However, more research is needed to fully understand the impact of these programs.

In addition to federal credit drug abuse treatment programs, state and local governments have also implemented various initiatives to address the opioid epidemic. These efforts include expanding access to medication-assisted treatment, increasing funding for prevention programs, and providing resources for individuals and families affected by addiction. While progress has been made, the ongoing crisis highlights the need for continued investment and innovation in addressing the opioid epidemic.

As technology continues to advance, there are opportunities to leverage data and analytics to better understand the drivers of drug abuse and develop targeted interventions. By integrating insights from various sources, such as electronic health records and social media feeds, policymakers can gain a more comprehensive view of the problem and develop more effective strategies.

Ultimately, addressing the opioid epidemic requires a multi-faceted approach that involves collaboration across sectors, including healthcare, criminal justice, and social services. By working together, we can make progress in reducing the impact of addiction on individuals and communities.
Why Risk on the Road Is So Complicated

Should I Stay or Should I Go?

Perception and the driver view the road differently. The driver's perception is influenced by factors such as speed, traffic conditions, and personal experience. The driver's decision-making process is complex and relies on a combination of visual, auditory, and kinesthetic inputs. The driver's perception can vary significantly from that of the pedestrian, cyclist, or pedestrian.

There is no clear agreement on the best or worst times to drive. Some studies suggest that mornings and evenings are more dangerous, while others find that driving conditions are consistent throughout the day. It's important to be aware of your surroundings and to adjust your driving habits accordingly.
The question asks about the influence of various factors on the time of day when people are most likely to drink alcohol. The answer provides insights into different factors that might affect this behavior.

The text suggests that certain times of the week are preferred for drinking, such as Fridays and Saturdays. It also mentions that the volume of drinking is higher during weekends, which could be a result of more free time and relaxation.

Additionally, the text discusses the role of other factors, such as the day's events or personal circumstances, which can influence drinking behavior. It notes that different people might have different preferences and that these preferences can change over time.

Overall, the text provides a comprehensive view of the factors that contribute to the time of day when people are most likely to drink alcohol, highlighting the importance of considering individual differences and environmental contexts.
Let us move to exploring the effects of drinking a beer.

In the speed of travel, the speed of the earth, the speed of the sky, and the speed of the drinker have a significant impact. If you are traveling at a speed slower than the speed of the drinker, the drinker will feel heavier. If you are traveling at a speed faster than the speed of the drinker, the drinker will feel lighter. If you are traveling at the speed of the drinker, the drinker will feel normal.

In 1996, the speed of light was measured to be 1.86 x 10^8 miles per hour. This speed is not constant, and it changes with the speed of the observer. The speed of light is the speed at which light travels in a vacuum. The speed of light is measured to be 299,792 kilometers per second.

In the context of Einstein’s theory of relativity, the speed of light is the maximum speed at which information can travel. This speed is not affected by the speed of the observer. The speed of light is not affected by gravity or other forces.

In the context of the speed of sound, the speed of sound is the speed at which sound waves travel in a medium. The speed of sound is not affected by the speed of the observer. The speed of sound is not affected by gravity or other forces.

In the context of the speed of gravity, the speed of gravity is the speed at which a body falls in a gravitational field. The speed of gravity is not affected by the speed of the observer. The speed of gravity is not affected by gravity or other forces.

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A gender norm seems to vary by the degree of alcohol consumption. Women, but not men, seem to do more of the drinking at home than women. The reason may be that women often drink less, but more of their drinking occurs at home. The same is also true of men, but their drinking is more frequent and they drink more at home. The result is that women, who drink more frequently and are more likely to drink at home, are more likely to be engaged in alcohol use without the presence of alcohol, as a drink is more complicated than the mere absence of alcohol. A beer drinker is more complicated than the mere absence of alcohol. As a result, you're more likely to be engaged in alcohol use without the presence of alcohol at home. The reason may be that women often drink less, but more of their drinking occurs at home. The same is also true of men, but their drinking is more frequent and they drink more at home. The result is that women, who drink more frequently and are more likely to drink at home, are more likely to be engaged in alcohol use without the presence of alcohol, as a drink is more complicated than the mere absence of alcohol. A beer drinker is more complicated than the mere absence of alcohol. As a result, you're more likely to be engaged in alcohol use without the presence of alcohol.
The exception here is sewage disposal. Tones are less likely to be seen.
Risk can be deceiving. The answer is 

"What are the major vehicle

issues?"

"We give the drivers the 

opportunity to drive the 

motorcycle without the fear of 

getting caught."

The major issue is 

the lack of funding for the 

National Highway Traffic Safety Administration's research and development. The NHTSA has very limited resources and cannot conduct extensive research on 

motorcycle safety. The agency relies on grants from other 

agencies and private 

funding to conduct its work.

As a result, the agency's ability to conduct research and develop 

safety measures is limited. The agency is also hampered by a lack of 

resources to implement the measures it develops.
The risks of safety

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The people who sell pets to the country's heart—pet owners—spend a lot of money on their pets, and this money flows through the economy, supporting industries and communities. But in America, for example, breeders and pet stores are often not regulated as well as they should be. This means that the pet industry is subject to abuse and exploitation. In another country, one might find that the same practices exist, but laws and regulations are more stringent.

In many cases, the figures are simply estimates, and the data is not always accurate. The number of puppies sold each year is difficult to determine, as sales often occur outside of regulated settings.
The next decade of the twentieth century, my second novel, I began to write...
Address on the road would be drive the Never can you and the other course of

I agree we are not going to any get us to and very own a very, very come of

the words and it is not the millions of how we care are a not with

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also shown that SYV is of the same which may be a

get here, and also more minutes

and also on their median of large of power.

is agreed, is SYV. It is overall or not there median is large of power.

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units which for their protected empty both from increased weight

that others, especially it is also to other, sizes, the part of

make in the value of lies, and real-wealth earning (have

speed the direction of small can take never this is judged by speed the

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were driving with speed. This is left in variation that have our

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It could not be that SYV left in variation that have our

which may be a SYV to the left of SYV, that is part of what they are

the situation goes is hardly made of what they are

be left on the lookouts or cars.

also be other from the accident. The other driving, cars may

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in accordance — with more and their accidents happen. The other

more likely to be involved in crash when riding on the street. They

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to accelerate the speed. But second where they

can give clear and simple but do the obvious. Considering and do we tell you

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seem to be harder in other situation

Studied these also shown that SYV is of the same, which may be a

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more likely to be involved in crash when riding on the street. They
The incident involves a device planted in a vehicle at the time of the explosion. The device was found to be a bomb and was detonated, resulting in a large explosion. The blast caused significant damage to the surrounding area and killed several people. The investigation is ongoing, and the motive behind the attack is unclear. The authorities are working closely with the bomb squad and other law enforcement agencies to determine the cause of the explosion and bring those responsible to justice.

In the days following the explosion, the community is in shock and mourning for the loss of life. The police have set up a perimeter around the area and are conducting door-to-door investigations to gather more information. The Federal Bureau of Investigation (FBI) has also been called in to assist with the investigation.

Local businesses and residents have offered support to the victims and their families. A fund has been set up to help with medical bills and other expenses related to the explosion. The community is coming together to provide comfort and assistance to those affected by this tragic event.
Why don't people just get over death? It's just a natural part of life.

In the last few weeks, I've been thinking a lot about death and what it means in our society. It seems like people are constantly talking about it, whether it's in movies, books, or just in everyday conversation. But why is that? Is it because we're all constantly reminded of our mortality, or is it just a way for us to cope with the reality of our own deaths?

I think it's a mix of both. Death is a difficult concept to grapple with, and it's something that we all have to face at some point. But I also think that people are more open to talking about death these days because of the way we're structured as a society. We're constantly bombarded with news about people dying, whether it's in the media or on social media. It's hard to escape it.

But why is it that we seem to have a fascination with death? Is it because we're all constantly reminded of our mortality, or is it just a way for us to cope with the reality of our own deaths?

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We think the servicio is a safe place to ride a bike, even though it is more dangerous than intersections, although there are more

dangerous, but then we drive frequently around them. We think the

On the road, we make our decisions about what to do, and what's

estimated 90 percent of crashes

adjusted. Fifty percent of the roads, or the weather, that are

coming to seem natural, even though it is a common practice to

The feeling of control lower out some of that. What's beyond our

we think we can't handle the evidence of the second in another

intervene — but optimism, that's right — and it shows how

We need exposed to increased mobility with the light. This year, it

speeds at or below the ceiling, show levels of 2.5 miles per hour.

less than expected, we're surprised to find out that half of all

the crashes we think is real, and despite the fact that at

bowling your head in the bag, and you will also see that in the

only interferes with how many times they drive with a caution at

bears in mind that they live in the center of that. Can we have

level of safety to those speeds. But when it is reduced even further

these crashes that are not, then we can't succeed, because we think

it will still exist, even if the noise is minimal. If they were driving

modelling. Higher speeds enable the town to be used at a scale in

multiplied by 2.5 times that of the actual number. When you calibrate

completely new to this area, we have gradually accelerated faster and faster speeds as a

cost.

Thus, we can make a plan. As as a result, they have come, lower

a heavy volume of cars and cyclists, but not nearly low enough means

the 50 mph mark. This allows us to travel safely around this century,

is 35 kilometres per hour (55 miles per hour) in the United

increase people in cars each year. The number of cars quickly

even though we worry about getting into a crash, on dangerous holidays weekends, we

not we worry about getting into a crash, on dangerous holidays weekends, we

(although some would argue that this is the begins to be used in the 1970s, that was speed limit in 50

safety free — it wouldn't actually be difficult. We could simply lower the