

# The impact of threat appeal messages on risky driving intentions: A Terror Management Theory perspective

by RN Carey<sup>1</sup> and KM Sarma<sup>1,2</sup>

<sup>1</sup> School of Psychology, National University of Ireland, Galway, Ireland

<sup>2</sup> Corresponding author: kiran.sarma@nuigalway.ie

## Abstract

This paper considers the impact of exposure to road safety threat appeals on intention to take driving risks among young male drivers. In particular, attention is given to the potential for driving-related self-esteem and the personality variable of impulsiveness to moderate this impact. The paper describes an experiment in which participants were exposed to mortality salient or neutral facts. The dependent variable was self-reported intention to take driving risks. Participants ( $n=80$ ) were male university students with a full driver's licence. Participants with high driving-related self-esteem, who were exposed to death-related facts and images, reported greater intentions to take driving risks than those exposed to neutral information. Impulsiveness was identified as a significant contributor to risky driving intentions. Though limited in its ecological validity, the study presents an opportunity to reconsider our understanding of resilience to driving-related health promotion campaigns.

## Keywords

Risky driving, Self-esteem, Terror Management Theory, Threat appeal

## Introduction

Young male drivers are over-represented in road traffic accident statistics, with evidence indicating that young males are more frequently involved in road traffic accidents than any other age group [1]. The source of these statistics lies not just in fast and reckless driving. In parts of the Republic of Ireland and United Kingdom youth car-cultures exist, with high-risk driving often playing a large role in these cultures. It is no surprise, then, that road safety and law enforcement agencies pay specific attention to this high-risk group and, working with academic institutions, are attempting to develop a more sophisticated understanding of the psychological factors implicated in risky driving.

Current efforts to address road safety concerns in the Republic of Ireland include driver education, training and testing, legislation to restrict the extent to which vehicles can be modified, as well as television and radio-based campaigns aimed at deterring people from reckless driving. It is the latter, road safety advertising campaigns, that is of primary interest here, and in particular the use of mortality salient 'threat appeals' that convey the message that 'dangerous driving kills'. 'Threat appeals' are often employed as a deterrent strategy in these

campaigns. Though often referred to as 'fear appeals', 'threat' is thought to be the more appropriate term, allowing for a wider study of mediating emotions and cognitive responses [2,3]. Through presenting the viewer with the reality of the negative consequences that might occur as a result of engaging in dangerous driving, threat-based campaigns are thought to motivate avoidance of such behaviour [4].

However, the efficacy of these threat appeals in moderating driving behaviour is unclear, with mixed results reported [3]. One potential explanation of these inconsistencies is that some individuals perceive risky driving as an important aspect of their self-esteem [5], and that exposure to threat appeals can elicit defensive responses in these individuals, which are manifest as an increased willingness to take driving risks (e.g. [6-9]). One theoretical framework which attempts to account for these defensive responses, and which assigns a central role for self-esteem, is Terror Management Theory [10].

## Terror Management Theory

Terror Management Theory (TMT) proposes that the fundamental source of our anguish and distress in life stems from our fear of death, and that our ultimate motive in life is to manage this fear [10]. According to TMT, when individuals are reminded of their vulnerability to death, their immediate coping mechanism (proximal defence) is to deny this vulnerability by ignoring the threat, suppressing it, or using logic-based cognitive distortions to exaggerate their immunity from death [11]. When confronted with a threat appeal claiming that eating fast food can lead to coronary heart disease, for instance, a person may use the proximal defence that 'I am young, so it won't happen to me'.

After this initial response, mortality salient thoughts may pass beyond conscious awareness, but may still linger on a sub-conscious level. According to TMT proponents, the individual copes with sub-conscious mortality salience by bolstering two core psychological structures – cultural worldview and self-esteem. On the former, the individual may respond by more firmly embracing the values of his/her society (cultural worldview) as this makes him/her feel connected to others, and thus safer, in the face of the threat of death. On the latter, the individual may bolster his/her self-esteem because in doing so, he/she can deny vulnerability to death and thus avoid fear-derived anxiety [11-13].

The complexity for health-promotion professionals, and of key relevance to the current study, is that the bolstering of self-esteem can take the form of engaging in risky behaviours that are linked to self-esteem. Theoretically, then, exposure to threat-based road safety campaigns could lead those with ‘self-esteem linked to driving’ (driving-related self-esteem), to respond with more extreme driving. A number of recent studies have attested to this, with findings of increased binge drinking [14], increased fitness intentions [15] and increased intentions to drive dangerously [6], following exposure to mortality salient information. In a recent study conducted in the UK, Jessop et al. found that participants who had been exposed to the mortality related risks of driving reported greater intentions to take driving risks than those exposed to neutral information, provided this behaviour was perceived to be relevant for their self-esteem [6]. This effect did not hold true for female drivers, findings consistent with a study by Taubman Ben-Ari and Findler [16].

### TMT, personality and risk-taking behaviour

Personality variables have been linked both to responses to mortality salience [17] as well as to propensity towards risk-taking behaviour [18]. Greenberg and colleagues highlight the potential for situational and personality variables to influence an individual’s judgements and responses to a mortality salient threat [17]. Their study found that individuals who are high in the trait of authoritarianism are more likely to use defensive mechanisms as a response to mortality salience. Further research into TMT and personality has found evidence of an interaction between mortality salience and sensation seeking [19], attachment style [8, 20], as well as an exacerbating role of mortality salience on phobic and compulsive behaviours [21].

Personality has been found to be a significant moderator of risk-taking behaviours such as dangerous driving [18, 22]. In a study by Zuckerman and Kuhlman, generalised risk taking was related to scales for impulsive sensation seeking, aggression and sociability, but not to scales for neuroticism or activity [18]. A study by Dahlen et al. examined the factors involved in unsafe driving, and found impulsiveness to contribute significantly to the prediction of aggressive and risky driving [22].

Impulsiveness is concerned with an individual’s control over their thoughts and behaviours [23], and is associated with a lack of planning and decision making [24]. It has been linked to risk taking, as well as to angry and aggressive driving [25] and driving under the influence of cannabis [26]. A study by Owsley, McGwin and McNeal found that participants who reported having previous driving violations were more likely to score highly on impulsiveness [27]. While links between personality variables and risk taking have been well documented, they have not been widely explored within a TMT framework.

### The current study

Following the research of Taubman Ben-Ari et al and Jessop et al. [6, 7], the current study explored the effect of viewing death-related facts and graphic, static images of road traffic

accidents on participants’ self-reported intentions to take driving risks. Further, it examined the extent to which personality variables may further explain variations in intended risk taking.

The current research explored one core hypothesis: that the mean level of reported intention to take driving risks after exposure will be greater in the group exposed to mortality salient information than in the group exposed to neutral facts, but that this finding will be superseded by an interaction effect between condition (mortality salient/control) and driving-related self-esteem, where only those with high-driving-related self-esteem will show an increase in intended risky driving behaviour. No hypothesis was proffered in relation to personality.

## Method

### Participants

A total of 80 drivers took part in this study. All participants were male university students in the Republic of Ireland between 17 and 24 years of age ( $M = 21.33$ ,  $SD = 1.64$ ) and all were in possession of a full driver’s licence.

### Measures

**Driving as Relevant to Self-esteem (DRS) scale.** Participants completed a self-report scale which assessed the relevance of driving for their self-esteem [7]. This scale contained 15 items, seven of which probed potential positive implications of driving for an individual’s self-esteem (e.g. ‘driving allows me to feel valued by others’) and eight of which probed negative implications of driving (e.g. ‘driving hurts my social relationships’). Participants rated the extent to which they agreed with these 15 statements by responding on a seven point scale, ranging from 1 (not at all) to 7 (very much). The 15 items were then averaged (with negative items being reverse coded) to create a mean DRS score for each participant. This scale had acceptable internal reliability ( $\alpha = .72$ ); however when item 5 was removed from the analysis, this figure increased to .75. Item 5 (‘driving allows others to derogate [insult, humiliate] me’) was therefore omitted from the analysis. Higher scores reflected higher perceptions of driving having positive implications for self-esteem.

**Mortality salience manipulation.** Participants in the experimental (mortality salient) condition were asked to read five facts about driving which were accompanied by three images of road traffic accidents. The facts were obtained from Irish Road Safety Authority (RSA) data and referred to mortality-related risks of driving which are relevant to young male drivers (e.g. ‘For every km driven, a 17 year old male is 8 times more likely to be involved in a crash than a middle aged man’). These facts and images were followed by the warning ‘dangerous driving kills’. Participants in the control condition were asked to read five neutral facts about driving which were unrelated to risks, crashes or deaths (e.g. ‘The total number of licensed vehicles at 31st December 2008 was 2,497,568’).

**Distracter task.** Research has tended to suggest that distal TMT defence responses occur after a delay or a distraction [12]. Participants were therefore asked to engage in a word-search activity for 3-4 minutes following the mortality salience manipulation. The words used in this word-search were neutral and unrelated to death.

**Manipulation check.** Participants were asked to complete a word fragment completion task to assess death-thought accessibility [28-30]. Twenty-two words were used in this task. Eight of these could potentially be completed to make either a death related word, or another word unrelated to death (e.g. COFF\_ \_ could be completed to make either coffin or coffee; KI\_ \_ ED could be completed to make killed or kissed; CO\_ \_ SE could be completed to make corpse or course etc). Scores between 0 and 8 were then calculated for each participant and compared across experimental conditions.

**Eysenck IVE questionnaire.** Participants were asked to complete the IVE questionnaire [31], a scale designed to measure impulsiveness, venturesomeness and empathy. Impulsiveness is a core personality trait which has been found to relate to driving behaviour and road safety [32-34]. This questionnaire consisted of 54 items which required Yes/No answers.

**Intentions to take Driving Risks scale (IDR).** Upon completing all of the above, participants were asked to complete a self-report scale measuring their risky driving intentions [IDR; [7]]. They were asked to read ten scenarios, each of which described a situation in which the individual might be tempted to take a particular type of driving risk. These scenarios were based on a study by Taubman Ben-Ari et al. [7] but adjusted in terminology so as to reflect Irish culture. For each scenario, participants were asked to indicate the percentage chance that they would perform the action described. They responded on an 11 point scale which ranged from 1 = 0% chance to 11 = 100% chance. A mean IDR score was calculated for each participant, where higher scores indicated higher intentions to take driving-related risks.

### Procedure

Participants were recruited opportunistically on a university campus and questionnaires were administered in groups. They were randomly allocated to either the mortality salient (N = 40) or the control (N = 40) condition. The researcher informed all participants that the study examined a number of influences on driving style, including personality, that participation was voluntary and that all responses would remain anonymous. The researcher emphasised that the materials were to be completed in the order presented.

### Results

As a manipulation check, a one-way ANOVA was carried out to determine whether there was significant difference in death-thought accessibility between participants who were exposed to death-related facts about driving (mortality salient condition) and those who were exposed to neutral driving facts (control

condition). The ANOVA revealed that participants in the mortality salient condition completed more word fragments to make death-related words ( $M = 3.88, SD = 1.09$ ) than those in the control condition ( $M = 2.65, SD = 1.00$ ),  $F(1, 79) = 27.39, p < .001, \eta^2 = .26$ .

The results of a bivariate correlation matrix (see Table 1) revealed that impulsiveness correlated significantly with intention to take driving risks ( $r = .27, p < .01$ ). A hierarchical multiple regression analysis was then conducted to explore this correlation further and to determine whether condition, DRS, or their interaction influenced risky driving intentions (see Table 2). Participants' DRS scores were mean centred to reduce the potential for multicollinearity. Regression was favoured over a 2x2 ANCOVA as the latter would have required splitting DRS to form two groups which can occlude effects and statistical power [35].

**Table 1. Bivariate correlation matrix of variables predicting intentions to take driving risks**

	1	2	3	4	5	6
1 IDR Average	1.00					
2 Condition	-0.47**	1.00				
3. DRS Average	-0.07	-0.15	1.00			
4. Impulsiveness	0.27*	-0.12	-0.06	1.00		
5. Venturesomeness	0.15	-0.14	0.13	0.19	1.00	
6. Empathy	0.06	-0.08	-0.04	0.01	-0.07	1.00

\* $p < .01$ , two-tailed, \*\* $p < .001$ , two tailed

Impulsiveness was entered in the first block, followed by condition (re-coded with the experimental condition allocated a value of -1 and the control condition allocated a value of 1) and DRS (mean centred) in the second block. The interaction between condition and DRS (centred) was entered in the third block. The criterion variable was participants' mean IDR score. No strong relationships were observed between the predictor variables with inter-predictor correlations  $< .9$ . VIF values ( $< 10$ ) and tolerance values ( $> .1$ ) for all predictor variables were adequate, suggesting that multicollinearity was not present.

In Block 1, impulsiveness was a statistically significant predictor of IDR ( $\beta = .28, p = .01$ ), with higher impulsiveness associated with greater intention to take driving risks. Overall this predictor accounted for 8% of the variance in intention to take driving risks ( $R^2 = .08, R^2 = .07, F(1, 78) = 6.48, p = .01$ ). The addition of condition and DRS in Block 2 significantly improved on the model ( $R^2 \text{ Change} = .21, p < .001$ ), and both impulsiveness ( $\beta = .22, p = .03$ ) and condition ( $\beta = -.46, p < .001$ ) were significant contributors to the model but DRS was not. Examination of the descriptive statistics would suggest that those exposed to mortality salient information reported greater intentions to take driving risks than those exposed to neutral facts. Overall the model emerging from Block 2 was statistically significant, explaining 28% of the variation in IDR ( $R^2 = .28, R^2 = .26, F(2, 76) = 10.97, p < .001$ ).

**Table 2. Hierarchical multiple regression predicting intention to take driving risks**

	$\beta$	SE	<i>p.</i>	$\Delta R^2$
<b>Block 1</b>				0.08*
Impulsiveness	0.28	0.05	0.01*	
<b>Block 2</b>				0.21**
Impulsiveness	0.22	0.05	0.03*	
DRS	-0.12	0.18	0.23	
Condition	-0.46	0.15	0.00**	
<b>Block 3</b>				0.00
Impulsiveness	0.22	0.05	0.03	
DRS	-0.12	0.19	0.25	
Condition	-0.46	0.15	0.00**	
DRS*Condition	-0.02	0.19	0.83	
<b>Total R<sup>2</sup></b>				<b>0.28**</b>

Note: \* $p < .05$ . \*\* $p < .001$ . DRS was mean centred.  $\beta$  = Standardised Beta Coefficient. Model 1 adjusted  $R^2 = .07$ , Model 2 adjusted  $R^2 = .26$ , Model 3 adjusted  $R^2 = .25$ .

Finally, the inclusion of the interaction term (condition x DRS) in Block 3 of the regression did not significantly improve on the model. In this final model, impulsiveness ( $\beta = .22$ ,  $p = .03$ ), and condition ( $\beta = -.46$ ,  $p < .001$ ) remained statistically significant, and the magnitude of the standardised beta coefficients suggests that condition was a stronger contributor to the overall model (Total  $R^2 = .28$ ,  $R^2 = .25$ ,  $F(1, 75) = .05$ ,  $p < .001$ ). Given the non-significant interaction between condition and DRS, the hypothesis that the TMT anxiety-buffer effect (increased risk taking) would only be evident among those with high driving-related self-esteem is rejected. In this sample, there was a main effect for exposure, such that exposure to mortality salient threat appeals was associated with greater intention to take driving risks, regardless of driving-related self-esteem. This finding is considered in more detail below.

## Discussion

In the current study, participants exposed to death-related facts and images reported increased intentions to take driving risks, providing partial support for the main hypothesis. If we are to accept TMT logic, the findings of the current study can be explained in the following way: reminding a person of his/her mortality initiates the onset of TMT defence mechanisms. These mechanisms, in turn, precipitate increased efforts to enhance self-esteem. Such efforts are evident in behaviours that serve to increase self-esteem, irrespective of whether these behaviours are dangerous or potentially life threatening. The authors found no significant interaction between DRS and condition. This seems to contradict TMT, which posits that increased risky driving intentions will only occur among participants who perceive this behaviour to be beneficial for their self-esteem. This suggests that, perhaps, it is not TMT defence mechanisms which are responsible for the findings.

However, the authors believe that the non-significant finding for driving-related self-esteem is due to very high levels of driving-related self-esteem in this sample. The potential range for this measure was 0-7. The lowest reported DRS score in this study (2.6) was higher than the median score reported for the same scale in the original paper (i.e. 1.92 [7]). In essence, the issue here is two-fold. First, the mean DRS score was high compared with previous studies. Second, driving-related self-esteem scores in the sample were negatively skewed, and tightly clustered towards the high end of the spectrum, which may point to the need for a more sensitive response format for the scale. These very high levels of driving-related self-esteem mean that it was not possible to test the impact of self-esteem on intention to take driving risks. The authors ended up with a homogenous sample of individuals with high driving-related self-esteem, with this population in general responding with greater intentions to take driving risks having been exposed to the mortality salient information. This leads to the main effect for condition.

A second aim of the research was to explore the potential for personality dimensions to further explain variation in driving behaviour. The present study assessed three core personality traits using Eysenck's IVE questionnaire. The IVE was selected for this study since previous research has identified impulsiveness as a significant predictor of dangerous driving and other forms of risk taking [36, 37]. An initial bivariate correlation matrix revealed a significant correlation between impulsiveness and risky driving intentions. A regression analysis was then performed to examine the amount of variance explained by impulsiveness. Consistent with previous research [38], it was found to be a significant predictor of participants' intentions to take driving risks.

Impulsiveness is characterised by behavioural disinhibition. In studies examining risk-taking behaviours such as reckless driving, drug and alcohol use and smoking, impulsiveness is often considered as an explanatory variable [39]. This connection between impulsiveness and risk taking may be due to the fact that impulsive individuals can behave in an unplanned and unpredictable manner in order to satisfy a desired outcome [40]. The results of a recent meta-analysis into sex differences in impulsiveness suggest that women tend to be more sensitive to the negative consequences of risk-taking behaviours than men, leading them to engage in fewer risky activities. Cross et al. [39] go on to point out that the exploration of behaviours that are both impulsive *and* risky is critical, in that it is this form of risk taking that is likely to underlie criminal behaviour.

Recent research has begun to view impulsiveness as a multidimensional construct, encompassing a cluster of traits including sensation seeking, risk taking, novelty seeking, boldness, adventuresomeness, boredom susceptibility, unreliability, and unorderliness [41]. In a paper by Whiteside and Lynam, the multi-faceted nature of impulsiveness is explored, and four separate psychological processes relating to

impulsiveness are identified: urgency, (lack of) premeditation, (lack of) perseverance, and sensation seeking [42]. Considering impulsiveness as an umbrella term for a number of distinct, but related, constructs will better guide future research in the area of risk taking behaviour.

The findings of the present study support the assertion that threat appeals may not work for some young male drivers, but attention is drawn to the following aspects of the literature in this area. First, there are discordant findings in the literature, and given the tendency for non-significant studies to be infrequently published, non-significant findings may be under-represented in the TMT literature, and thus effect sizes may be artificially inflated. The available literature may, to some extent, be artificially supporting TMT.

Second, there is a problem in terms of the ecological validity of outcomes. The current study assessed risky driving intentions using self-report measures. While previous studies have found that self-report driving intentions correspond well to actual driving behaviour [34], there are unmistakable drawbacks to using this type of scale. Other studies have assessed driver behaviour using the Video Speed Test [43] or driving simulators [7]. Such outcome variables are also not without limitations. The gold standard in driver behaviour research is the use of in-vehicle devices installed in the participants' own cars (e.g. see [44]), which until now has been prohibitively expensive. However, with GPS now standard on many mobile phones, and many applications offering car monitoring, this may become the trend for future research (e.g. see [45]). Ecological validity and psychological realism could be further increased by incorporating actual road safety advertising campaigns into experimental psychological experiments (e.g. see [46]).

Third, the role of 'personality' in risky driving needs to be better understood. General personality domains (e.g. impulsiveness) should be disentangled into sub-facets of the dimension. Loo suggests that personality research should use, where possible, subscale scores derived from primary personality dimensions [47]. He argues that researchers may obtain more reliable correlations by breaking down overall scores into its various components. Specifically, his study examined the roles of three dimensions of extroversion (impulsivity, sensation seeking and decision time) in relation to driver behaviour, and found that impulsivity carried the relationships with all three driving-related measures [47].

Overall, the present research suggests that, among a sub-group of drivers, exposure to threat-based messages about dangerous driving may result in maladaptive behavioural intentions. This has important practical implications. While there is still a pervasive belief that fear is the most effective deterrent, there are many who maintain that threat appeals simply do not work [48]. The findings of the current study support this position, but should be considered in the context of the study limitations noted earlier.

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