Fear appeals, defensive avoidance and their application to road safety messages.

Rebecca Anne Pedruzzi

B. Psych (Hons)

Thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy (Psychology)

Department of Psychology

James Cook University

September, 2015

Statement of Access

I, the undersigned author of this work, understand that James Cook University will make this thesis available for use within the University library and via the Australian Digital Thesis network for use elsewhere. I understand that, as an unpublished work, a thesis has significant protection under the Copyright Act.

Rebecca Pedruzzi

Date

Statement of Sources

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or any other institution of tertiary education. I declare that I have stated clearly and fully in the thesis the extent of any collaboration with others. To the best of my knowledge and belief, the thesis contains no material previously published by any other person except where due acknowledgement has been made. Every reasonable effort has been made to gain permission and acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

Rebecca Pedruzzi _____ Date

Ethics Declaration

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council (NHMRC) National Statement on Ethical Conduct in Human Research, 2007. The proposed research study received human research ethics approval from the James Cook University Human Research Ethics Committee, Approvals H3791; H4576; H5043.

Rebecca Pedruzzi _____ Date

Statement on the Contribution of Others

I recognise the financial contribution of the Australian Federal Government provided through an Australian Postgraduate Award Scholarship.

I recognise the financial and infrastructural contribution of James Cook University through providing me a work station, access to resources, and funding to conduct my research and attend conferences.

I recognise the financial contribution of the Graduate Research School who awarded Graduate Research Scheme grants for attendance at domestic and international conferences.

I recognise the support, guidance, and input provided by my primary supervisor Dr Anne Swinbourne and secondary supervisor Professor Frances Quirk.

Rebecca Pedruzzi _____ Date

Acknowledgements

The community response to my research amongst North QLD towns was spectacular and I am forever grateful. Thank you to all the groups and organisations that advertised or participated in this research.

To my primary advisor Dr Anne Swinbourne, your consistent belief in my ability certainly got me through the toughest parts of this degree. The skills you instil in your students, in particular your focus on big picture issues, have made me a better researcher and problem solver on *all* accounts. I can't thank you enough for your years of guidance, tough love, and laughs.

To my secondary advisor Professor Frances Quirk, thank you for being the mediator. Whenever I needed an alternative point of view, I knew where to go. Your advice and encouragement, especially in the final stages of this PhD, has been truly valuable.

A special note of thanks to the ever expanding lab group 'The Penthouse Crew.' The fun times, friendship, and environment of peer review have helped shape this thesis. To Kayla, I'm so glad we experienced our PhD journeys together. The best part of this journey is that I found the wonderful friend I have in you. Thank you for the chats, the skype sessions, the wine when needed, and for insisting that I learn how to use shortcut keys! To my lifelong friends, my QLD girls, thank you for providing plenty of fun and a lot of perspective. I am truly blessed to have had your constant, unwavering source of support throughout this degree.

To Mum and Dad, you have opened a world of possibilities for your children by insisting that a tertiary education was *not* optional. Without your support and direction, I'm not sure I would have found a profession that I value so much. To my sister Francine, thank you for your common sense and for always giving me a place to stay whenever I made the journey from Perth to Townsville. Having a home I could treat as my own (without the house chores!) made my PhD write up much more pleasant.

And finally to my husband Zekai, none of this would have been possible without you. The support you have given me over the years is more than I could have ever hoped for. You are certainly a man in a million.

List of Works

The following is a list of publications, presentations and interviews which have arisen directly from this thesis.

Peer reviewed conference publications

Pedruzzi, R., Swinbourne, A., & Quirk, F. (2013). Can the Extended Parallel Process Model predict attention to health information? Suggestions for health campaigns. *Psychology & Health, 28* (Supp 1). p. 135.

Pedruzzi, R., Swinbourne, A., and Quirk, F. (2012) Who is in control? The development of a model for communicating health information. *Psychology & Health, 27* (Supp 1). p. 102.

Pedruzzi, R., Swinbourne, A., and Quirk, F. (2012) One size fits all: communicating the unknown in health promotion. *International Journal of Behavioral Medicine, 19* (Supp 1). S273-S274.

Peer reviewed conferences

Pedruzzi, R., Swinbourne, A., & Quirk, F. (2013). Health behaviours, control and uncertain outcomes: Perspectives for health messages. Oral presentation at the *Stress and Anxiety Research Society* conference, 1-3 July, Faro, Portugal.

Pedruzzi, R., Swinbourne, A.L., & Quirk, F. (2012). The development of a model predicting attention to health information: Why perceived control is crucial. Oral presentation at the *Population Health Congress 2012*: Population health in a changing world, 9-12 September, Adelaide Convention Centre, Adelaide, Australia.

Pedruzzi, R., Swinbourne, A.L., & Quirk, F. (2011). Attending to health risk information: Is denial always maladaptive? Oral presentation at the 32nd International conference of the *Stress and Anxiety Research Society*, Munster, Germany.

Pedruzzi, R., Swinbourne, A.L., & Quirk, F. (2011). Attending to health risk information: Is denial always maladaptive? Oral presentation at the 46th Annual *Australian Psychological Society* conference, 4-8 October 2011, National Convention Centre, Canberra, Australia.

Media interviews

Win news Media interview 10/02/2014 (Townsville, North QLD).

ABC North Queensland Breakfast radio interview 10/02/2014 http://blogs.abc.net.au/queensland/2014/02/do-you-think-youre-a-good-driver.html

"Study looks at Risky Behaviour" General news article published in the Townsville Sun on 26/02/2014, Townsville, QLD.

Abstract

Mass media advertising has an important role to play in road safety efforts, particularly in creating awareness and enhancing risk perceptions (Delhomme et al., 2009; Elliott, 2011). Poor methodological design, and a lack of scientific evaluation mean that it is difficult to determine if road safety campaigns are effective let alone what elements make them effective (Wundersitz, Hutchinson, & Woolley, 2010). Elliot (2011) suggests that the first aim of road safety campaigns should be to gain audience attention. The message then needs to be remembered, not necessarily as a message but the associations with the recommended behaviour. This process is often performed in road safety advertising through the use of threatening and graphic car crash scenes (Castillo-Manzano, Castro-Nuño, & Pedregal, 2012; Lewis, Watson, & White, 2008a). Some practitioners have cautioned that employing these types of messages in health promotion may be ineffective as they can lead to defensive responses such as avoidance or denial (Hoekstra & Wegman, 2011; Ruiter, Abraham, & Kok, 2001; Witte & Allen, 2000). However, this hypothesis is rarely explored in the road safety field. Identifying how and when avoidance occurs could be valuable and aid in the creation of appropriate mass media communications.

The present research programme considered evidence from both the road safety and broader health literature in aiming to understand the factors that may lead to the avoidance or acquisition of road risk information. As such, road threats were compared with the health threat of Coronary Heart Disease (CHD) often employed in the literature. The factors under investigation included the role of positive beliefs (both optimism and unrealistic optimism) and cognitive precursors such as threat, efficacy and control appraisals.

Study 1 (*n*=311) employed a between subjects design that presented participants with threatening essay information about road or CHD outcomes. In the road condition, road crash outcomes were characterised by low perceived personal control and high control attributed to the role of other people. This was very different to control appraisals for the CHD condition where health outcomes were characterised by high perceived personal control and low perceived control attributed to others. Results demonstrated an interaction effect between the condition and perceived control where the adaptive effects of optimism were only noted in the CHD condition. Specifically, recall of risk information was greatest for optimists in the CHD condition characterised by high perceived personal control. These results suggested that the role of optimism in facilitating recall of risk information may largely be an artefact of perceived control appraisals. As such identifying targets characterised by high perceived personal control in road safety might be important to the acquisition of risk information.

Study 2 (*n*=207) aimed to investigate the outcomes individuals perceived they could personally control with regard to road threats. This was performed relative to CHD threats. Results demonstrated the qualitatively different nature of threatening road outcomes. Overall, participants' beliefs in their ability to carry out risk and protective road behaviours were not related to beliefs in their ability to control road crash outcomes. However, there were strong relationships between behavioural control and perceived control over legal sanctions (specifically the occurrence of fines). In contrast for a CHD threat, participants perceived that what they did behaviourally influenced the occurrence of a heart attack outcome, via controlling a number of markers (e.g. blood pressure, weight) that indicate an individual is at risk. These findings demonstrate why threatening road messages characterised by crash outcomes are not ideal to use in road safety promotion efforts. Instead, messages presenting fine

outcomes may be more appropriate as individuals perceive they have some influence over the outcome.

In a road only scenario (Study 3; *n*= 228), participants were once again presented with road risk information. This information portrayed risky behaviour leading to road crash and legal sanction outcomes in two separate essays. Results demonstrated that threat and efficacy appraisals were independently related to recall of the legal sanction information. Specifically, increases in threat and efficacy lead to increases in recall. No such relationships were demonstrated for the crash outcome information. Further, a high risk target group remembered equally as much legal sanction information compared to low risk groups who were engaging in higher levels of protective behaviour. For the crash information, a similar target group recalled less crash information than two low risk groups.

Overall, the findings suggest that threatening road safety messages may not lead to inattention processes, as long as the outcome is appraised as controllable by the individual and their ability to carry out risk and protective behaviours is related to the outcome presented. These findings are considered in light of current fear appeal theory and best practice health promotion and intervention.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ARSC – Australian Road Safety Council

BITRE – Bureau of Infrastructure, Transport, and Regional Economics

CARRS-Q – Centre for Accident Research and Road Safety Queensland

CHD – Coronary Heart Disease

EPPM – Extended Parallel Process Model

FPC – Focus of Perceived Control

HRA – Health Risk Appraisal

LPC – Locus of Perceived Control

MHLC – Multidimensional Health Locus of Control

NHMRC – National Health and Medical Research Council

PM – Protection Motivation

RPA – Risk Perception Attitude framework

RTA NSW – Roads and Traffic Authority New South Wales

TAC – Transport Accident Commission

T-LOC – Traffic Locus of Control

WALGA – Western Australian Local Government Association

WHO – World Health Organisation

Introduction

Globally, the effects of road traffic crashes are enormous. More than 1.2 million people die every year on the world's roads, and another 20 to 50 million people are injured. The effects on families and communities are devastating and immeasurable, while the economic consequences of road crashes are estimated at billions of dollars yearly. As such, road crashes are a significant and concerning public health issue (WHO, 2013a). Locally in Australia, there have been decreases in road fatalities during the past decade. From 2004 to 2013, road fatalities decreased from almost 1600 deaths to approximately 1200 deaths, representing a 25% change. However these decreases are not uniform across the country. Throughout this period, Queensland, Western Australia and the Northern Territory have had consistently higher fatality rates per 100, 000 population in comparison to the overall Australian rate. The only exception was Queensland in the year 2010. In contrast, New South Wales and Victoria have had consistently lower fatality rates during the same time period (BITRE, 2014). Although the majority of the Australian population live in urban areas and capital cities, more than half of road deaths occur on rural and remote roads (CARRS-Q, 2012). It is likely that many factors impact upon these differences. Rural areas are characterised by monotonous road environments, as well as lengthy travel distances and driving times. These conditions can lead to fatigued driving (Di Milia, 2006; Rossi, Gastaldi, & Gecchele, 2011) and increase the risk of a crash. The time to receiving medical treatment is also significantly longer in these areas which will largely affect the severity of crash outcomes (CARRS-Q, 2012).

However, road crashes are preventable and improvements are possible (WHO, 2004). Mooren, Grzebieta, and Job (2013) note that countries such as Sweden, The Netherlands, and the United Kingdom are consistently positioned amongst those with

the lowest fatality rates in the world. These countries continue to invest resources into road safety improvements in areas such as road planning, engineering, enforcement, policy, and education. In particular, the identification and development of effective policy and intervention strategies through mass media and communication campaigns are crucial to improvement efforts (Lewis, Watson, White, & Tay, 2007). Road safety campaigns are designed to mitigate risk by informing and persuading populations to change their attitudes and behaviour (Hoekstra & Wegman, 2011). As such it is imperative that these campaigns achieve their goals (Lewis, Watson, Tay, & White, 2007).

In Australia, road safety advertising frequently employs the use of high threat campaigns that demonstrate severe consequences of risky driving in graphic ways (Donovan & Henley, 2003; Lewis et al., 2008a; O'Rourke, 2000). The consequences portrayed often involve horrifying pictures of mangled cars, bloodied victims and even the death of children (Algie & Rossiter, 2010). While some advertisements focus on legal sanctions such as fines and demerit points (Donovan, Jalleh, & Henley, 1999) and others have appealed to perceptions of social acceptability (see the 'Pinkie' campaign, New South Wales Government, n.d.), outcomes portraying injury and death certainly remain the status quo (Lewis, Watson, Tay, et al., 2007; Tay, 2005). It seems that Australia is not alone in this endeavour, with countries such as New Zealand, the USA and UK also favouring this approach. This is decidedly different to countries like The Netherlands who have a long history of employing tactics such as humour in this field (Hoekstra & Wegman, 2011).

The use of fear appeals in Australian road safety advertising became particularly popular in the 1990s. At this time, the Victorian Transport Accident Commission (TAC) had employed a series of hard hitting advertisements that demonstrated graphic

scenes of road carnage, accompanied by physical and emotional consequences (Donovan et al., 1999; Lewis, Watson, Tay, et al., 2007). These advertisements were expensive to create with estimations between 250,000 and 450,000 Australian dollars per advertisement. The TAC won international recognition for these advertisements and their approach was swiftly adopted by several other Australian jurisdictions (Donovan et al., 1999). However these appeals, and their accolades, are largely based on the assumption that more fear results in greater persuasion (Lewis, Watson, Tay, et al., 2007; Tay & Watson, 2002).

In a report evaluating the TAC advertising and its' contribution to road trauma reduction, Cameron, Haworth, Oxley, Newstead, and Le (1993) found that the level or reach of advertising was related to road trauma. Specifically increases in audience reach (defined as the percentage of individuals in the viewing area estimated to be watching the advertisement) were found to be related to reduced road trauma. Donovan and colleagues (1999) point out that these findings have been interpreted incorrectly, and in such a way that the *type* of advertising was demonstrated as effective (e.g. Fry, 1996) when in fact this was not evaluated. Road fatality data examined Australia wide suggests that Victoria had similar trends to other states – albeit Victoria had employed more frequent advertising at much higher costs (Donovan et al., 1999). This highlights some of the problems with using fatality statistics, in isolation, as an outcome variable.

Elliott (2003, 2011) has long suggested that measuring advertising and marketing campaign performance based on road crash statistics is flawed as too many factors impact upon this outcome. Hutchinson and Wundersitz (2011) also argue that the random variability in crash statistics is too great, therefore measuring the success of campaigns in this way is doomed to fail. Instead, these authors argue that evaluations should be based on behaviour change, linked to safety, and objectively observed.

Specifically, the crux of the issue is whether or not a campaign had the desired effect on the target behaviour, regardless of whether this is detected in the crash database. Elliott (2011) further argues that determining how or why the campaign had an effect on behaviour is also invaluable. Unfortunately, while scientific evaluation of road safety campaigns is necessary, it is almost always absent (Delaney, Lough, Whelan, & Cameron, 2004; Delhomme et al., 2009; Wundersitz et al., 2010).

Delhomme and colleagues (2009) suggest that the best evidence of the effectiveness of road safety campaigns comes from broad analyses of mass media campaigns. Their analysis of studies and meta-analyses in public health and road safety fields, highlighted some important findings. Firstly, campaigns should be combined with enforcement, education and legislation. Secondly, the target audience should be segmented by variables such as demographics and attitudes. Lastly, the campaign should use a theoretical model and be based on prior research. This final point is especially important. In practice, road campaigns are very rarely based on theoretical foundations (Elliott, 2011; Wundersitz et al., 2010) and many experts in the field highlight this is necessary (Delhomme et al., 2009; Woolley, 2001). Elliott (2011) suggests that the main reason for the insufficient scientific framework is the belief that it's too expensive to seek out a scientific process. Specifically, only 20% of budgets are allocated to message design. The remainder is allocated to media placement.

This is interesting considering the significant amount of money spent on campaigns that have not been evaluated. Donovan et al. (1999) highlighted the expense of the TAC campaigns in comparison to campaigns employed by other Australian states. The TAC campaigns were not only more dramatic and emotional; they were also more expensive to produce. These authors sought to determine if the more expensive and dramatic campaigns resulted in greater intentions to change behaviour, in

comparison to less expensive and less threatening campaigns. They tested a number of advertisements with almost 1000 drivers. Two of the best performing advertisements were two expensive TAC campaigns that highlighted graphic crash scenes. However, overall they found that the budget advertisements performed equally as well as their expensive and threatening counterparts. They concluded that big budgets were not necessary to create effective messages.

Mass media has an important part to play in improving road safety, particularly in creating awareness and the perception that one is at risk (Delhomme et al., 2009; Elliott, 2011). An applied example of this process is evidence suggesting that legal sanctions (specifically double demerit points) are effective in reducing the number of crashes. An evaluation completed in Western Australia found a 7% decrease in crashes during double demerit periods over 5 years. This was in comparison to a 9% increase in crashes during non double demerit periods within the same 5 year period (WALGA, 2008). Double demerit points are likely to be effective for a number of reasons. Double demerit weekends usually have increased police presence and thus increased enforcement. However, the presence of police is always combined with the widespread use of media. Specifically, TV, radio and roadside billboards remind people of the consequences of their risky behaviour during these periods. Together, this likely increases the perception that people will be caught and as such they adjust their behaviour over these defined time periods.

In summary, poor methodological design, and a lack of scientific evaluation mean that it is difficult to determine if road safety campaigns are effective let alone what elements make them effective (Wundersitz et al., 2010). Reliable evaluation methods are urgently needed in road safety. Road safety researchers need to be proactive in seeking out potential influences from other fields because in most contexts – especially

in Australia – advertising messages and media are left in the hands of marketing personnel who may not have this insight or capability (Elder et al., 2004; Elliott, 2011). Most importantly, large amounts of tax payer dollars are being invested into road safety campaigns that may not actually be effective. If people are not adequately responding to these campaigns, then these dollars could be channelled into more appropriate intervention methods.

Elliot (2011) suggests that the first aim of road safety campaigns should be to gain audience attention. The message then needs to be remembered – not necessarily as a message but the associations with the recommended behaviour. This process is often performed in road safety by aiming to elicit an emotional response – usually fear. Some practitioners have cautioned that employing these types of messages may be ineffective as they can lead to defensive responses such as avoidance or denial (Dejong & Atkin, 1995; Hoekstra & Wegman, 2011; Job, 1988; Ruiter et al., 2001). Identifying how and when this occurs could be valuable and aid in the creation of appropriate mass media communications.

The following thesis presents a novel way of evaluating and improving the effectiveness of a road safety message. Specifically the project investigates attentional preferences for risk messages and also examines factors that may facilitate or hinder this process. This program of research was performed in order to provide a framework for creating road safety messages that an audience will attend to. This work has considered and incorporated evidence from the road safety arena, but has also employed examples and techniques from the broader health literature. Specifically, insights have come from a number of domains including health and social psychology, neuroscience, and advertising. This has been suggested and employed elsewhere by experts in the road safety field (Delhomme et al., 2009; Elliott, 2011). The thesis consists of seven

chapters. The first three chapters incorporate a review of the literature. Chapter 1 presents an up to date understanding of fear appeal theory via an evaluation of the empirical evidence. Chapter 2 outlines how fear control or defensive responses are usually conceptualized and measured in the literature while also demonstrating some problems with these methods. Additionally, this chapter considers the measurement of attention as a way to determine the presence of an early defensive response to fear appeals. Chapter 3 considers the role of positive beliefs already linked to avoidance or acquisition of risk information in the evidence base. This chapter outlines the inconsistencies in these findings and hypothesises how situational factors (specifically perceived control) may be responsible. The review of the literature generated a number of hypotheses that are tested in Chapters 4 through 6. Chapter 7 presents a general discussion of the project outcomes in terms of the implications for road safety and health promotion practices.

Chapter 1

Fear appeals: From practice to research

1.1 The use of threat in risk communication

At their most basic, fear appeals are communication attempts that present the negative consequences of engaging in risky behaviours. The message aims to elicit fear by presenting a threat, in an attempt to encourage motivation for the performance of protective behaviours (Ruiter et al., 2001). While threat and fear are terms that are used interchangeably, threat is more accurate as 'threat' is a stimulus and 'fear' is a response. Furthermore, a threat can produce a variety of emotions and cognitions beyond fear (Donovan & Henley, 1997). However, the terms have become somewhat blurred and unclear in the literature (Hastings, Stead, & Webb, 2004).

Fear arousing messages have a long history of use in health education. Some significant public health issues that have been addressed by the use of such messages include sexually transmitted disease prevention, smoking cessation, risky driving behaviours and overweight and obesity. Locally the most memorable use of threat in health messages is the Grim Reaper campaign broadcast in Australia during the 1980s. This campaign featured a skeletal, hooded Grim Reaper in a dark room with an emblematic scythe in one hand. As the advertisement progressed the Grim Reaper used a bowling ball to bowl over tenpins of Australians, warning that every single Australian could be killed by Acquired Immunodeficiency Syndrome (AIDS). The startling death imagery used in the campaign ensured its memorability. So much so that twenty years on, politicians regard the Grim Reaper campaign as the most efficacious in Australian history. For example, in 2008 Prime Minister Kevin Rudd heralded these advertisements as exemplary when calling for a federal advertising campaign to discourage binge drinking. The Howard government made similar remarks in 2006

when calling for a campaign to address the growing use of crystal methamphetamine in young people (Stylianou, 2010).

The Grim Reaper image is not only imprinted in the minds of the Australian public, it is also considered the gold standard by influential parties. However, there are two myths surrounding the originality and success of this campaign. First of all, this advertisement was heralded as a novel approach for health education practice. Yet in the 1940s and 1950s the Australian Road Safety Council (ARSC) used similar shock tactics in an attempt to reduce the increasing number of road casualties. Specifically, a skeletal Grim Reaper was depicted in radio and print campaigns with references to death. The second myth surrounding the Grim Reaper AIDS campaign was the belief that it was successful in changing behaviour. The findings regarding the efficacy of this campaign are inconclusive (Rigby, Brown, Anagnostou, Ross, & Rosser, 1989) and a study by Rosser (1992) demonstrated a dramatic decrease in safe sex behaviours amongst a group of homosexually active men 4 months after the Grim Reaper campaign occurred. Stylianou (2010) argues that memorability has been confused with effectiveness and thus this type of strategy is used across all types of public health issues. The high memorability of the tactic may also explain its popularity amongst politicians as the impact creates a perception in the general public that something is being done about the issue.

Certainly the use of threat and shock tactics in public health campaigns continues to this day. This can be evidenced by the current 'Live Lighter' campaigns (originally employed in Western Australia) that present graphic images of toxic fat around vital organs in the body in an attempt to target obesity (Government of Western Australia, 2012). Another Australian example is legislation that requires cigarette companies to present images such as diseased lungs and gangrene on plain cigarette packaging.

Many countries worldwide are now following in this tradition (WHO, 2013b). Other examples both locally and overseas include confronting First Aid awareness campaigns (St John Ambulance Australia, 2014) and extremely graphic car crash scenes used for road safety advertising (Smith, 2009).

In addition (and lending support to the claim made by Stylianou, 2010) it seems the public are accepting of these types of messages. For example, Van Putten and Jones (2007) aimed to illustrate community attitudes towards social marketing advertising in road safety in Australia. A series of focus groups were conducted with a total of 80 participants aged over 18 years. Participants attended two discussion sessions. The first session involved a discussion about attitudes towards social marketing. This discussion included road safety marketing. In the second session participants viewed six different advertisements, two of which pertained to road safety. The specific advertisements were chosen due to their identification as problematic in the first focus session. The advertisements were created by the Roads and Traffic Authority (RTA NSW) and depicted death resulting from drink driving and speeding respectively. After viewing each advertisement, participants responded to a short survey.

A thematic analysis of the discussion in the first session demonstrated that consequences of actions were first and foremost the most important factor considered by the audience. While participants acknowledged road advertisements were graphic, they also felt that the benefits of showing these advertisements to community members overshadowed any negative consequences. Quantitative data from the survey conducted in the second session demonstrated that a majority of participants viewed the messages as socially acceptable and considered they successfully marketed safe driving. Very few participants viewed the advertisements as violent. This report demonstrates that community members seem to be accepting of threat appeals in road safety

messages as it is perceived that the benefits of showing the consequences far outweigh any costs (Van Putten & Jones, 2007).

While it is important to produce messages that the public perceive as appropriate, appropriateness does not equal effectiveness. Research participants frequently report threat appeals as motivating and thus report intentions to change, yet many studies show no change in actual subsequent behaviour (Dejong & Wallack, 1999). Participants also tend to report that these messages are personally irrelevant (Hastings & MacFadyen, 2002) and meant for others. For example, Walton and McKeown (2001) found that drivers who believed they drove slower than average (whether they were correct or not) regarded a threatening anti speeding message as intended for others. This is particularly true for road safety messages as most people believe that they are better and more skilled drivers than the average person (Harré, Foster, & O'Neill, 2005; Job, 1990; Pedruzzi & Swinbourne, 2009).

So it appears from this brief review that the use of threat and shock tactics in examples of public health campaigns has been regularly employed for more than half a century. However, this use does not always reflect best evidence based practice. Fear campaign advertising practices are usually founded on implicit assumptions about the effects of threat and fear (Ruiter et al., 2001) and bureaucrats or politicians without knowledge of behaviour change principles often have the final say on campaign design (Job, 1988; Stylianou, 2010). Furthermore, the costs of these campaigns are extremely high. For example the dissemination of the Live Lighter campaign in Western Australia was reported to cost around 9.1 million Australian dollars over 3 years (Live Lighter, 2012). In estimating the costs of graphic road safety campaigns commissioned by the Transport Accident Commission, Delaney et al. (2004) gave estimates of over 200,000 Australian dollars per advertisement. Considering the large amount of money spent on

fear appeals, it makes sense that we ask the following questions: Specifically, what does the evidence base tell us about the use of threat in health communication? Are these appeals effective and how is effectiveness measured?

While there is an abundance of literature which aims to answer this question, evaluating the effectiveness of risk messages is no easy task. The outcomes studied in fear appeal research generally fall into two overarching groups. These are *acceptance* of the message and *rejection* of the message which are both assessed in a number of ways. Message acceptance signifies uptake of the message recommendations, and is usually measured by looking at whether attitudes, intentions and behaviours after being exposed to the message are in line with the recommended action (Witte & Allen, 2000). Measuring rejection of a message is more complex and is not consistently performed in the literature. In order to provide some clarification around these issues, the most prevalent fear appeal theories will be presented and discussed.

1.2 Fear appeal theory

Early fear appeal theories, classified as Drive theories, proposed a non-linear relationship between fear and adaptive behaviour (Hovland, Janis, & Kelly, 1953; Janis, 1967; McGuire, 1968, 1969). These theories hypothesised that fear arousal was necessary to motivate action; however too much fear was suggested to lead to maladaptive outcomes. Eliciting a moderate amount of fear was hypothesised to be ideal and produce the most adaptive outcomes. A lack of empirical support for this inverted U-shaped relationship led to the rejection of Drive theories (Witte, 1992). Consequently, emotional and cognitive responses to fear appeals were defined and became the focus of research. In particular, Leventhal's Parallel Process Model (1970) guided the direction of this focus and laid the foundation for fear appeal theory as it stands today (Witte & Allen, 2000).

Leventhal's (1970) model proposed that fear appeals produce danger control and fear control processes (see Figure 1.1). The danger control side of this model involves a cognitive process and constitutes an effort to control the threat. Danger control responses are considered adaptive because in order to minimise or avoid the threat individuals will act – usually by taking up the recommended response or some precautionary measure. The fear control side of the model is an emotional process – an effort to control fear about the threat. Fear control responses are considered maladaptive or defensive under Leventhal's early model because in order to reduce the negative emotional response precautionary measures will not be employed (Good & Abraham, 2007). Leventhal did not state when or how each of these processes would occur. The model was also never explicitly tested but it did inform future thinking and research into fear appeals (Witte & Allen, 2000).

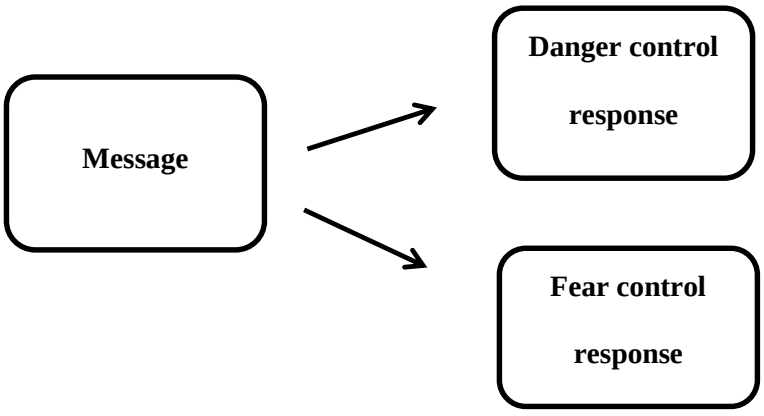


Figure 1.1. Leventhal's Parallel Process Model.

Rogers extended on Leventhal's (1970) model by specifying when danger control processes would be engaged. Protection Motivation theory (Rogers, 1975) was the first theory to distinguish the components of a fear appeal and the cognitive processes that facilitate message acceptance. Protection Motivation Theory (PM theory) hypothesises the existence of two appraisal processes that lead to protective motivations (Figure 1.2).

Specifically, perceptions of severity and perceptions of vulnerability inform a process of threat appraisal. Perceived vulnerability refers to an individual's perception of risk for a threat while perceived severity refers to the seriousness of the threat (Cismaru & Lavack, 2007). These perceptions are necessary for the initiation of threat evaluation. Fear acts to heighten the threat appraisal process through perceptions of severity alone (Witte & Allen, 2000). Perceptions of response efficacy and perceptions of self-efficacy influence the coping appraisal process. Response efficacy is defined as a belief that the recommended response can alleviate the threat and self-efficacy is an individual's confidence in their ability to successfully perform the response (Boer & Seydel, 1996). Protective motivations are the outcome of the threat and coping appraisal processes. Protective motivations direct activity, therefore they are akin to behavioural intentions. As PM theory is used to persuade individuals to follow a recommended action, individuals' intention to perform the recommended action has been used to measure how effective the persuasive attempt is (Floyd, Prentice-Dunn, & Rogers, 2000).

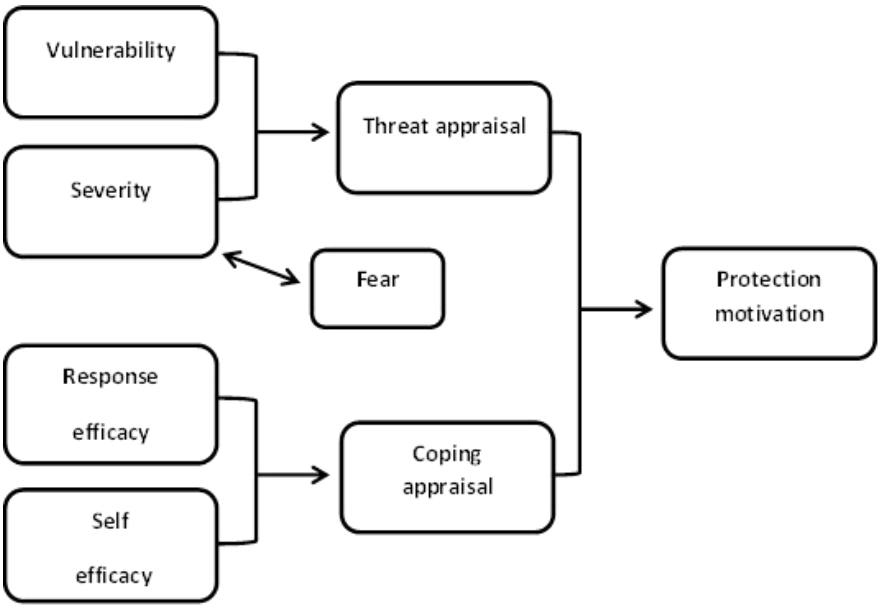


Figure 1.2. Protection Motivation Theory.

The variables mentioned thus far are those that are consistently included in most studies using PM theory (Boer & Seydel, 1996). A revised model (Rogers, 1983) included a rewards appraisal component as part of the threat appraisal process which referred to the rewards gained by not adopting the recommended response. A meta-analytic review of research employing PM theory by Milne, Sheeran, and Orbell (2000) found that only one study attempted to include the rewards component. This is probably due to the difficulty in operationalising this component. The final variable included in the revision (part of the coping appraisal process) is perceived cost, specifically the cost of engaging in the recommended response. Perceived cost includes barriers such as time, inconvenience, and discomfort. Lower perceived cost has been shown to produce greater protection motivation (Cismaru & Lavack, 2007). These additional components are rarely measured or used in research therefore the remaining review of PM theory will largely refer to the specified variables in the original model.

Although PM theory was originally designed as an explanatory framework for fear appeal research, it is now widely accepted as a model of decision making in health (Maddux, 1993). PM theory has been applied widely, encompassing fields as diverse as injury prevention and extending to issues concerning the environment and politics (Floyd et al., 2000). Despite the scope in application, there is disagreement regarding the relationships among the variables in the theory and their proposed interactions. Originally all the components were hypothesised to combine multiplicatively in a four-way interaction. However, this hypothesis was consistently unsupported by empirical research (Cismaru & Lavack, 2007). The revised (1983) model suggested that the variables within each appraisal process would be additive. Witte and Allen (2000) report that factor analytic studies have demonstrated that severity and vulnerability combine to represent a higher order factor of threat. This has also been shown with

efficacy respectively. The relationship between threat and coping appraisals is hypothesised to be interactive (Witte & Allen, 2000) such that an interaction between the two variables must exist for protection motivation to occur. The argument is that threatening information will only result in protection motivation if there are positive coping appraisals (Ruiter, Verplanken, Kok, & Werrij, 2003). Furthermore, the notion of an interaction or multiplicative relationship goes both ways. If the value of the threat or coping appraisal is zero, protection motivation will not occur as multiplying any value by zero will always equal zero (Cismaru & Lavack, 2007).

In contrast to the proposed theoretical relationships between threat and coping appraisals, empirical evidence has been inconsistent. A meta-analysis conducted by Milne et al. (2000) cited numerous studies with only direct effects between the variables and outcomes. Results concluded that while both threat and coping components were positively associated with intentions to perform health related behaviours (protective motivations) the coping components had the strongest and most consistent associations with intention. Relationships between the PM variables and actual behaviour were similar, although weaker. Floyd and colleagues (2000) demonstrated similar findings. Additionally, PM variables are more strongly associated with current behaviour compared to future behaviour (Norman, Boer, & Seydel, 2005). Taken together, this evidence suggests that threat and efficacy may have direct effects on protective outcomes, and not interactive effects as the theory suggests.

Empirical evidence has demonstrated that threatening information is also associated with fear control or maladaptive responses. For example, Prentice-Dunn, Floyd, and Flournoy (2001) found that a high threat message about breast cancer, while associated with adaptive responses, was also associated with negative emotions. Specifically, a high threat message was positively associated with intentions to perform

breast self-examination but also associated with feelings of hopelessness. Beyond emotion, Norman et al. (2005) reported on numerous studies demonstrating negative relationships between vulnerability perceptions, behavioural intentions and concurrent behaviour (e.g. Ben-Ahron, White, & Phillips, 1995; Plotnikoff & Higginbotham, 2002). In terms of application to PM theory, Rogers (1983) notes that if perceived efficacy is low, perceived threat could produce "no effect or a boomerang effect" (p.170). This implies that an individual will not be motivated to respond, or they may respond in a maladaptive way that is opposite to what is recommended. However, it is not possible to make these predictions from the formal PM model (Witte, 1992).

PM theory attempts to bridge the gap between fear appeals and attitude change by specifying what makes a fear appeal work (Milne et al., 2000). However the model does not explain when fear appeals fail. The focus is solely on the danger control processes hypothesised by Leventhal (1970) and fear control is not a response that Rogers addressed. Witte (1992) made this observation and hypothesised that the neglect of emotion and fear in the model could explain the inconsistent findings in the fear appeal literature. Witte proposed the Extended Parallel Process Model (EPPM) by adopting the danger control side of PM theory and defining the fear control side of Leventhal's (1970) model that lacked specificity. Basically the EPPM takes Rogers' (1975) PM theory and incorporates Leventhal's Parallel Response Model in order to explain how fear appeals succeed and also why they may fail.

Witte (1992) identifies appraisal processes in the EPPM that are central to the way an individual evaluates a fear appeal. Firstly, the individual appraises the threat of the hazard. The threat appraisal process (or perceived threat) is hypothesised to have two components. These are perceived susceptibility and perceived severity. Perceived susceptibility can be defined as a person's belief about their risk of experiencing a

threat while perceived severity is defined as how harmful or severe the threat is perceived to be. The second appraisal process concerns efficacy. Efficacy appraisal (or perceived efficacy) also has two components in this model. These are perceived self-efficacy and perceived response efficacy. Self-efficacy can be defined as a person's belief or confidence in performing the recommended response while response efficacy refers to a person's belief that the response will be effective in preventing the threat (Maloney, Lapinski, & Witte, 2011). These processes are similar to the threat and coping appraisals in PM theory.

According to the EPPM once threat appraisal occurs three different responses are possible (See Figure 1.3, page 21). This is where the EPPM departs from PM theory. If the threat appraisal is low, the fear appeal will be ignored as there is no motivation to further process the message. So the individual will do nothing. If the threat is appraised as high, that is an individual perceives they are susceptible to a serious threat, fear is experienced. Within the model fear is defined as an emotion that is negative in valency and is associated with high levels of arousal. In contrast, the threat appraisal process is a cognitive process (Witte, 1992). A relationship exists between them such that the higher the threat perceived, the more fear is experienced. The point here is that fear is needed to warrant motivation to begin the second appraisal process. However, once fear is experienced, an individual is motivated to take action to reduce this feeling. Here the second appraisal – the efficacy evaluation – begins. When efficacy is evaluated as being low, responses aimed at controlling the external threat or danger will not be performed. Thus, an individual will rather aim to control their fear about the threat. Fear control strategies include denial, avoidance and reactance. When efficacy is high, an individual is motivated to control the danger and as such will take on the recommended response (Witte & Allen, 2000). Essentially, high threat perceptions lead

to fear which motivates action. Efficacy determines the nature of that action (Maloney et al., 2011).

Like PM theory the effect of severity and susceptibility are additive. This is also the case for self-efficacy and response efficacy. Additionally, the relationship between threat and efficacy is hypothesised to be interactive. That is once perceived threat is appraised as high, the outcome is dependent on the level of efficacy (Witte & Allen, 2000). The danger control route of the EPPM is portrayed in PM theory. However the EPPM advances the theory by specifying the pathways to fear control responses. Overall, Witte (1992) extended on previous research in three important ways. The EPPM aims to explain why a fear appeal fails, fear is incorporated as a central variable, and the relationship between threat and efficacy is defined.

The prevailing theory in health communication is that perceived threat (along with sufficient efficacy perceptions) is necessary for behaviour change (Peters, Ruiter, & Kok, 2012). Empirical evidence reported so far shows independent relationships between threat, coping, and adaptive responses. Coping is noted as having consistently stronger positive effects than threat. Furthermore, threat can lead to both adaptive and maladaptive outcomes. At an applied level, determining these relationships has necessary implications for developing effective health messages. If efficacy alone facilitates adaptive responses, then using threat to convince people to change their behaviour may be redundant. Furthermore, the defensive reactions demonstrated in the literature due to the main effect of threat may be avoided. However, if the relationship between threat and efficacy is interactive such that the effect of threat is dependent on the levels of efficacy, then threat information is necessary for health messages to be effective (Ruiter et al., 2003). In order to fully resolve this dilemma, research using the EPPM will be called upon. The EPPM allows us to determine the nature of the

relationship empirically, as it attempts to account for defensive reactions to fear appeals.

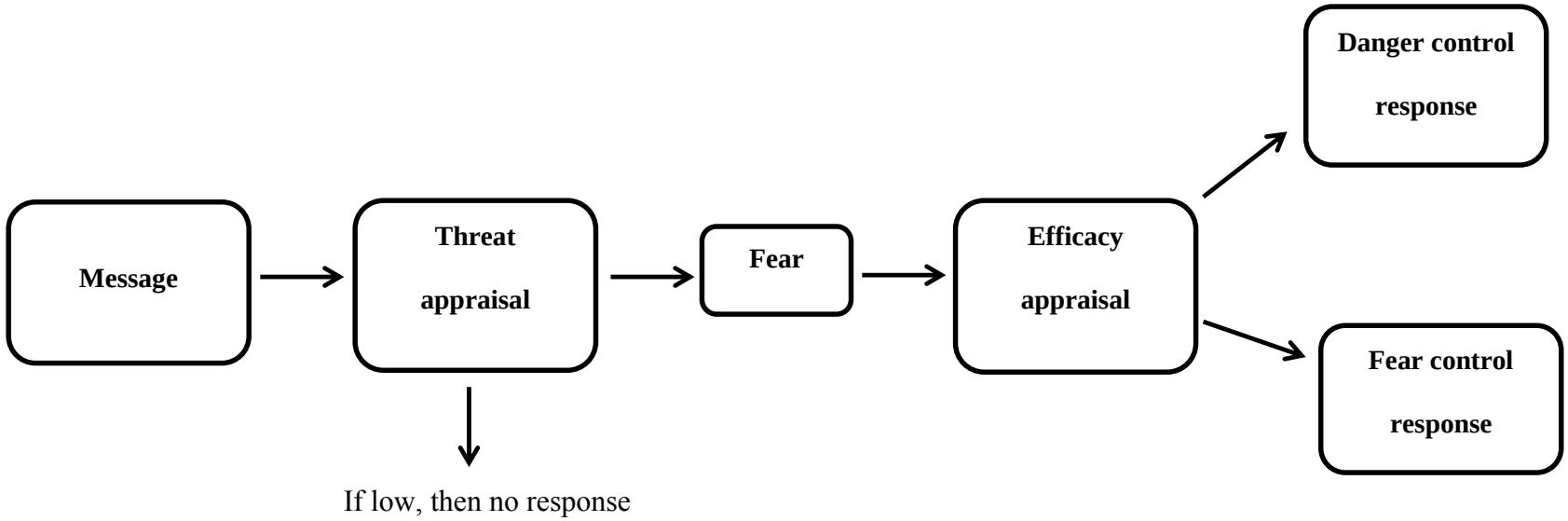


Figure 1.3. The Extended Parallel Process Model.

1.3 Evaluating the EPPM: fear and danger control pathways

The EPPM has been used to frame interventions for a number of significant public health issues. Some of these include sexually transmitted disease prevention (Roberto et al., 2007) smoking cessation (S. Schneider, Gadinger, & Fischer, 2012) cardiovascular disease (McKay, Berkowitz, Blumberg, & Goldberg, 2004) and tractor safety (Witte et al., 1992). The research methods used to evaluate the fit of the EPPM are also diverse, employing empirical research, surveys and focus groups (Gore & Bracken, 2005). The outcomes assessed in these studies are almost always the attitudes, intentions and behaviours related to the message recommendations. These outcomes are collectively defined as danger control responses. Fear control outcomes such as defensive avoidance, reactance, denial and outcomes related to rejection of the message have also been measured although this is conducted less often (Witte & Allen, 2000). It should also be noted that the majority of the EPPM research has addressed attitudinal outcomes, not behavioural ones (Rimal & Real, 2003). The main disparity in the literature concerns whether or not the relationship between threat and efficacy is interactive as defined in the model. Some research has shown support for the EPPM while other research has suggested that making threat salient is problematic and efficacy should be the focus of persuasive health communications (Ruiter et al., 2001). In order to demonstrate this, two examples that employ similar methods but focus upon different behaviours will be compared and contrasted.

McMahan, Witte, and Meyer (1998) aimed to test the EPPM using messages concerning ElectroMagnetic Field (EMF) exposure. University student participants received either a low or high threat risk message along with a list of measures they could take to decrease their risk. Due to ethical concerns, efficacy perceptions were not manipulated in this study. Instead, assessments of existing efficacy perceptions relating

to EMF exposure were used to examine how threat and efficacy were related to each other. These perceptions were measured via a questionnaire given to the participants after viewing the message. Self-efficacy assessed participants' perceived ability to undertake preventative behaviour by asking questions about the convenience of using methods to control EMF exposure. Response efficacy assessed the success of these behaviours by asking participants to indicate how effective EMF control measures were in preventing aversive health outcomes. In order to differentiate perceived efficacy as per the EPPM, these items were combined and groups low and high on efficacy were determined using a median split. The questionnaire also measured threat (perceptions of severity and susceptibility) and fear arousal in order to determine that the participants receiving the high threat message did in fact perceive greater threat and experience more fear.

Danger control outcomes were assessed by asking about attitudes and intentions towards reducing EMF exposure. These questions asked participants to rate how desirable it was to reduce EMF exposure as well as their intentions to reduce EMF exposure. Current self-reported behaviour was also assessed. Fear control outcomes were measured by examining the degree to which participants wanted to avoid thinking about the EMF exposure information (defensive avoidance), whether or not participants felt the message was exaggerated (message minimisation) and whether or not they felt the information was manipulated (perceived manipulation). Likert scales were used for all response formats (McMahan et al., 1998).

Manipulation checks confirmed that participants who received the high threat message did report higher levels of threat and fear than those who did not receive the high threat message. Results demonstrated a significant main effect for efficacy on attitudes indicating that as efficacy increased so did participants' attitudes towards

reducing EMF exposure. A significant interaction between threat and efficacy on attitudes indicated that for the high threat groups, efficacy determined the direction of the relationship with attitudes. Specifically, the high threat, high efficacy group had the strongest attitudes towards reducing EMF exposure. The high threat, low efficacy group had the weakest attitudes towards reducing EMF exposure. For the low threat groups, desire to reduce EMF exposure was relatively neutral and similar, regardless of the level of efficacy. There was a significant main effect of efficacy on intentions, whereby higher efficacy perceptions led to greater intentions to reduce EMF exposure. There was also a significant main effect of efficacy on concurrent self-reported EMF reduction behaviours which demonstrated that regardless of threat level, higher efficacy was related to greater EMF reduction behaviour. There were significant main effects for efficacy on all measures of fear control. Regardless of threat level, lower efficacy perceptions were associated with greater defensive avoidance, message minimisation, and perceived manipulation. Specifically, groups with the lowest efficacy perceptions reported greater desire to avoid thinking about the information, stronger feelings that the message was exaggerated and stronger feelings that the message was misleading. There were no other significant findings (McMahan et al., 1998).

In order to test the predictive value of the model on intentions to reduce EMF exposure, multiple regression was used. The independent variables were fear, severity, message type, response and self-efficacy. Current adaptive behaviour was included as a covariate. Fear and both types of efficacy were significant predictors of intentions to reduce EMF exposure. Specifically, these relationships were positive whereby higher fear and efficacy were related to greater intentions to reduce EMF exposure (McMahan et al., 1998).

The EPPM notes that high perceived threat produces fear. Fear can facilitate or impede self-protective behaviour depending on levels of efficacy. If efficacy is high, then fear has a facilitating effect. If efficacy is low, then the response will be null or maladaptive (Witte, 1992). McMahan and colleagues (1998) demonstrated that for attitudes towards reducing EMF exposure this was certainly the case. Both threat and efficacy were needed in order to motivate protective attitudes. Thus the interactive relationship between threat and efficacy proposed by the EPPM is supported in this study for attitudes. For intentions, those who reported experiencing high levels of fear and high perceptions of efficacy had the greatest intentions to reduce EMF exposure, that is, to adopt protective action. In contrast, low perceptions of efficacy were enough to engage maladaptive fear control responses.

Using a similar design, Ruiter et al. (2003) examined fear and danger control responses with regard to breast self-examination. The aim of this research was to determine whether or not the relationship between threat and efficacy was interactive as the EPPM hypothesises or comprised of main effects whereby threat and efficacy have separate and distinct relationships with danger and / or fear control responses as some of the literature was suggesting. In this study, threat was operationalised using a low or high threat message about breast cancer. An assessment of coping appraisal was then completed by asking participants to estimate how effective (response efficacy) and feasible (self-efficacy) they perceived breast self-examination to be in detecting breast cancer. Danger control responses were measured using attitudes and intentions towards performing breast self-examination. The fear control outcomes assessed defensive avoidance, message derogation and perceived manipulation. Like McMahan et al. (1998) these fear control outcomes respectively examined the extent to which participants avoided thinking about breast cancer, the extent the message was

exaggerated and feelings that the message was manipulating. Fear arousal was also measured by asking participants to estimate the extent to which they felt afraid, frightened, worried or uncomfortable while reading the breast cancer message. These responses were measured using Likert scales (Ruiter et al., 2003).

Results firstly indicated that the manipulation of threat was successful. Participants who received the high threat message reported more fear than those receiving the low threat message. However, the findings for danger and fear control responses were somewhat different to McMahan and colleagues (1998). Regression analyses indicated it was only the coping appraisal that significantly predicted attitudes and intentions towards performing breast self-examination. This relationship was positive, demonstrating that as coping appraisal increased, attitudes and intentions also tended to increase. For the fear control outcomes, both threat and coping had significant main effects on all three measures. However, the interaction was not significant. The relationship between threat and fear control was positive, indicating that as fear increased, fear control responses tended to increase also. Coping appraisal was negatively related to fear control, indicating that increases in coping were associated with decreases in fear control. This study provides support for a main effects model whereby threat and coping are independent in their relationship with fear and danger control processes (Ruiter et al., 2003).

The two research examples reported above employ similar strategies yet demonstrate somewhat conflicting results. The research of McMahan et al. (1998) provides support for the EPPM while Ruiter et al. (2003) suggest that the variables act independently. The latter demonstrates that coping appraisal alone was the best determinant of adaptive responses while threat can generate fear control outcomes. So what might account for the different findings? The threat of breast cancer is widely

known and frequently communicated. As such providing information that further amplifies the threat appraisal process may be redundant. In this context, the provision of threatening information may even ensure a fear control response. Instead high efficacy appraisals may shift the already present threat appraisal to a danger control response. In contrast, EMF exposure is possibly more novel with little known or understood about the outcomes. In this context a threatening message may be needed in order to motivate action, as the EPPM hypothesises. Further, the efficacy appraisal determines the nature of that action. Perhaps then enhancing threat perceptions should not be used as a panacea for all health threats, as in some contexts this type of intervention may backfire.

Interestingly, a meta-analysis of the fear appeal literature conducted by Witte and Allen (2000) also provides superior support for a model characterised by main effects. The aim of their analysis was to examine how people react to fear messages (investigating both danger and fear control responses) and assess the fit of the data to fear appeal theory, in particular the EPPM. The studies included in the meta-analysis had to be at least quasi experimental in design and fear or threat needed to be manipulated so that there were two levels of a fear message as a minimum. This process enabled the authors to determine whether the stronger fear appeal was more effective than the weaker fear appeal. Cross sectional surveys that were correlational in design were not included. Main effects of message features on corresponding perceptions demonstrated the manipulations were successful across studies.

The effects of fear appeal strength were first investigated for message acceptance or danger control responses. These were the attitudes, intentions and behaviours in line with the recommended action. Results demonstrated significant main effects of message features on attitudes, intentions and behaviour. Specifically, message

manipulations of fear, severity, susceptibility, self-efficacy and response efficacy were positively correlated with attitude, intentions and behaviour change. Effect sizes were small (correlations at .1) positive and linear indicating that stronger manipulations of the EPPM variables led to greater danger control responses. Interaction effects between threat (high, low) and efficacy (high, low) were investigated using a 2x2 analysis of variance. Results demonstrated significant main effects for threat and efficacy on danger control responses but no significant interaction. The high threat/high efficacy condition had the greatest persuasive effects (Witte & Allen, 2000).

Subsequently, an additive model and the EPPM model were tested using effects coded analyses. The additive model regards threat and efficacy as independent and higher levels of each were hypothesised to produce greater persuasion. In contrast, the EPPM model predicts the high threat high efficacy group should have the most persuasive effects while the remaining groups should be somewhat similar. The EPPM hypothesises that when threat is low, individuals do nothing. This is irrespective of levels of efficacy therefore even low threat messages with high efficacy were hypothesised to have weak persuasive effects. However, the high threat/low efficacy condition should have the weakest or even negative effects on attitudes, intentions and behaviour as this condition should motivate the qualitatively different process of fear control. The analyses suggested that both the additive and EPPM model fit the data, however the additive model received greater support. The additive model indicated that higher levels of each variable produced greater effects as expected. The EPPM was only partially supported. While the high threat/high efficacy group did have the highest means as predicted, the high threat/low efficacy group was more persuasive than the low threat/low efficacy group (Witte & Allen, 2000).

Witte and Allen (2000) also investigated the fear control side of the EPPM as no prior meta-analysis had done so. The researchers reported on thirteen studies that examined the relationship between fear appeal strength and defensive responses. While interaction analyses were not performed for these outcomes, main effects of threat and coping were investigated. Results indicated the strength of the fear appeal was positively correlated with defensive responses. That is, as the strength of the fear appeal increased, defensive responses tended to increase as well. There was also a negative relationship between the efficacy message and the fear control response whereby the stronger the efficacy message, the weaker the fear control response. Fear control and danger control responses were negatively related to each other.

This meta-analysis demonstrates that the effects of threat and efficacy are best described as independent and having somewhat different outcomes. Specifically, threat has the potential to cause both fear and danger control responses. This is different to McMahan and colleagues (1998) who demonstrated an interaction effect where both variables were needed to engage danger control attitudes. While the results echo those of Ruiter and colleagues (2003) whereby no support is shown for the interactive relationship proposed by the EPPM, they are also somewhat different. Ruiter et al. (2003) demonstrated that threat was positively related to fear control outcomes only. Overall, and in comparison to threat, coping seems to have a somewhat specific effect. It is consistently related to adaptive outcomes. The effect of threat and the proposed interaction with coping is less clear as inconsistent results have been found. The question then needs to be asked - Why are there inconsistent findings regarding the efficacy and threat interaction? This is an important question considering the most common methods used in health and safety advertising aim to generate heightened risk perceptions (Hill, Chapman, & Donovan, 1998; Peters et al., 2012). Doing so across all

contexts may be problematic and lead to inaction or even defensive responses. An applied limitation of any communication theory is that sometimes audience members don't interpret messages the way they were intended to be interpreted. Applying the EPPM across a number of public health issues, without consideration of the specific threat or the target audience, may be the reason for the inconsistencies between theory and evidence. This idea will be further considered in the section below.

1.3.1 Explanations for inconsistent findings using the EPPM. Maloney et al. (2011) state that the EPPM works well where fear appeals are appropriate to use and the specificity of the model allows room for adjustments and limitations. Certainly, moderating factors have been identified. For example, research by Cho and Salmon (2006) demonstrated that individuals reacted differently to fear appeals depending on their readiness to change as defined by Prochaska and DiClemente's (1983) stages of change model. Individuals in the early stages of change were more likely to use fear control processes and those in the later stages were more likely to employ danger control processes after exposure to a fear appeal. This is likely due to increases in efficacy as an individual progresses from the early stages to later stages (e.g. see Figure 1.4). With increasing efficacy, high threat messages are more likely to result in danger control responses (Cho & Salmon, 2006). Furthermore, inappropriate use of fear appeals can occur, in particular where efficacy perceptions cannot surpass high levels of threat perceptions. An example of this is AIDS prevention efforts in Namibia. Muthusamy, Levine, and Weber (2009) found that undergraduate students in Namibia had high pre-existing levels of fear about HIV/AIDS. In addition, fear messages (created using EPPM guidelines) did not change fear perceptions, attitudes, intentions or behaviour. The authors therefore concluded it is ineffective to scare the 'already scared.' These examples draw attention to the importance of pilot testing with samples

drawn from the target population prior to message dissemination (Maloney et al., 2011). This example demonstrates that not all health behaviours are created equally, and thus a one size fits all approach to risk communication can be ineffective.

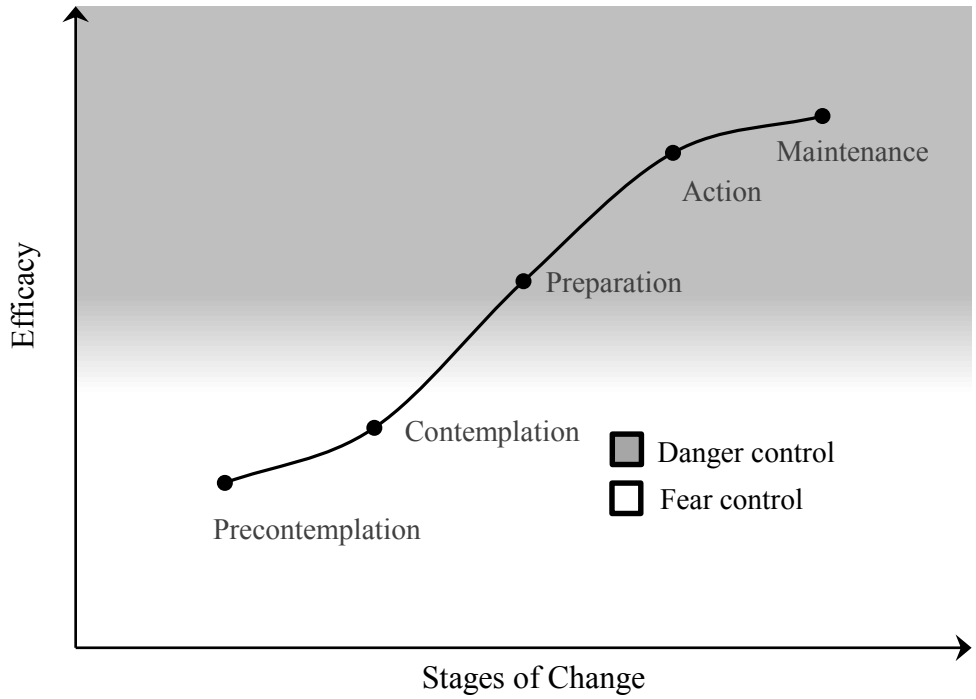


Figure 1.4. The effect of readiness to change on type of response is hypothesised to occur due to increases in efficacy.

As demonstrated, empirical evidence for the EPPM is mixed thus highlighting an inconsistency between theory and application. Recently, Peters et al. (2012) hypothesised that this disjunction between EPPM theory and empirical evidence can be attributed to methodological problems, specifically poor selection of the target audience. While theory predicts that threat and efficacy need to be high for fear appeals to work, efficacy and threat levels are different for individuals and populations from the outset. For example, self-efficacy for exercising is high for those that already do regular exercise. Likewise, the threat of lung cancer will be significantly different for

those that smoke socially compared to those that smoke cigarettes daily. Poor selection of the target audience may therefore contribute to the reduced detection of an effect.

When an experiment is conducted with samples high in threat or efficacy, Peters et al. (2012) argue that the manipulation will not work. More specifically, when a threatening message is given to a behaviour population combination where threat is already high, threat will not have an effect. When threat and efficacy are low, and threatening information is presented, defensive processes are likely to occur. When threat is high and efficacy is low, threatening information is also likely to initiate defensive responses. As no desirable behaviour change occurs, it is unlikely that the work will be submitted or published. Perhaps then, much of the published fear appeal research occurs with behaviours or populations where threat is low and efficacy is high. The low levels of threat mean that the manipulation of threat will work while high efficacy perceptions ensure defensive reactions do not occur.

In order to illustrate this idea, a research example from the literature will be used. This study by Gore and Bracken (2005) provides a good example as participants were classified as holding danger or fear control beliefs prior to receiving a message. The aim of the research was to test the assumptions of the EPPM using risk messages pertaining to meningitis. The sample consisted of university students and the outcomes examined were fear and danger control responses. A mixed design was employed whereby the between factor was the type of message used and the within factor was participants fear or danger control responses before and after receiving the message. In order to classify participants as being in fear or danger control, twelve questions regarding their beliefs about susceptibility, severity, self-efficacy and response efficacy towards meningitis were used. There were 2 different meningitis messages presented to the students; a high threat / no efficacy message or a high efficacy / no threat message.

The messages were delivered as a short presentation by an individual affiliated with the local hospital.

A reinterpretation of the literature suggests that people who hold fear control perceptions (high threat, low efficacy) will employ defensive responses when faced with a threat message. Gore and Bracken (2005) demonstrated that this in fact did occur. Participants who had fear control beliefs prior to receiving the high threat message had significantly greater fear control responses after receiving the message. Furthermore, in line with the hypotheses proposed by Peters et al. (2012) the manipulation of threat should fail for individuals who hold danger control perceptions (high threat, high efficacy). Gore and Bracken's (2005) findings indicate that the participants who had danger control beliefs prior to receiving a high threat message, held fear control responses after receiving the message. In fact, it was the high efficacy message that shifted participants' fear control beliefs into danger control responses. The high efficacy message however, did not have an effect for participants who held initial danger control beliefs.

All of the above indicate that the profiles of the target audience must be considered if the EPPM is to be successfully applied. Witte (1996) acknowledged this somewhat early on by creating measureable statistical criteria to construct fear appeals. The 'critical point' where a person can shift from a danger control to a fear control process can be obtained mathematically. The discriminating value is the point at which threat perceptions begin to surpass efficacy perceptions. It is simply a difference score where the standardised perceived threat score is subtracted from the standardised perceived efficacy score. A discriminating value of zero is the critical point. If the score is positive, then perceptions of efficacy outweigh perceptions of threat. This is when danger control processes are likely. When the discriminating value is negative,

fear control is likely as perceptions of threat surpass perceptions of efficacy (Maloney et al., 2011). This criterion was developed so that a diagnosis of fear control or danger control could be made for an audience and risk statements could be consequently adjusted. Witte (1996) recommended that high threat, high efficacy messages be used when individuals are in danger control and only efficacy messages be used when individuals are in fear control. As fear appeals generally fail to include or address efficacy components, pre-existing levels of efficacy are then paramount in determining whether a person acts in a health protective manner (Witte, Berkowitz, Cameron, & McKeon, 1998). Witte (1996) developed the Risk Behaviour Diagnosis scale in order to measure perceptions of threat and efficacy regarding a hazard. This is then used to determine a discriminating value and the components required for a fear appeal to be effective (Maloney et al., 2011). This method is fine for experimental settings however real world application to population settings will be tedious. Pilot testing of risk communication messages is therefore crucial to the development of effective mass media.

The idea that base levels of efficacy and threat can vary for individuals is thus an important idea to consider and develop. Furthermore, baseline levels of threat and efficacy are not only due to individual differences. They are also due to the specific behaviour under investigation. Peters and colleagues (2012) caution that manipulating threat in a sample high in efficacy erroneously demonstrates a main effect for threat. The correct interpretation would be a "simple effect of threat under high efficacy (pg. 4)." Manipulating both variables in a factorial design ensures this erroneous interpretation does not occur. These researchers thus aimed to re-analyse fear appeal studies in a meta-analysis designed to address this issue. Only studies that manipulated both threat and efficacy were included. Specifically, there had to be at least two levels

of each variable to ensure that bias could be eliminated. The outcome variable under investigation was strictly behaviour due to evidence demonstrating that changes in intentions or attitudes do not necessarily generate behaviour change.

These stringent but robust criteria resulted in only nine studies eligible for inclusion in the meta-analysis where data could be obtained that allowed effect size to be computed. To explore heterogeneity amongst the studies a series of moderation analyses suggested that the quality of the behavioural measure moderated the relationship between threat and behaviour. These analyses suggested that one study should be excluded due to a weak behavioural measure. In this particular study behaviour was measured immediately after the manipulation. The behavioural outcome assessed was willingness to consume medication for roundworm. This medication was provided to the participants therefore baseline efficacy was already high. This left eight studies included in the main effects analysis, only six of these studies examined an interaction effect. Results indicated a main effect of efficacy and an interaction effect between threat and efficacy whereby threat only had an effect when efficacy was high. Likewise, the effect of efficacy was only significant when threat was high. The effect of threat under low efficacy was negative and trending towards significance. Thus, it would suggest that high threat under low efficacy may result in reduced behaviour as compared to low threat and low efficacy (Peters et al., 2012).

While this meta-analysis is likely underpowered, the implications of this research are nonetheless important. It seems that the methodology employed in fear appeal research has affected the outcomes to some extent. Perhaps this can explain the inconsistencies between the findings of previous meta-analyses. In addition, the studies used in this meta-analysis represent the body of evidence regarding the effectiveness of threatening communications. Considering this evidence base is so small (where

methodology problems are not paramount) proper tests in this field are greatly needed. It is also somewhat concerning given the prevalence and wide application of threatening communication by intervention developers, assuming the direct translation of experimental outcomes to the real world. This research suggests that unless efficacy is high (or effectively enhanced) threatening communications can be ineffective (at best) or even backfire.

In summary, baseline levels of efficacy and threat are important to consider when assessing the suitability of a fear appeal. As stated previously this will differ for individuals on any given behaviour- population combination (Peters et al., 2012). A more recent framework examining differences in pre-existing appraisals of threat and efficacy amongst individuals is the Risk Perception Attitude framework (see Rimal & Real, 2003). This framework describes the interaction between threat and efficacy as an attitudinal variable and investigates the relationship to self-protective versus avoidance motivations. The Risk Perception Attitude framework (RPA) considers an individual's standing on these cognitive antecedents and classifies individuals into one of four groups with regard to their risk and efficacy appraisals. These groups are represented in Table 1.1. By considering baseline levels of threat and efficacy as antecedents to action, the RPA provides a useful approach in classifying audience profiles for health promotion efforts in order to predict reactions to fear appeals.

Table 1.1

The four attitudinal groups defined by the Risk Perception Attitude Framework

Perceived Risk	Perceived Efficacy	
	Low	High
Low	Indifference	Proactive
High	Avoidance	Responsive

1.4 Concluding remarks

Although fear appeals as a method of attempting to influence behaviour have been researched for over 60 years, three variables central to the empirical theory base have remained constant throughout. These are fear, perceived threat, and perceived efficacy (Witte & Allen, 2000). The Extended Parallel Process Model is probably the most well-known and widely tested framework. This is most likely due to the testable nature of the theory, in particular the ability to define and explain both fear control and danger control processes. Today, fear appeals are widely used in practice even when there may be warnings about the possibility of defensive responses from researchers and practitioners in the field. Certainly the evidence base cautions for situations where fear appeals may lead to fear control processes such as avoidance, denial and reactance. The literature has demonstrated inconsistent findings regarding the effectiveness of such appeals while empirical research has found that this may relate to methodology issues, in particular the disregard for baseline levels of efficacy for different behaviours in populations. This implies that pilot testing of messages should be of utmost importance. Yet in practice, fear appeals as a mechanism to motivate adaptive responses, seem to be applied on a one size fits all foundation.

The current chapter, while discussing fear appeal theory and the reasons for inconsistencies between theory and evidence in an experimental context, has largely focused on danger control responses and how they are conceptualised and measured. In order to fully understand the implications of fear appeals, Chapter 2 will examine fear control strategies and the process of message resistance. The focus will largely be the measurement of message resistance in a road safety context, however inferences will be made from the broader health literature due to the scarcity of research in this field.

Chapter 2

Message resistance: Evidence and measurement

2.1 Why study message resistance processes?

While it has been argued by many authors that threat appeals have the potential to facilitate behavioural change (Hill et al., 1998; Sutton, 1992) others warn that threat appeals can trigger defensive reactions that may interfere with or halt protective action (Hastings et al., 2004; Ruiter et al., 2001; T. R. Schneider et al., 2001). In the context of health behaviour communication, a defensive reaction is a cognitive strategy that allows an individual to manage or reduce any negative emotions elicited by the health threat (van 't Riet & Ruiter, 2013). The advantages of defensiveness may be twofold. Not only does a defensive response manage the fear that is elicited by the threat, it also controls any negative emotions that threaten one's own sense of self (van 't Riet & Ruiter, 2013). In fact, it is a common finding that risk communication attempts are least effective for those most at risk (eg. Block & Williams, 2002; Croyle, Sun, & Louie, 1993; Earl et al., 2009; Rothman & Schwarz, 1998). Furthermore, studies have demonstrated that risk messages are effective when perceived efficacy is high and fail when efficacy is low (e.g. Peters et al., 2012; See Chapter 1, Section 1.3.1). Hastings and colleagues (2004) point out that fear appeals are consequently most effective for those segments of the population who are best equipped to act on the message from the outset. Those who are psychologically less resourced will feel worse when faced with risk messages and thus engage in defensive responses that may further increase their risk. This has led to the suggestion that health promoters should be more selective about the strategies employed especially when no clear prompts to the recommended action or efficacy information has been given (Brown, 2001; Ruiter & Kok, 2005).

The idea that individuals will employ defences against messages that threaten their sense of wellbeing is not new (Brown, 2001). However outside the domain of psychopathology, defences and biases have received little attention with regard to the design of reliable measures in comparison to other constructs. Defensive responses to risk messages are rarely addressed by behavioural scientists (McQueen, Vernon, & Swank, 2013). Consequently, the measures that have been used in the literature to capture fear control strategies are quite varied (e.g. Good & Abraham, 2007) and reveal little about the nature of defensive responses to fear appeals. In a recent paper, van 't Riet and Ruiter (2013) argue that defensive responses to health communication attempts are not well understood. This raises two issues. The first is that researchers do not distinguish between types of defensive responses. Instead, these responses are treated as homogenous. The second limitation is that defensive responses have rarely been studied in real life settings (van 't Riet & Ruiter, 2013). In real life settings individuals can selectively attend to messages that help reinforce their pre-existing attitudes and behaviours. Laboratory research studies instead direct participants to attend to a message (e.g. Keller & Block, 1996; Nielsen & Shapiro, 2009) which reveals little about spontaneous reactions to messages, least of all whether the message is able to compete with others in a highly competitive media environment (Hastings et al., 2004).

Messages designed to warn people of a threat can be ineffective for many reasons. To demonstrate practically the difficulties in measuring the occurrence of defensive responses to risk messages, Good and Abraham (2007) used the example of two sun protection messages in a hypothetical thought experiment. The first message emphasised the risk of skin cancer and the second message presented the risk of premature ageing, however, both outcomes were due to unprotected sun exposure. If an individual believes the first message but not the latter, does this mean defensive

processing occurred for the latter message only? Rejecting the premature ageing message *might* indicate defensiveness because rejecting a threatening message protects self-worth (Sherman, Nelson, & Steele, 2000; Steele, 1988). However, another possibility is that the premature ageing message was simply less believable because it had less valence for the individual (Good & Abraham, 2007). Given situations such as this how can the occurrence of a defensive response be reliably detected? Clearly, the influence of threat appeals cannot be fully assessed and consistent recommendations for health promotion practices cannot be made with such complex and poorly understood responses. In order to test prevailing models of fear appeal theory (such as the EPPM) valid and reliable measures of defensiveness are needed.

2.1.1 The context of road safety. Despite the widespread use of fear appeals in road safety advertising, many scientists and practitioners have cautioned that they may be ineffective (eg. Castillo-Manzano et al., 2012; Elliott, 2003, 2005; Hoekstra & Wegman, 2011; Job, 1988; Wundersitz & Hutchinson, 2011). In an early example, Job (1990) employed learning theory principles to highlight a number of issues. Specifically, learning to drive involves procedures akin to systematic desensitization and flooding where fear is extinguished and a response incompatible with fear is reinforced. Messages that portray the dangers of driving are unlikely to reinstate the fear response for a number of reasons. Firstly, the situation in which an individual receives the message is problematic. As messages usually reach drivers in the comfort of their own living room, any fear elicited by the message will not generalise to driving. Secondly, media coverage of road crashes may lead to overconfidence. Drivers see many reports of serious crashes, however having not been killed or injured, they may conclude that they are safer or more skilled than average. Lastly fear messages may cause anxiety, and as no direct or immediate action is possible, defensive responses can

occur. The defensive response is reinforced by anxiety reduction, and further presentations of the message strengthen this response.

In a similar vein, Henley and Donovan (1999) noted the frequent use of death threats in Australian threat appeals generally. They maintain that death is a qualitatively different outcome in comparison to non-death outcomes in threat appeals. Specifically, threat appeals generally consist of a contingent behaviour and a negative outcome (Donovan & Henley, 1997). The occurrence of the negative outcome is contingent on the behaviour, whereby engaging in the recommended action will minimise the likelihood of the negative outcome. With non-death outcomes, it might be possible to offer solutions or behaviours that affect the outcome. However, it is much more difficult to reassure individuals that their behaviours will prevent death. Further complicating this issue is the fact that death is inevitable, therefore audiences may believe that the action they take does not matter. As it is unlikely that any behaviour could alleviate death anxiety, defensive responses are likely to occur, rendering the threat appeal ineffective (Henley & Donovan, 1999). This is especially important to consider in a road safety domain because death is a consistently portrayed outcome of risk communication attempts.

More recent opinions cautioning the use of fear appeals in road safety advertising point to the inconsistent empirical evidence (Lewis, Watson, Tay, et al., 2007) and the absent or poor methods of 'real world' campaign evaluation (Wundersitz et al., 2010). For example, Carey, McDermott, and Sarma (2013) performed a meta-analysis of the empirical literature on fear arousal and driver behaviour. Empirical research conducted over a 21 year period from 1990 was included in the analysis. The results suggested that the experimental manipulations were effective in increasing fear arousal, that is, threat appeals did lead to increased fear. However, threat appeals had no effect on

laboratory based indices of driving, or self-reported driving intentions. These researchers conclude that there is little evidence supporting the idea that threatening road advertising is effective in changing behaviour.

Glendon and Cernecca (2003) also point out the limited success of road safety messages to change behaviour. They offer a different opinion – which should be thought about when determining the best evaluation methods. These researchers suggest that campaigns don't succeed in reducing unsafe behaviour, but they can increase awareness. In a review of the mass media literature, Woolley (2001) found that mass media certainly has a role to play in road safety but in isolation behavioural change will not happen. Further, mass media efforts must support other activities such as enforcement for behaviour change to occur. Woolley also identified that adequate evaluation methods for road safety advertising are lacking and need to be addressed.

Phillips and Torquato (2009) reviewed 45 anti-speeding advertising campaigns used in 20 different countries including Australia. The campaigns were recent - over 80% of the campaigns were less than 5 years old. Many of the advertising campaigns employed the use of threat as a stimulus. For example, two thirds of the campaigns demonstrated the risk of harming others, while 16% demonstrated the risk of harm to the self. Almost 40% of the advertised campaigns evaluated were categorised as 'hard hitting emotional' with the outcomes described as shocking. Another 40% were described as rational where objective information using facts and logic describing speeding as undesirable was presented. Some campaigns contained both elements. In their review the authors concluded that proper evaluation of campaigns was lacking. No campaign had an independent evaluation that examined the direct or indirect effect on speeding behaviour. Twenty percent of campaigns examined self reports of knowledge, recall, attitudes and behaviour. However, these evaluations were almost

always performed by the authorities leading the campaign. This finding is not unique. Phillips, Ulleberg, and Vaa (2011) noted that no solid conclusions could be made about the effects of fear appeals in road safety advertising. These authors suggest that more robust evaluation methods are needed to determine the effects of such campaigns. Almost all reviewers highlight that scientific evaluation of road safety campaigns is essential, but in practice it is largely absent (Elliott, 2011).

Despite the fact that evidence for the use of fear appeals in road safety is inconsistent, and in general difficult to quantify, fear campaigns continue to be used as a method of road safety advertising. It has even been suggested that change is unlikely and the state of affairs will need to be tolerated for years to come (Wundersitz et al., 2010). Consequently understanding the factors that influence the relationship between fear and persuasion may be more valuable to investigate (Lewis, Watson, Tay, et al., 2007). Proponents of this view have employed fear appeal theory – in particular the Extended Parallel Process Model (EPPM; See chapter 1) as a theoretical foundation from which to base research (Lewis, Watson, & White, 2010, 2013). Inherent to this model is the idea that fear is needed to gain attention and motivate further processing of a message. However, the coping appraisal determines the nature of the response. That is, message acceptance or message rejection (Lewis, Watson, Tay, et al., 2007).

As per the health literature, message acceptance has been examined in road safety by assessing changes in attitudes, intentions and behaviour (Lewis, Watson, Tay, et al., 2007). However, message rejection outcomes have been almost entirely overlooked in this field (Lewis, Watson, & White, 2008b; Lewis et al., 2013). This is problematic because empirical evidence has suggested that message acceptance and message rejection are not mutually exclusive outcomes (Lewis, Watson, Tay, et al., 2007). As such message rejection will have some bearing on the overall effectiveness of a

message. This makes message rejection an important outcome to examine, particularly with reference to the factors that influence such outcomes (Lewis et al., 2010). The best way to operationalize message rejection will be considered in the section below. This review will consider the methods employed in road safety research and, due to the shortage of research in this field, examples from the health literature will also be employed.

2.2 The measurement of defensive responses

2.2.1 The failure of message acceptance measures to indicate fear control.

Much of what is known about defensive responses outside the domain of psychopathology comes from laboratory research in social psychology. This body of research largely examines the difference in message acceptance beliefs between experimental and control groups. Specifically, the presence of defensive responses is often operationalised as the difference in message acceptance beliefs between an experimental and control group (McQueen et al., 2013). Message acceptance is usually operationalised using attitudes or belief statements in line with message recommendations (Witte & Allen, 2000). Agreeing with a statement about alcohol consumption increasing your chances of cancer would indicate message acceptance. While these measures are designed to assess danger control responses, they are widely applied to the measurement of fear control where lower ratings on message acceptance measures are conceptualised as defensiveness. To demonstrate, a review and meta-analysis by Good and Abraham (2007) established that 'message acceptance' was by far the most common operationalisation of defensive responses to threatening messages in the literature. Good and Abraham's research aimed to identify how defensive responses were operationalised in the literature while also examining the sensitivity of such

measures. This work is novel as no previous review has examined how defensive processes are identified.

Good and Abraham's (2007) review included studies that presented threatening messages and measured outcomes that were indicative of defensive or fear control responses. The studies had to be of quasi experimental or experimental design and include either manipulations of threat relevance, self-affirmation or self-efficacy. Specific patterns of group differences on defensiveness are expected depending upon the manipulation of these variables. If a risk message is highly relevant to an audience member, it is more likely that greater threat and fear is experienced therefore defensive responding can occur (Croyle et al., 2006; Eppright, Hunt, Tanner Jr, & Franke, 2002). In contrast, low and high efficacy perceptions are hypothesised to be related to defensiveness and message acceptance respectively (Witte, 1992; Witte & Allen, 2000). Self-affirming tasks are hypothesised to have similar effects. Self-affirmation (Steele, 1988) is the process by which a person maintains a sense of self-worth, competence and control in their lives. Self-worth can be threatened via a cognitive dissonance process when behaviour is inconsistent with an attitude. A good deal of evidence shows that affirming the self-concept reduces the behaviours performed to cope with dissonance (see McQueen & Klein, 2006 for a review). Therefore, reinforcing self-esteem may reduce any defensive processes that interfere with processing negative information relevant to the self (Reed & Aspinwall, 1998; Sherman et al., 2000). Good and Abraham (2007) thus hypothesised that defensiveness would be greatest for those in the high relevance and low efficacy / non affirmed conditions.

The results of this review were largely as expected. Participants in the high relevance and low affirmation / efficacy conditions demonstrated more defensiveness than those in the low relevance and high affirmation / efficacy conditions. However, of

primary interest here is the classification of message acceptance, its sensitivity, and application in the literature. Specifically, message acceptance was identified as a robust factor with a large effect size indicating sensitivity in the detection of defensive responses to threatening messages between groups. Message acceptance was also the most highly utilised measure (46 tests across 33 studies) and was operationalised using attitudes or belief statements. In all but one study the hypotheses were supported, that is, message acceptance was significantly greater in the low relevance or high affirmation/efficacy conditions (Good & Abraham, 2007).

While this finding demonstrates the broad use of message acceptance measures to assess fear control and their robustness in differentiating between the experimental and control groups, there are limitations. For example, agreeing with a statement about alcohol consumption increasing chances of cancer does not mean the message will be fully accepted. Accordingly, when testing the hypothesis that self-affirmation could reduce biased processing of a message linking alcohol to breast cancer, Harris and Napper (2005) demonstrated that 'belief in the link' was not as robust as other measures of message acceptance. There were no differences between affirmed and non-affirmed participants on 'belief in the link' ratings but affirmed participants reported significantly greater intentions to reduce alcohol consumption. Likewise, Good and Abraham (2007) point out the weak sensitivity of this sub category. They also reported that effect sizes varied within the message acceptance category, thus indicating the existence of heterogeneity. Additionally, the nature of the threat seemed to affect the sensitivity of the message acceptance category. Message acceptance was not as sensitive in detecting group differences for breast cancer threats in comparison to other threats. This may indicate that there is something unique about the way in which individuals respond to threats about breast cancer. A self-affirmation or efficacy

manipulation may not buffer defensive responses towards breast cancer threats as it does for other threats. However, the ability to capture this response in the existing body of literature may be lost due to the way defensive responses are operationalised.

Ultimately, measuring message acceptance and defensiveness in the same way means the occurrence of both responses cannot be captured. van 't Riet and Ruiter (2013) suggest that models like the EPPM fail to account for data demonstrating the co-occurrence of health promoting and defensive responses. For example, Croyle et al. (1993) found that participants who received unfavourable cholesterol test results had strong intentions to make positive lifestyle changes. These participants also rated their test results as less accurate and less serious than those who received favourable test results. Hence, fear control and danger control responses can occur simultaneously (van 't Riet & Ruiter, 2013). Conceivably this issue is made more visible by the inclusion of appropriate defensiveness measures. Relying solely on message acceptance measures to indicate the effectiveness of a threatening message is problematic as these measures fail to capture responses that aim to control fear about the threat.

The use of message acceptance measures to assess fear control responses is therefore limited in scope and should not extend to the measurement of fear control. Furthermore, additional belief statements should be approached with comparable caution. For example, Good and Abraham's (2007) meta-analysis further identified perceived susceptibility and perceived severity as robust measures with medium effect sizes. Lower ratings on both measures are indicative of defensiveness. It could be argued that conceptually these factors are analogous to message acceptance as both measure agreement with an attitude or belief statement. Furthermore, as indicators of defensiveness, perceived susceptibility and perceived severity have similar problems to

measures of message acceptance. Good and Abraham (2007) warn that people can accept they are at risk while still discounting a message (eg. Morman, 2000). Heterogeneity was also present for the severity measure largely due to the nature of the threat. For example, pancreatic disease threats were found to be a homogeneous subgroup characterised by larger group differences and greater effect sizes. While this finding was in the expected direction (severity ratings for those in the high relevance, low affirmation / efficacy condition were lower than those in the low relevance, high affirmation / efficacy condition) the effect was much more pronounced for this threat type (Good & Abraham, 2007). So perhaps then, these measures also offer nothing unique in defining fear control responses.

2.2.2 The measurement of message rejection in a road safety context. In the context of road safety, message rejection outcomes have only been addressed by a handful of studies. In a seminal piece of research, Tay and Watson (2002) used the EPPM as a framework to examine the effect of fear and efficacy on both message acceptance and message rejection outcomes. These researchers noted that message rejection is not often examined in the literature – largely due to the incorrect assumption that message rejection and message acceptance are largely the same response – just at opposite ends of the scale. In this study participants viewed one of two advertisements about driver fatigue. Both advertisements were threatening and featured a fatigued driver violently crashing into a large truck. However, only one of the advertisements included an additional message that comprised a number of behavioural coping strategies. The specific strategies included stopping to take a nap, having a coffee break, and swapping drivers. This condition represented a high efficacy manipulation. The manipulation was not performed as a treatment comparison experiment. Instead, the aim of this manipulation was to ensure variation existed in the perceived efficacy

score of drivers in order to investigate any effect of efficacy on message acceptance and message rejection.

After viewing the advertisement, participants responded to questions that assessed fear arousal, self-efficacy and response efficacy. Fear arousal was assessed using an aggregate of participants' ratings regarding the emotional valence of the message. For example, these questions measured the extent to which participants felt 'frightened,' 'anxious,' and 'uncomfortable.' Self-efficacy was measured by asking participants to indicate their confidence in their ability to avoid situations of driver fatigue. Response efficacy was measured by asking participants to indicate the extent to which they felt the advertisement was effective in providing strategies to avoid situations of driver fatigue. All of these items were measured using Likert scales where higher numbers were indicative of greater fear arousal and greater efficacy perceptions. Message acceptance was measured using items that assessed adaptive behavioural intentions, specifically the extent to which participants intended to avoid driving while fatigued. Message rejection was measured using items that assessed maladaptive behavioural intentions. For example, participants were asked to indicate the extent they felt tempted to switch to another channel when viewing such advertisements. These outcomes were also measured using Likert scales where higher numbers were indicative of greater message acceptance and rejection respectively. In addition, adaptive behavioural intentions and self-reported behaviour (specifically the frequency of fatigued driving) were both assessed at a follow up period one to two weeks later (Tay & Watson, 2002).

Results indicated there was no difference in fear arousal between the groups – irrespective of which message they had viewed. Participants who received the additional coping message had significantly higher perceptions of self-efficacy and response efficacy, indicating that the manipulation was successful. These participants

also reported stronger immediate intentions to avoid driving while tired in comparison to the participants who received the threat only message. The high efficacy group also had significantly stronger intentions to avoid fatigued driving, and, significantly lower reports of fatigued driving at the follow up period in comparison to the group of individuals who received the threat only message. There were no significant differences on maladaptive intentions between groups (Tay & Watson, 2002).

Regression models examined the effect of fear arousal and perceived efficacy on message acceptance and message rejection outcomes. For the prediction of immediate adaptive intentions, there was no effect of fear arousal. Self-efficacy was significantly and positively related to immediate adaptive intentions. This relationship suggested that as beliefs about one's ability to avoid fatigued driving increased, so did participants' intentions to avoid fatigued driving. Likewise, response efficacy also had a significant and positive effect on immediate adaptive intentions. This relationship suggested that the more participants felt the advertisement was effective in providing strategies to avoid situations of driver fatigue, the more participants intended to avoid fatigued driving. At the follow up period, response efficacy was the only significant predictor of adaptive intentions. Response efficacy was also the only significant predictor of self-reported behavior (Tay & Watson, 2002).

For message rejection, fear arousal was significantly and positively related to maladaptive intentions. This relationship suggested that as participants' ratings of fear arousal increased, participants' intentions to avoid such messages also increased. Self-efficacy had no significant effect on maladaptive intentions, however response efficacy had a weak negative effect. This relationship indicated that as participants' beliefs that the advertisement was effective in providing strategies to avoid fatigued driving

increased, participants' intentions to avoid similar messages decreased (Tay & Watson, 2002).

The research of Tay and Watson (2002) demonstrates the important role of efficacy for message acceptance outcomes which is suggested by the broader fear appeal literature that is largely applied to health behaviours. Although no interaction between fear and efficacy was examined, strengthening efficacy perceptions was fundamental to increasing adaptive intentions and adaptive self-reported behaviour in a road context. More specifically, the belief that a message provided strategies to alleviate driver fatigue was especially important in predicting intentions to avoid fatigued driving and lower self reports of fatigued driving. Further, these beliefs were also related to lower intentions to avoid such messages. What is particularly important to note in the above findings is the effect of fear arousal on both types of outcomes. While there was no relationship between fear arousal and message acceptance, the relationship between fear arousal and message rejection highlights the importance of measuring such outcomes. This relationship suggests that too much fear may result in fear control responses such as denial and avoidance. Similar findings regarding the effects of fear and efficacy on message rejection outcomes were demonstrated by Ruiter et al. (2003) in the context of breast cancer (Chapter 1). This response warrants further attention as it may suggest in real life settings road safety advertisements which portray threatening and violent outcomes may be problematic as they could lead to avoidance responses. This hypothesis is rarely examined in the empirical literature.

The inclusion of appropriate defensive measures should thus be used when evaluating the effect of a fear appeal in a road safety context. However, as pointed out by Lewis et al. (2010, 2013) this is seldom done. Without reliable measurement, it may be impossible to capture fear control responses. Most importantly, these responses can

help determine the overall effectiveness of a message (Lewis et al., 2008b). More recent studies have taken the approach of Tay and Watson (2002) and further investigated message rejection outcomes in road safety (e.g. Lewis et al., 2008b, 2010, 2013). In particular, Lewis et al. (2013) expanded on the work of Tay and Watson by investigating the proposed interactive relationship between threat and efficacy (suggested by the EPPM) on message acceptance and message rejection. These authors hypothesized that high levels of both threat and efficacy would be associated with greater adaptive intentions and less maladaptive intentions after viewing a threatening road safety message.

In this study, participants (n = 143) received an audio message that described a young male speeding and killing a pedestrian who turned out to be his friend. Threat and efficacy perceptions were assessed after listening to the message. Threat was measured using participants' ratings of likelihood of being involved in a crash due to speeding (perceived susceptibility) and the extent participants felt a crash was severe (perceived severity). Perceived efficacy included assessments of self-efficacy and response efficacy. Self-efficacy was measured using participants' beliefs that the message provided strategies they could adopt, along with their beliefs in their capability to use such strategies. Response efficacy was assessed using participants' beliefs that the message provided strategies to effectively reduce speeding. Message acceptance was measured by assessing participants' intentions to obey the speed limit. Message rejection was measured by assessing participants' intentions to change the channel or leave the room when faced with a similar message. In order to test the effects of low and high perceptions of threat and efficacy, a median split was performed on these variables. ANOVAs were employed to test their effects on acceptance and rejection. For message acceptance, there was no significant effect of threat or efficacy and no

interaction. For message rejection, there was a main effect for efficacy. This effect indicated that the high efficacy condition had lower levels of message rejection than the low efficacy condition. There were no other significant findings (Lewis et al., 2013).

As per the findings of Tay and Watson (2002) the results of Lewis and colleagues (2013) point to the important role of efficacy in reducing maladaptive intentions. However, there was no interaction between threat and efficacy as hypothesized. It could be that road threats are qualitatively different to the traditional health threats used in the fear appeal literature, and as such models like the EPPM need to be refined for this context. Before this proposal is further developed, the implications of the work by Peters et al. (2012) suggest that baseline levels of threat and efficacy must firstly be considered. Specifically, their re-analysis of the literature demonstrated that ignoring preexisting appraisals may have contributed to the reduced detection of an interaction effect between threat and efficacy. This should be considered in future work with road safety messages.

Research such as the above is greatly needed, not only in road safety but in fear appeal research more generally. Therefore, the above research methods and examples should be commended. However, the operationalization of message rejection in these studies is not without problems. A limitation is that reports of avoidance intentions do not necessarily translate to a realistic viewing environment where viewers could potentially switch off to all or parts of an advertisement (Lewis et al., 2008b, 2010). These self-report measures, which have also been employed with more conventional health behaviours (e.g. McMahan et al., 1998; Ruiter et al., 2003; Chapter 1) fail to capture the extent an individual avoids a message in a more realistic viewing environment. An alternative method to capture fear control responses will be examined in section 2.3 below.

2.3 What types of measures may adequately capture a fear control response?

Defensive responses have been assessed using multiple measures, without consideration of the measures' prior use, reliability, or an understanding of the fundamental processes involved in defensive responses (Good & Abraham, 2007). As such researchers are faced with a repertoire of seemingly equivalent measures with no clear information regarding their application or efficacy. Additionally, the conceptual terms and definitions used to describe defenses are similarly diverse. Defensive responses have been called biases, maladaptive coping, avoidant coping, and ego defenses among other terms (McQueen et al., 2013). The names of specific defenses also vary widely in the literature. For example, van 't Riet and Ruiter (2013) define the defensive response 'avoidance' as 'the control of attention away from a threatening stimulus' (pg. S111). Brown (2001) instead refers to this process as 'repression.'

An empirical example by Morris and Swann (1996) demonstrates how defensive responses can be erroneously grouped together, resulting in poor measurement and differentiation of the underlying mechanisms that make each response distinct. Morris and Swan examined the effects of fear inducing HIV prevention films on both sexually active and sexually inactive college students. In comparison to the sexually inactive students, sexually active students reported lower perceived risk of HIV, less interest in obtaining additional AIDS information and less memory for AIDS relevant information pertaining to the film. The authors came to the conclusion that fear messages produced *denial* in the students most at risk, therefore having effects opposite to that intended by fear inducing communications. In a discussion of this result, Blumberg (2000) argues that these responses are unlikely to be the result of a single coping mechanism as suggested by Morris and Swan. For example, the lower perceived risk reported by sexually active students may be due to a defensive process where they developed

counterarguments against the message. This may have created feelings of invulnerability which resulted in reports of lower risk. Avoiding additional information about AIDS might be the result of trying to control or suppress their fear about AIDS. The finding of reduced memory for the film information could be due to self-distraction, lessening the impact of the threat through inattention. Blumberg argues that these responses (which he calls counterargumentation, suppression and blunting respectively) are distinct constructs. In demonstrating what Morris and Swan's conclusions might mean for health promotion practices, Blumberg (2000) states that such a broad definition of denial, encompassing a number of responses is confusing because it does not allow AIDS educators to understand the precise effects communication attempts may have on a population.

Considering that defensive responses are likely the result of a number of coping mechanisms, and individuals will have a large repertoire of defensive responses to use when faced with threatening information (McQueen et al., 2013), what then might be an appropriate way to detect this process? In developing a conceptual model to distinguish defensive responses, Blumberg (2000) argues that these responses are characterised by differences in information processing. Specifically, as information is further processed and elaborated upon, increasing relevance / risk sensitization gives rise to specific disengagement strategies. Blumberg's model integrates prior work in consumer psychology and advertising that considers the way an individual processes persuasive communication attempts. Specifically, Greenwald and Leavitt (1984) developed an information processing framework defined by stages of audience involvement. The stages are a hierarchical and unidirectional process beginning at preconscious awareness and progressing to effortful elaboration and assessment. Each stage cues later stages (McQueen et al., 2013). Greenwald and Leavitt's (1984) framework is

based on Krugman's (1965) early observation that the impact of advertising differs for low and high audience involvement. Low involvement on behalf of a consumer or audience member may lead to gradual or implicit shifts in perception. In comparison, high involvement may lead to more observable and explicit attitude change. Likewise, in a health communication context, awareness of risk requires a person to deliberately process information. Furthermore, risk sensitization becomes more apparent as information is increasingly processed and elaborated upon. Blumberg (2000) integrates defensive coping styles at each processing stage which can block risk sensitization and consequent protective action. Essentially, Blumberg's coping styles are 'exits' at each stage of Greenwald and Leavitt's model so that further processing of the information can be avoided. Interrupting the processing of information, means that personal risk or relevance is not salient, thus alleviating the fear or anxiety generated by increasing relevance.

Blumberg's (2000) full model is displayed in Figure 2.1. The primary stage of preattention is mostly a subconscious evaluation of the stimulus (McQueen et al., 2013). At this stage, 'attention avoidance' is the exit strategy or defensive coping response. Attention avoidance can occur if the person is distracted, if the message is not salient enough to orient attention towards the stimulus, or via habituation from repetition (Blumberg, 2000). McQueen and colleagues (2013) describe this response as purposely unaware and give examples such as avoiding the news or avoiding going to the doctor. The second stage of information processing is the focal attention stage. Here, an individual has oriented towards the message and processes the words and images. At this point, the anxiety or negative affect caused by the words or images is suggested to cue the individual to stop processing the message. The exit here is termed

'blunting.' Blunting is described as the avoidance of comprehension and occurs when individuals use distraction to avoid the threatening parts of a message.

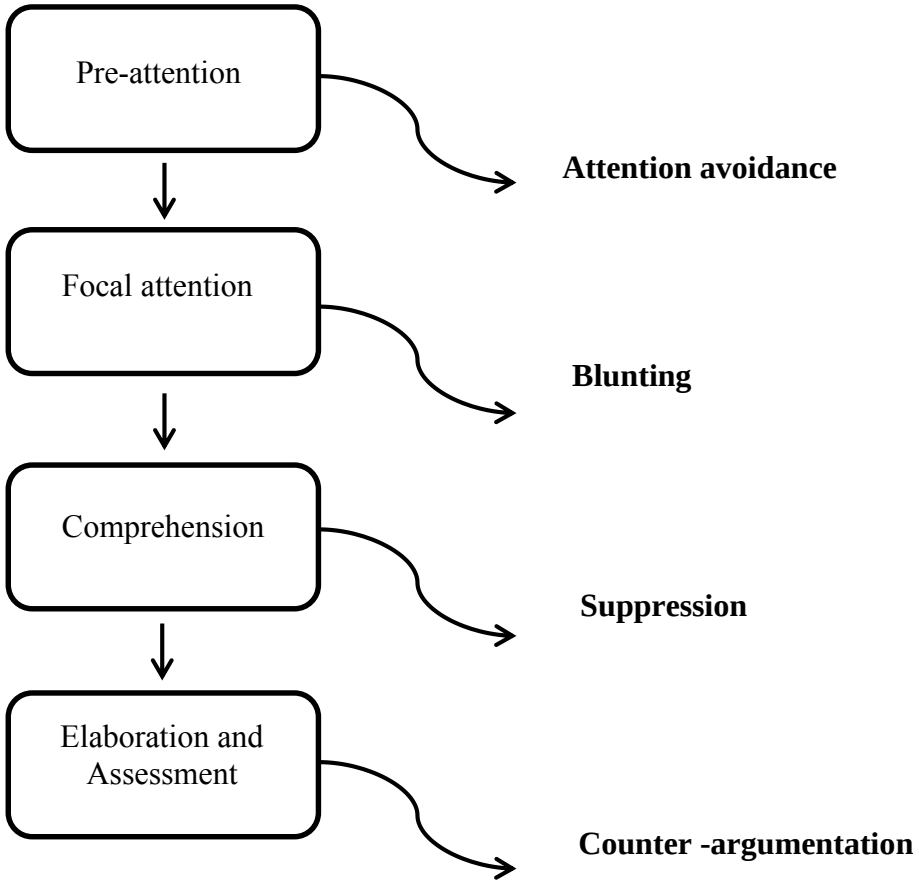


Figure 2.1. Blumberg's (2000) Information processing model of defensive responses.

Research has found that individuals can differ in their motivation to seek out and process threating information. 'Blunters' avoid threatening information or distract themselves from it. In contrast, 'Monitors' seek out this type of information (Miller, 1987, 1995). Avoiding threatening information allows Blunters to effectively reduce their anxiety compared to Monitors (Phipps & Zinn, 1986). A study by Sparks and Spirek (1988) demonstrated that Blunters who watched a horror film showed little increase in electrodermal arousal throughout the film. In comparison, Monitors had

significantly greater arousal. The explanation for this finding is that Blunters are so adept at disengagement through avoidance or distraction strategies, that physiological arousal is also reduced. Blunting as an exit strategy at the focal attention stage can be characterised and measured by distraction and decreased understanding of the message (Blumberg, 2000). For example, Miller and colleagues (2005) developed an educational intervention designed to increase women's knowledge of genetic risk for breast cancer. Results demonstrated that women characterised by a high monitoring style had significantly greater increases in knowledge over a 6 month period in comparison to women classified by a low monitoring or blunting style.

Although Monitors attend to threatening information and more readily comprehend it, this does not necessarily mean that the personal relevance of the threat is recognised. It is unlikely however, that the message meaning can be activated without drawing inferences to personal relevance. At the comprehension stage 'suppression' is the defensive coping response. Suppression occurs when an individual avoids thinking about the threatening information and personal relevance is not inferred. The use of suppression means that a person has to monitor the unwanted thought. This makes the thought active at some level. Evidence of this response can be seen using speeded word association and Stroop interference tasks. For example, an individual who is trying *not* to think of the word 'house' will show greater interference (have slower responses to naming the ink colour) on a Stroop task that presents the word 'house' in comparison to an individual who is actively thinking of the word 'house.' Suppression is therefore not the most effective way to deal with a threatening message in the long term as paradoxically it requires a constant monitoring process (Blumberg, 2000).

The final phase, elaboration and assessment, requires the individual to assess the facts and inferences in the message. At this stage the individual is also likely to assess whether s/he has the skills to manage the threat. Counterarguments are exits here, as they aid in rejecting unfavourable or threatening information. 'Counter-argumentation' involves a biased assessment made after the message is comprehended and the relevance of the risk is acknowledged. Counterarguments will be more readily supported if an individual's ability to manage the threat is low. Motivated counter-argumentation may include a singular focus on a specific argument whilst ignoring others. For example, individuals may focus on their protective behaviours and ignore their risk behaviours. This selective focus could then result in biased perceptions of vulnerability, which can be particularly resistant to change (Blumberg, 2000).

Blumberg (2000) provides a good conceptual model in which to frame a number of complex defensive responses. Additionally, the model can aid the selection of measures used in research (McQueen et al., 2013). When faced with a health message, the process of risk sensitization occurs in stages from purposeful ignorance to the acknowledgement of risk relevance. Defensive responses implemented at any stage to avoid further processing of the message can halt risk sensitization. As attention is necessary for risk awareness, it makes sense to examine disruptions of this process. Fear control strategies should then be evidenced as inattention when a threat is particularly relevant to an individual. The next section will therefore examine the empirical research investigating attention to threatening messages in individuals at risk.

2.3.1 Empirical evidence examining inattention as a defensive response. In their meta-analysis, Good and Abraham (2007) identified 'defensive avoidance' as a measure of defensiveness. This was based on Witte's (1992) assertion that defensively avoiding a message can occur through inattention or suppression of thoughts about the

threat. Measures of defensive avoidance were all hypothesised to capture how willing a person is to process threatening messages. This factor was made up of measures that included recall of information, time and effort spent reading information, and questions that measure the extent to which a person avoids thinking about the threat. This category thus includes measures that are designed to capture the accessibility of attitudes about a threat (Good & Abraham, 2007). Chi square tests indicated this category was homogenous in Good and Abraham's review. Fourteen tests of defensive avoidance were used however two of these tests had unexpected results. For example, Liberman and Chaiken (1992) gave coffee drinkers and non coffee drinkers information that supported and refuted a link between caffeine and fibrocystic breast disease. They found that coffee drinkers' self reports of reading effort were greater than those of non coffee drinkers for both types of information. It could be that coffee drinkers put more effort into reading information in order to scrutinize the message. Or perhaps, they were unwilling to report low levels of reading effort for a message that was clearly relevant (Good & Abraham, 2007). Or possibly, this finding demonstrates a health conducive response by those who we would expect to be most defensive due to their risk status. The average weighted effect size for the defensive avoidance category was small suggesting that these measures may not be reliable in detecting expected defensive responses. However, as defensive avoidance blocks the storage of threatening information, the processes may be better detected after a delay or during message processing (Good & Abraham, 2007; Witte, 1992).

A technique used in recent research has in fact demonstrated this, whilst also showing attentional mechanisms that are not captured in traditional self-report measures. Defensive processing of health information has been demonstrated by means of neuroscientific techniques that provide insight into the disengagement processes by

some individuals. This research, which Falk (2010) refers to as communication neuroscience, examines the psychological processes related to the processing of health information. Specifically, techniques such as electroencephalography (EEG) and functional MRI (fMRI) monitor neural activity while health information is processed. The benefit of using these techniques is that they may be able to better capture the processes that differentiate message acceptance from message rejection. This can be beneficial in identifying psychological factors that may be missing in current persuasion and behaviour change theory.

An example of this approach by Kessels, Ruiter, and Jansma (2010) studied how smokers and non smokers attended to low or high threat smoking pictures. In their study, a variant of Posner's (1980) cueing paradigm was used to assess event related brain potentials (ERPS). ERPs are recordings of brain activity obtained using an EEG. This approach enables early attentional processes to be assessed within milliseconds of stimulus presentation. The paradigm devised by Kessels et al. (2010) presented two horizontal or two vertical dots (targets) on a computer screen to the left or right visual field. A high or low threat smoking image acted as a cue and preceded this target. In 82% of the trials the cue appeared at the target location. In 18% of the trials the cue appeared at the opposite location. These are called valid and invalid trials respectively. The valid trial ensures a quick response because the image cues attention to the correct location. The reaction to a valid trial is indicative of an attention capturing process. When an invalid trial is presented, attending to the target position will be slower because the image has cued attention to the incorrect location. It requires attention to be disengaged and reallocated to the target. The reaction to an invalid trial is indicative of a disengagement process. Reactions are determined by the time it takes to press a

specific button as a response to each trial. Errors (missed responses, incorrect responses and reactions faster than 120ms) are also recorded.

Reactions to the invalid trials were the main interest of the research. It was hypothesised that disengagement processes would be likely in those for whom the information was particularly relevant (due to defensiveness). That is, smokers were hypothesised to disengage their attention more readily from the cued location to the target location in invalid trials for the high threat condition compared to the low threat condition. ERPs were also used to measure attention allocation processes. Specifically, the P300 ERP component increases when the amount of resources needed for attending increases. This would be indicative of more difficult disengagement. As such it was hypothesised that smokers would have faster reaction times and lower P300 amplitudes for the high threat invalid trials compared to the low threat invalid trials. For non smokers it was hypothesised that these effects would not occur as there is no reason to engage a defensive response. It was further expected that for valid trials there would be no difference between smokers and non smokers on reaction times or P300 amplitudes. However, for valid trials, the high threat message was expected to capture attention more than the low threat message due to its survival value. This would be reflected in faster reaction times and higher P300 amplitudes (Kessels et al., 2010).

The participants were 29 university students classified as smokers or non smokers. The threatening images were varied as a within factor (low, high) as were the type of trials (valid, invalid). Before the cueing task formally commenced participants were given a practice block of 2 minutes in length. After the task participants were asked to rate the images for threat value. Irrespective of smoking status, high threat images were given significantly higher threat value than low threat images (Kessels et al., 2010).

Results indicated a significant interaction between trial type and smoking status on the number of errors. For smokers, more errors were made on invalid trials than valid trials. For non smokers there was no difference in the number of errors made between trials. For reaction times, there was a significant main effect of trial type. This indicated that reaction times were faster for valid trials than invalid trials. There were no other main effects or interactions. The hypothesis that smokers would have faster reaction times for the high threat invalid trials compared to the low threat invalid trials was not supported. For the ERP analyses, a mixed ANOVA showed a significant interaction between threat and smoking status for the invalid trials. Specifically, smokers had lower P300 values for the high threat trials compared to the low threat trials. For non smokers there was no effect. These findings were as hypothesised. For the valid trial type there was a significant main effect of threat indicating higher P300 values for the high threat trials compared to the low threat trials. Smoking status did not affect this finding (Kessels et al., 2010).

While the effect of reaction time did not occur, the ERP findings support the proposition that smokers were able to disengage more effectively from the high threat information compared to the low threat information. This suggests that when information threatens self-image, an avoidance response can occur early on in the attention process. While high threat smoking images captured attention more readily than low threat images irrespective of smoking status, the results demonstrate that for smokers the high threat image facilitated more effective disengagement. The approach used by Kessels and colleagues (2010) has demonstrated a valuable mechanism that is not visible with self-report or reaction time measures of defensiveness. While a threatening message may initially capture the attention of individuals for whom the threat is relevant, an efficient disengagement process allows them to deal with any fear

elicited from the threat. This helps us to understand why high threat messages may have undesirable effects, even when they successfully capture initial attention (Falk, 2010). As Blumberg (2000) hypothesised, an audience member may orient towards a threat but use a defense like blunting at the focal attention stage to avoid comprehending the risk.

In a similar vein, Brown and Locker (2009) hypothesised that drinkers most at risk of problems would spend less time reading an emotive anti alcohol message. These researchers were also interested in determining how inattention would affect risk perceptions, in particular if inattention led to biased perceptions of risk. In this study, participants viewed one of two printed anti-alcohol messages that only varied in their use of threatening imagery. The highly emotive message portrayed images of severe health outcomes such as diseased organs and deformities from oral tumour surgery. The non-emotive message portrayed images of intoxicated drinkers and diagrams of disease. The effect of these images on risk perceptions was measured in order to test different defensiveness interpretations. Specifically, prior work by Brown and Smith (2007) demonstrated that lower personal risk estimates were formed by participants exposed to a distressing image, compared to those given a less distressing message. These participants also spent significantly less time viewing the message; however viewing time did not mediate the effect of the message type on risk estimates. The participants receiving the distressing image also tended to evaluate the message more negatively than participants receiving the less distressing image. In fact, these evaluations could mediate the effect of the distressing message on risk estimates. Although it was suggested that the lower risk estimates were largely due to a defensive process, initiated to alleviate the distress caused by risk sensitization, this outcome could be due to other processes. Brown and Locker (2009) suggested that investigating

whether or not defensive responses are in fact more pronounced in individuals who habitually employ denial as a coping strategy, could adequately test a defensiveness interpretation. As such, they hypothesised that defensive reactions to emotive messages would be moderated by denial. That is, individuals who are high in denial should have more biased risk estimates. A further aim was to test whether defensive responses were the result of a specific personal vulnerability to the threat or a general unease generated by the aversive stimulus. It was thus hypothesised that defensive responses would be moderated by greater vulnerability to alcohol related problems. Defensive responses were operationalised using perceptions of risk. Viewing time was measured and evaluations of the message were taken to test for potential mediational effects of avoidance and biased processing respectively.

One hundred student drinkers were recruited who firstly filled out a questionnaire. The questionnaire included a short version of the alcohol use disorders identification test (AUDIT; Miles, Winstock, & Strang, 2001) and the denial subscale of the COPE (Carver, Scheier, & Weintraub, 1989). These measures assessed vulnerability to alcohol related problems and denial as a habitual coping response. Participants were then randomly assigned to either the emotive image or no emotive image condition. The anti-alcohol message was read in the presence of an experimenter who discretely monitored the time spent viewing the material. After viewing the message, participants filled out a second questionnaire that assessed message induced distress. The questionnaire also evaluated how persuasive and effective the message was. Participants were also asked to rate the amount of effort put into reading the message and estimate their perceived likelihood of alcohol related problems in the future (Brown & Locker, 2009).

Results indicated that in comparison to the non- emotive message, participants who received the emotive message reported greater distress and lower message evaluations. These participants also spent less time reading the message. Post manipulation risk estimates were not significantly different between conditions. Whether vulnerability to alcohol problems and denial moderated the relationship between the type of message and risk estimates was examined via regression analysis. A significant interaction effect indicated that risk estimates were significantly lower in the emotive imagery condition for participants high in denial and high in vulnerability. There were no other significant findings. Correlations between denial and drinking (controlling for vulnerability) were calculated in order to investigate if the effect was attributable to the possibility that participants high in denial drink more than those low in denial. These correlations were not significant, indicating that alcohol consumption was unlikely to confound the results. As the relationship between the type of message and risk estimates was moderated by denial and vulnerability, mediational analyses were performed for the participants low and high on these variables. For the high denial, high vulnerability group, the time spent viewing the message could fully mediate the relationship between condition and risk estimates (Brown & Locker, 2009).

The results suggested that highly emotive messages could lead to lower risk perceptions in audience members who used denial as a coping strategy and were vulnerable to alcohol related problems. This could be partly due to the fact that these participants avoided the message. This finding adds weight to a defensiveness interpretation. It also demonstrates that examining defensive avoidance in health promotion is important. People who defensively avoid health messages may perceive themselves to be at lower risk of problems. If risk is perceived as low, then further protective action is unlikely to occur. Brown and Locker's research is not without

problems. The risk estimates are relative as baseline estimates were not measured. However, Brown and Locker (2009) demonstrate why inattention is important to measure as a fear control strategy.

2.4 Concluding remarks

The aim of this chapter was to demonstrate that valid and reliable measures of defensiveness are needed in order to adequately test models of fear appeal theory, and thus fully understand the effects of threatening communication messages. The most common outcome measures employed for determining the effect of threatening messages on individuals are examinations of attitudes, intentions and behaviour change in line with message recommendations (Witte & Allen, 2000). This has also extended to the measurement of message rejection – which has been assumed erroneously to be at the opposite end of the message acceptance scale. While these outcomes may identify *if* a defensive coping response occurred or what specific defensive coping response was used, they rarely identify *how* the response came about. In order to understand how defensive responding occurred, measures of the extent of information processing are ideal (Blumberg, 2000).

In a road safety context, maladaptive intentions have been used to signify message rejection. While this research is commendable, the measurement of message rejection does not adequately reflect a naturalistic viewing environment where people can choose to attend to all or parts of a threatening message (Lewis et al., 2008b). Sweeny, Melnyk, Miller, and Shepperd (2010) note a number of health contexts where an individual prefers to not know or avoids information. For example, up to half of all people who are tested for HIV do not follow up their test results (Centers for Disease Control and Prevention, 1997; Hightow et al., 2003). Similarly many people, when given the opportunity, choose not to know their genetic risk for breast or colon cancers

(Keogh et al., 2004; Ropka, Wenzel, Phillips, Siadaty, & Philbrick, 2006). Thus in the context of road safety fear control responses could be as simple and efficient as turning off the television in response to a threatening or unpleasant message.

The empirical evidence examined with health behaviours in Section 2.3.1 adds support to the idea that using threatening messages may be counterproductive because they trigger inattention processes in audience members who are most at risk or for whom the message is highly relevant (Brown & Locker, 2009; Kessels et al., 2010). To this author's knowledge, no such hypothesis has been investigated with road safety messages. While the early work of Tay and Watson (2002) has been recently adapted by Lewis et al. (2013) to examine possible interactive effects of threat and efficacy on message acceptance and message rejection, both examples have overlooked baseline appraisals of these constructs. This is a limitation as research from the broader fear appeal literature has demonstrated that these appraisals determine the interactive relationship between threat and efficacy. Consequently, these appraisals may be especially powerful in determining the best way to create road safety messages that individuals will attend to.

Whether the aim of threatening road safety messages is to change behavior or simply create an awareness of risk, neither can be achieved without first ensuring individuals attend to this information. Specifically, it would be valuable to investigate if preexisting threat appraisals lead to inattention processes and if efficacy perceptions buffer this response. Certainly there may be a variety of factors involved in this relationship and these factors should be explored. The next chapter will therefore review the literature that investigates factors that may impede or facilitate the processing of threatening information.

Chapter 3

Understanding motivations for information avoidance and information acquisition

3.1 A role for individual difference and situational factors?

In chapter 2 it was established that defensive coping strategies can impede the processing of health information. Research examining the effects of threatening health messages has demonstrated inattention by those individuals most at risk for a threat. In a review of what is known about information avoidance, Sweeny et al. (2010) state that information avoidance is studied in a haphazard fashion, by researchers in divergent fields, none of whom communicate with each other. The current state of the research is therefore quite disorganised and not well understood. What is more certain however, is the broad framework that Sweeney and colleagues suggest to use when understanding information avoidance. Specifically these researchers suggest it is likely that individual difference and situational factors will affect motivation to process information. Certainly the review below identifies a number of factors that fall under this framework. Once again, in all but one study (Pedruzzi & Swinbourne, 2009) this body of work largely employs examples from the health literature.

3.2 The role of adaptive and defensive positive beliefs

In chapter 2 (section 2.2.1), the hypothesis that self-affirmation could reduce defensive responding was presented. Specifically, when a threat is highly relevant to an individual it is likely that fear and anxiety is experienced. In order to deal with these emotions, defensive responding can occur. Experimental evidence has suggested that affirming the self-concept reduces the defensive responses performed to cope with dissonance (G. L. Cohen, Aronson, & Steele, 2000; Sherman et al., 2000). Another construct, that is a trait of some individuals, is hypothesized to act in a similar way.

This is the trait of optimism, and a large body of literature has conferred that being optimistic about the future has a number of advantages.

Optimism can be conceptualised as a general and relatively stable characteristic of personality. Such a characteristic is labelled dispositional optimism and can be formally defined as the general positive expectancy of experiencing good outcomes in life (Scheier & Carver, 1985). The trait of optimism has many advantages that go far beyond the effects of simply making people feel better. Specifically, these advantages may be attributed to the coping strategies individuals employ (Scheier & Carver, 1985). One prominent coping theory (Lazarus & Folkman, 1984) suggests that individuals deal with stress in one of two ways; problem focused versus emotion focused coping. Problem focused coping requires that individuals take active steps to deal with the stressor / threat stimulus whereas individuals who engage in emotion focused coping try to diminish or remove the emotion associated with the stressor/threat. These definitions are akin to the danger and fear control strategies postulated by the Extended Parallel Process Model (EPPM; Witte, 1992) described in Chapter 1. While it has been hypothesized that optimism may be associated more strongly with the use of problem focused coping than emotion focused coping (Scheier, Weintraub, & Carver, 1986) in fact research findings are mixed. Optimism has been found to be both positively and negatively related to the use of emotion focused strategies (Solberg Nes & Segerstrom, 2006). Overall research findings most frequently report that, as a group, optimists tend to be action oriented in their approaches to health. This is most likely because they believe their efforts will have desirable outcomes therefore they engage in the action (Carver, Scheier, & Segerstrom, 2010).

Individuals with an optimistic outlook in life are reported to adopt more positive health practices (Ylöstalo, Ek, & Knuuttila, 2003), cope better with stressful situations

and illness (Friedman et al., 1992) and generally report enjoying better psychological and physical health (Achat, Spiro, DeMolles, & Sparrow, 2000; Tindle et al., 2009) compared to individuals low in optimism. An early example that clearly demonstrates this is the research of Scheier et al. (1989). These researchers recruited a group of men undergoing coronary artery bypass surgery. Before surgery optimists reported lower levels of hostility and depression than did pessimists, and after surgery optimists reported greater relief and happiness. More interestingly, optimism was a significant predictor of patients' physical recovery. Post surgery optimists, as a group, were faster to sit upright in bed and also walked around the room earlier than did pessimists. At the 6 month follow up it was found that optimists had returned to normal life activities such as physical activity and full time work significantly earlier than pessimists.

Dispositional optimism was also a predictor of coping, correlating positively with problem focused coping and negatively with denial (Scheier & Carver, 1992). Prior to surgery optimists were less likely to dwell on the negative aspects of their experience and more likely to set goals for their recovery (Scheier et al., 1989). Perhaps most importantly, Scheier and Carver (1992) specifically note that the above effects were independent of the severity of the patient's heart disease and other major medical factors that could have influenced these results. Therefore, the favourable outcomes demonstrated among optimists cannot be attributed to the argument that optimists did better because they were healthier or had less radical surgery. It is more likely that, behaviourally, optimists were doing something different to pessimists. Further research supports this hypothesis. A 5 year follow up of the same patients revealed that optimists were more likely to be regularly taking vitamins and less likely to be eating unhealthy lunches than pessimists. Compared to pessimists they were also more likely to have joined a cardiac rehabilitation program (Scheier & Carver, 1992).

As demonstrated above, optimism has been positively related to better health outcomes and this finding has been consistently replicated in the literature. Research by Steptoe, Wright, Kunz-Ebrecht, and Iliffe (2006) aimed to determine whether dispositional optimism was related to healthy behaviours in a community sample of individuals aged 65 to 80 years. Results indicated that optimism was positively associated with brisk walking, moderate alcohol consumption and not smoking. This finding was independent of age, gender, chronic illness, and socioeconomic status. The researchers also assessed physical health status using the Short Form (36) Health Survey (SF-36; Jenkinson, Layte, Wright, & Coulter, 1996; Ware Jr & Sherbourne, 1992) which measures eight domains of health related quality of life. Self rated health was measured by asking participants to indicate how they would rate their health on a four point scale. Optimism was positively associated with physical health status as rated on the SF-36 and also self rated health. When participation in brisk walking was introduced into the explanatory model the association between physical health status and optimism was not significant. This indicates the relationship between health status and dispositional optimism is mediated by health behaviours just as Scheier and Carver (1992) suggest. Steptoe et al. (2006) also suggest it may be possible that immune and inflammatory processes are involved. Indeed, optimism has been associated with better immune status (Segerstrom, Taylor, Kemeny, & Fahey, 1998) and more favourable immune responses following stressful events (F. Cohen et al., 1999). So dispositional optimism may lead to better health outcomes through a combination of psychological, behavioural, and even biological processes (Steptoe et al., 2006).

While the above examples provide support for the relationship between optimism, active problem focused coping and positive health outcomes, some researchers have cautioned that optimism may at times be unrealistic and prevent people from taking

precautionary and proactive measures (Schwarzer, 1994; Weinstein, 1989). Unrealistic optimism, also known as optimism bias, refers to an individual's mistaken belief that negative events are less likely and positive events more likely to happen to them than they are to their peers. This bias was initially demonstrated by Weinstein (1980) who reported that the majority of a college student sample believed that (in comparison to their peers) they were less likely to experience negative events such as divorce or illness and more likely to experience positive events like travelling to Europe or owning their own home.

Optimism bias is synonymous to the popular belief of invulnerability and the idea that 'it won't happen to me.' It differs from dispositional optimism in terms of specificity, social comparison, and most importantly accuracy. For example, dispositional optimism is defined in terms of expectancies about specific events independent of outcomes for others (Armor & Taylor, 1998). Optimism bias is assessed by asking a person to estimate their chances of experiencing an event relative to their peers. Hence, the latter judgments are social comparisons rather than absolute judgements. Optimism bias can be inaccurate while dispositional optimism is a general orientation that cannot be demonstrated to be accurate or inaccurate (Radcliffe & Klein, 2002).

In terms of coping, optimism bias may be defensive in nature (Schwarzer, 1994) and therefore associated with avoidant coping strategies. However, viewing oneself more positively than others can be advantageous as it may lessen the effect of stressful situations such as those caused by health threats (Taylor & Brown, 1994). The belief that one is healthier or coping better than the average 'other' is widespread and related to reduced stress (eg. Helgeson & Taylor, 1993). The negative impact of such erroneous thinking is that individuals may overestimate their invulnerability and

therefore fail to undertake health promoting behaviours. For instance, Bedi and Brown (2005) use the hypothetical example of cardiac patients. For cardiac patients illusional beliefs or threat avoidance may help reduce stress, however eventual outcomes may be compromised if the illusional beliefs result in a failure to make appropriate lifestyle changes. A successful outcome in a cardiac situation demands active coping to implement strategies such as a good diet, smoking cessation, regular exercise and compliance with treatment.

There are a number of ways in which individuals may maintain their illusional beliefs and thus reduce stress. For example, an individual may evaluate their own standing on a risk by creating a comparison group with an unrealistic high risk. Alternatively, an individual might avoid information that challenges their overly optimistic views. Further, they may maintain their illusional beliefs through selective attention, thus processing risk information in a biased way. Each of these strategies are hypothesised to regulate the emotional response to a threat, however once employed they distort the response to risk relevant information (Wiebe & Black, 1997). Optimism bias therefore results in very different coping strategies compared to dispositional optimism.

Research examining optimism bias and message resistance processes suggests that unrealistic optimists are more likely to avoid exposure to risk information. In an early study by Wiebe and Black (1997), never married heterosexual students were asked about their risk of becoming pregnant or contracting a Sexually Transmitted Disease (STD). Students were also asked about their prior sexual behaviours in order to estimate their actual risk. By comparing the perceived risk of contracting an STD or becoming pregnant with the actual risk of the event, participants were classified as being illusional or realistic about their risk perceptions. Participants were then asked to

evaluate a pamphlet containing risk information about sexual behaviours. Additionally they were asked to rate their interest in reading about the topic and asked to comment on the relevance of the pamphlet. Affect was also assessed before and after reading the pamphlet.

Wiebe and Black (1997) hypothesised that compared to participants who had realistic risk perceptions, participants with illusions of invulnerability (unrealistic optimism) would be less distressed when confronted with risk information, avoid exposure to risk information and deny the relevance of the material. Results indicated these hypotheses were supported. Women with illusional risk perceptions were significantly less distressed after reading the pamphlet than women who had realistic high risk perceptions. Therefore among these women, illusional beliefs minimised distress in response to information that was intended to make them aware of their risk. The reason this effect was seen in women only is probably due to the fact that females experience more unfavourable consequences of unplanned pregnancy. Consistent with the second hypothesis, illusional high risk participants were less interested in the pamphlet information than realistic high risk participants. They also reported the pamphlet was significantly less relevant to themselves than to others while realistic high risk participants reported the pamphlet was equally relevant to themselves and others. It was suggested that biased responses such as these may contribute to the ineffectiveness of some sex education interventions.

As pointed out in Chapter 1, research in a road context by Walton and McKeown (2001) found that individuals who had biased perceptions of their speed, relative to others, were more likely to report that speeding messages are meant for other people. Further the belief that mass media messages will have greater influence on others than on oneself (the 'Third-person effect'; Davison, 1983) has been demonstrated in a road

safety context. This research has highlighted different reactions by males and females to fear appeal messages depicting physical threats of speeding and drink driving. Males reported Third-person beliefs (the message has more influence on others than on me) but women reported reverse Third-person effects (the message has more influence on me than on others) (Lewis, Watson, & Tay, 2007). This research is valuable as it measures and questions the relevance of negative road campaigns.

It seems then that positive beliefs could differentially affect attention to threatening information. Optimism may have a facilitating effect via active coping processes (Figure 3.1). Unrealistic optimism may instead be related to avoidance of threatening information via illusions of invulnerability (Figure 3.2). Accordingly, it makes sense to examine research that looks specifically at the effects of these beliefs on measures of attention.

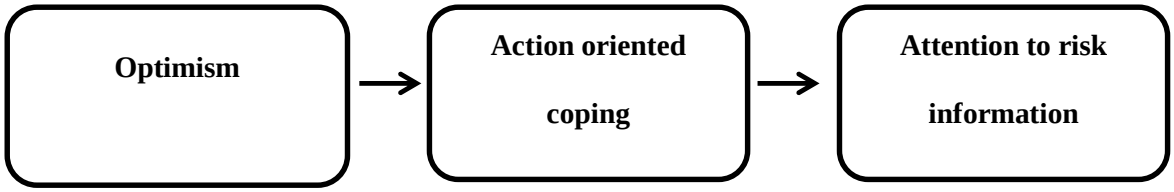


Figure 3.1. Hypothesised facilitating effect of optimism on attention to risk information.

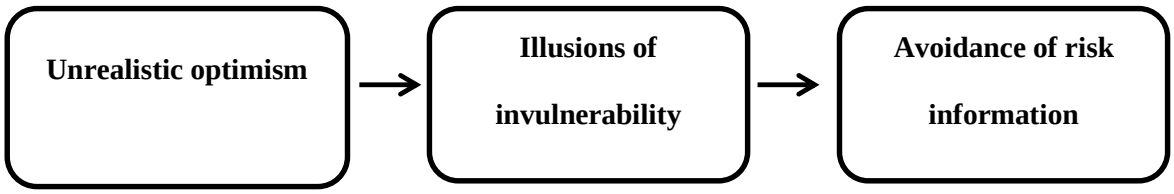


Figure 3.2. Hypothesised effect of unrealistic optimism on attention to risk information.

3.3 Positive beliefs and attention

3.3.1 The effect of optimism on attention. Although the literature regarding the relationship between optimism and the processing of health risk information is scarce there are a handful of studies that do examine the relationship. The first is from Aspinwall and Brunhart (1996) who shed some light on conflicting reports regarding the adaptiveness of optimistic beliefs when faced with threats. Specifically, they noted that while the benefits of optimism are well established in the literature, some authors suggest that optimistic beliefs are primarily defensive (eg. Schwarzer, 1994) denying threats in order to preserve self-esteem or a belief in control. Aspinwall and Brunhart (1996) therefore aimed to investigate this proposition by examining whether optimism inhibited or facilitated attention to threatening health information. Dispositional optimism has been defined as a generalised positive expectancy of experiencing good outcomes (Scheier & Carver, 1985). More specifically, health related optimism represents favourable beliefs about preventing and withstanding illness (Luo & Isaacowitz, 2007). Measures of both generalised dispositional optimism and the more domain specific health related measure were used in the study as the effect of optimism was assumed to be particularly enhanced when the optimistic beliefs corresponded to the information used in the study. Based on the assumption that optimism and denial are two distinct constructs it was hypothesised that optimism would be adaptive in confronting threats to wellbeing. Hence attention to information was hypothesised to increase as a function of the information's self relevance (Aspinwall & Brunhart, 1996). Attending to relevant risk information is adaptive because it allows an individual to plan an appropriate strategy to confront the risk which maximises their chances of dealing with the risk effectively. The authors further predicted that individuals high in optimism would spend more time reading risk information and recall more of that

information compared to individuals low in optimism. In addition, optimists would read and recall more risk information about a health behaviour relevant to themselves (Aspinwall & Brunhart, 1996).

To test this relationship, individuals who engaged in either regular vitamin use or regular UV exposure were given the opportunity to read information about the risks of both behaviours. They were also presented with neutral and benefit information about the behaviours. Reading time was discretely assessed and two surprise recall tests were conducted. The first test immediately followed exposure to the material while a second recall test was conducted the following week. Results indicated that participants high in health related optimism spent significantly more time reading risk information than they did reading neutral or benefit information. The same participants also spent significantly more time reading about the behaviour they did practice compared to the behaviour they did not practice. With regard to recall, it was again the participants high in health related optimism that had greater recall of risk information than benefit or neutral information. However, the effect for recall was only seen in vitamin users. When dispositional optimism was considered as a predictor results were similar although weaker (Aspinwall & Brunhart, 1996). While it is difficult to understand why the effect of optimism was found only for vitamin risk and not for UV exposure, these findings suggest that optimists can selectively attend to threatening information that is relevant to them. The trait of optimism may confer an advantage as optimists demonstrate they can ignore an irrelevant threat and concentrate their coping efforts towards relevant threats in a way that others cannot.

In contrast, Segerstrom (2001) used a subliminal measure of attention and obtained different results. In this study an emotional Stroop task was used to examine the relationship between optimism and attentional bias for positive, negative and neutral

valenced words. While it is well established that optimists' better outcomes are largely due to the coping strategies they employ, Segerstrom (2001) suggests that the processes enabling this to occur may be lost in the self-report nature of behaviour and cognition in the research. In particular, self-report measures capture voluntary and deliberate behaviours. Segerstrom argues that optimists may adapt to stressors in ways that can't be captured using self-report. For example, optimists may attend to and interpret stimuli in a different way. The finding that optimists spent more time viewing threatening information compared to benefit or neutral information (Aspinwall & Brunhart, 1996) could be due to an automatic preference for this type of information or a choice to spend more time reading threatening information. The first is an unconscious process while the latter is the result of more deliberate effort. Furthermore, both processes could occur. Segerstrom (2001) hypothesised a positive relationship between optimism and attentional bias for positive stimuli. That is, higher optimism would be related to greater interference in naming the ink colour of positive words in a Stroop test. A negative relationship was hypothesised between optimism and attentional bias for negative words such that less interference would be expected by optimists.

Participants were 48 undergraduates who completed the 10 item Life Orientation Test-Revised (LOT-R) (Scheier, Carver, & Bridges, 1994) and an emotional Stroop task. Attentional bias is measured by Stroop interference, that is response latency on the Stroop task. Results demonstrated that in comparison to the control words, negative words and positive words caused significantly greater interference. Specifically, there was a significant interaction between optimism and word type where optimism was associated with greater attentional bias for positive words and less attentional bias for negative words. For participants high on optimism, while interference existed for both

positive and negative words, it was greater for positive words. For participants with moderate levels of optimism, there was no significant difference on interference between positive and negative words. Pessimists demonstrated no Stroop interference for positive words but significant interference for negative words. These effects remained the same after controlling for mood and trait anxiety (Segerstrom, 2001). These results suggest that optimists have an attentional bias for positive stimuli. Specifically, this unconscious attentional bias could contribute to the better coping outcomes associated with optimism.

Isaacowitz (2005) noted the conflicting differences between the findings of Aspinwall and Brunhart (1996) and that of Segerstrom (2001) and argued that early attentional processes of optimists may favour positive information. In Isaacowitz' (2005) research eye tracking technology was used to study early attentional preferences in real time. The sample consisted of 51 young adults aged from 18 years to 21 years who were told they would be viewing some images including skin cancer images. The full stimulus set included melanoma images, schematic line drawings and neutral faces. The melanoma images served as the negative stimuli, while the line drawings and neutral faces served as control measures. The line drawings were matched to the contours of the melanomas to serve as a control comparison while the neutral faces had been selected as non emotional by a small group of raters. All images were presented via a computer in their respective orders (face, lines, melanoma) for 15 seconds per image with a 5 second grey filler screen in between. Eye tracking software recorded fixation patterns 60 times per second. Gaze patterns were operationalised using difference scores that compared fixation patterns for the cancer images with the neutral images. Positive scores indicated more attention to the cancer images while negative scores indicated more attention to the neutral images. Prior to viewing the images,

participants filled out questionnaires that measured optimism, positive and negative affect, and depression. Participants were asked to report the extent they worried about skin cancer and the extent skin cancer was relevant to their daily lives. Participants were also asked to report if they had a family history of skin cancer.

Preliminary analyses demonstrated the schematic line drawings were the best control measure and as such these were used to calculate fixation patterns. A regression model included demographic variables, measures of positive and negative affect, family history of skin cancer, and optimism. Optimism significantly predicted fixation patterns. Specifically, greater optimism was associated with less fixation on the skin cancer images. There was no effect for family history or relevance or any other measures of affect in this sample. Therefore, the inattention to negative stimuli was not due to mood or affect (Isaacowitz, 2005).

It could be argued that the negative images were not relevant to participants due to their age so the researchers manipulated relevance in a second study. The sample was somewhat larger (87 participants) and half received a relevance manipulation. Specifically, these participants were told that the images might be useful in identifying future skin problems. The remaining participants were simply told to view the stimuli. All participants knew that some of the images presented would be of skin cancer. In this study the participants were presented with skin cancer images and female faces. Fixation patterns were once again measured, and post viewing the stimuli participants completed a recognition memory task. This task required participants to correctly identify whether or not they had seen the images. Results indicated a main effect of optimism, where once again optimists attended away from the negative stimuli. There was no effect for the manipulation of relevance. There was a main effect of family history indicating that family history of skin cancer was associated with less relative

attention to the cancer images. No variable predicted recognition memory, however this may be due to a ceiling effect (overall accuracy was 94%) (Isaacowitz, 2005).

These results are consistent with Segerstrom's (2001) research indicating that early attentional preferences by optimists seem to be for positive stimuli. This could be due to a fast or unconscious mechanism that directs optimists' attention towards positive stimuli. These results are inconsistent with those of Aspinwall and Brunhart (1996), however it may be that attentional processes change over time. That is, early attentional processes may be unconscious and automatic in comparison to the processes involved later, such as focusing on and processing a message to determine how it might be useful (Isaacowitz, 2005). Blumberg (2000) too highlighted this process when discussing defensive processing. Specifically, Greenwald and Leavitt's (1984) model of information processing hypothesises that audience involvement is defined by the extent to which information is processed. Blumberg (2000) further hypothesises that inattention to threatening information will appear differently at each stage and thus should be measured accordingly.

The finding by Isaacowitz (2005) that family history was associated with less attention to cancer images was opposite to the hypothesis. This finding was interpreted within a cognitive psychology approach suggesting that personal experience with skin cancer could mean that these participants were faster to recognise skin cancers and thus more efficient in processing the images. However, this finding could also be the result of a denial process or defensive coping strategy. As the skin cancer images were likely more threatening to participants with a family history, inattention to these images could be a fear control strategy to decrease anxiety. This is the suggestion made by Kessels et al. (2010) in interpreting their finding that smokers were able to disengage more

effectively from threatening smoking pictures compared to non threatening ones (see Chapter 2).

Research by Pedruzzi and Swinbourne (2009) in a road context may be able to offer some insight into the above discrepancies. These researchers aimed to address the gap between driver knowledge and behaviour by applying the research findings from the optimism literature to the processing of information about road risks. This research was noteworthy as the conditions under which people ignore or attend to road risk information can have a profound effect on the way campaigns are tailored and distributed in the community. A community sample of 325 licensed drivers was recruited from a regional metropolitan centre. In accordance with the findings reported by Aspinwall and Brunhart (1996) it was hypothesised that participants high on optimism would have greatest recall for road risk information. This hypothesis was expected to be supported due to the positive relationship between optimism and problem focused coping strategies. Specifically, attending to risk information would be an approach favoured by optimists as it allows them to manage their road risk. Results indicated the hypotheses were not supported. Participants high on optimism tended to remember more neutral information than risk information (Pedruzzi & Swinbourne, 2009).

This finding was interpreted by the authors as a defensive coping response. Specifically, a road risk situation is qualitatively different to some health behaviours where people can, in fact, eliminate or decrease their exposure to a risk factor and thus have a large influence over their own health outcomes. Exposure to a negative road event is not always under the control of the individual and not always a consequence of their own behaviour. For example, an individual can choose to exercise regularly and this will decrease their chance of having a heart attack. In contrast, an individual can

choose to drive to the speed limit but that may or may not reduce their risk of a crash. This is because there are other people on the road and they too contribute to road outcomes. Pedruzzi and Swinbourne (2009) also found that optimism was positively associated with precaution taking behaviours on the road. As optimism scores increased, precaution taking tended to increase as well. If the optimists in the sample perceived that they are already doing all they can do to protect themselves, attention to risk information would consequently be redundant and possibly distressing. Most importantly, if road outcomes are characterised by low perceptions of control the best response to manage anxiety and distress would be to ignore risk information.

Optimists seem to be quite flexible in their choice of coping strategy when faced with a threat. For example Solberg Nes and Segerstrom (2006) demonstrated in their meta-analysis that when stressors were controllable, optimism was associated with the practice of problem focused coping. When a stressor was uncontrollable, optimism was associated with the use of emotion focused coping. The authors also examined the relationships between optimism, approach coping and avoidance coping. Approach coping signifies engaged strategies where the goal is to engage with and manage the stressor or the emotions associated with it. Avoidance coping describes the use of disengaged strategies where the goal is to escape the stressor and associated emotions (Skinner, Edge, Altman, & Sherwood, 2003). Solberg Nes and Segerstrom (2006) found that optimism was related positively to the use of engagement coping and negatively to disengagement coping.

In the context of road safety, optimists most likely have low expectations of control regarding their road outcomes. This perception is likely formed from their driving experience. That is, other people can also affect their own individual driving outcomes. Therefore the best thing they can do is manage their fear. Furthermore, this

hypothesis may be better able to explain the results of Aspinwall and Brunhart (1996). As individuals can control whether or not they take vitamins, attending to risk information about vitamin use will act to decrease any concern and facilitate the best outcomes for individuals. Attending to risk information in this situation is then the best response, a response that was largely favoured by optimists. So perhaps the effect of positive beliefs on attention should look instead like that pictured in Figure 3.3. Specifically, it is through control perceptions that optimism has an effect. The effect of optimism will differ depending on the amount of perceived control. When control over the outcome is high, optimism should be related to increased attention. Instead, when optimism is low, decreased attention is hypothesised to occur.

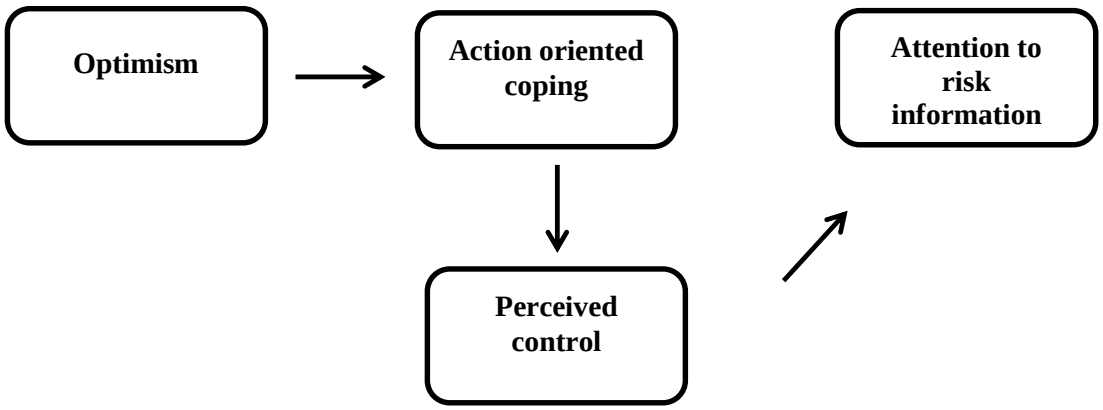


Figure 3.3. Hypothesised effect of optimism on attention to risk information is moderated by perceived control.

If this interpretation is in fact the case, it has important implications for mass media fear appeals and health promotion strategies. The assumption that people will engage in problem focused coping is critical to health promotion attempts. Most interventions educate people about illness or disease and present strategies that will reduce levels of susceptibility to or risk for disease in populations. These strategies

assume that individuals will actively use the information to formulate coping strategies. However, the crux of the matter is that different situations engender different coping strategies (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). When people are confronted with a negative or stressful event their goal should be to alleviate distress and facilitate the best outcomes possible. These goals are the foundation of coping responses, independent of whether the response is a problem focused one or not. Perceptions of control are key to the choice of coping strategies. When control over the occurrence of a negative event is high, active problem focused coping is the most adaptive response as an individual can control the impact by making the event go away or by minimising it. When control over the occurrence of the event is low, emotion focused coping is the more adaptive response. An individual can control the impact of the event by controlling the negative emotions associated with having to weather the impact.

The trait of optimism may bring more meaning to this argument as optimists tend to be very good at choosing the best strategy. That is, they reliably choose the response that alleviates distress and facilitates the best outcomes. The implications of control perceptions deserve further consideration and are discussed in Section 3.4.

3.3.2 The effect of unrealistic optimism on attention. An investigation by Radcliffe and Klein (2002) took a within study approach to the examination of heart attack related knowledge, behaviour and beliefs by examining the operation of the two optimism constructs at the same time. In this study middle – aged adults completed a computerised Health Risk Appraisal (HRA). The appraisal included questions about life satisfaction, daily exercise habits and family history along with physiological information such as weight and blood pressure. This generated an overall heart attack risk score. Dispositional optimism was assessed using the LOT-R (Scheier et al.,

1994). Participants were also asked to indicate their likelihood of having a heart attack in the next 10 years compared to the average person of the same age and sex. In order to obtain a measure of optimism bias this risk estimate was then compared to the participant's HRA score. Participants who considered their risk to be greater than 10% lower than their HRA computed risk ratio were defined as optimistically biased. Lastly, all participants read an essay concerning heart attack risk behaviours and then answered questions regarding the essay material (Radcliffe & Klein, 2002).

Radcliffe and Klein (2002) hypothesised that participants high in dispositional optimism and low on optimism bias would reveal a specific profile. In particular, they would have a better standing on heart attack risk factors therefore having the lowest heart attack risk and thus report the least worry about this risk. Furthermore, such participants were hypothesised to know the most about heart attacks at baseline, choose to read information about heart attack risk more carefully and retain more of this information. Results certainly demonstrated the positive outcomes of dispositional optimism displayed in previous research. Participants high in dispositional optimism had lower blood pressure, were more satisfied with life and had a lower risk of heart attack. Once again, optimistically biased participants displayed a very different profile indicative of processing deficits, defensiveness and higher risk. These individuals were generally at a higher risk of heart attack, less worried about their risk levels, had less prior knowledge of risk factors and retained less knowledge after reading the essay about risk factors. They were also more likely to choose to read about a risk factor on which they believed they had a favourable standing rather than information about other risk factors. These results demonstrate that when compared to optimistic individuals, optimism bias appears to impede the processing of risk information.

Luo and Isaacowitz (2007) also examined the effects of different positive beliefs on memory for skin cancer information. These researchers found that optimism bias predicted lower levels of correct recognition of mole images. This result was marginally significant. Based on these findings, Pedruzzi and Swinbourne (2009) examined the effect of optimism bias on the processing of a threatening message in a road safety context. It was hypothesized that individuals high on optimism bias would recall less of the threatening message compared to individuals low on optimism bias. Results demonstrated no effect of optimism bias on recall of information. Hatfield and Job (2001) might be able to offer some explanation for the inconsistent effect of optimism bias. The suggestions they make concern optimism bias and behaviour. Specifically, the influence of optimism bias on precaution taking behaviour could depend on the mechanism that produces it. If optimism bias results from an egocentric consideration of the individual's own risk decreasing behaviour (and a failure to consider others) then it should be associated with precaution taking. If it was associated with defensive denial, optimism bias may be associated with a lack of precaution taking. In their study, Pedruzzi and Swinbourne (2009) found that optimism bias was positively associated with precaution taking. That is, increases in optimism bias were related to increases in precaution taking on the road and decreases in risk taking. So perhaps in this study, optimism bias was not produced by a denial process, but a failure to consider the behaviour of others. This might then buffer the effect of denial.

Another factor that deserves attention concerns the difference in the measurement of unrealistic optimism across the studies. Specifically, the research of Radcliffe and Klein (2002) and Luo and Isaacowitz (2007) looked at heart attack and skin cancer risk respectively. Both of these outcomes have tangible bases for estimating risk – for example, family history. Both studies used objective measures of risk in calculating

unrealistic optimism. For example, objective risk of heart attack compared factors such as one's blood pressure, cholesterol results and family history to the estimated population score for that age category. Then, their perceived risk of a negative outcome was compared to their actual risk of the event. In contrast estimating negative road outcomes is more difficult. Pedruzzi and Swinbourne (2009) asked individuals to consider their risk and another's risk and took the difference. As such, they were comparative risk ratings. In order to make the findings comparable, it could be argued that more objective measures of negative road outcomes (such as risk taking behaviour) need to be considered.

3.4 Why perceived control must be considered

Perceived control is the perception of being able to bring about a desired outcome. Perceived control is essential for wellbeing and has even been suggested as a vital human need (Leotti, Iyengar, & Ochsner, 2010; Thuen & Rise, 2006). Research strongly supports the hypothesis that individuals cope more effectively when they perceive a threat or stressor to be controllable. Perceived control over life events is consistent with feeling good, better coping and even better performance on cognitive tasks in comparison to those who perceive little control (Thompson & Spacapan, 1991; Thuen & Rise, 2006). A belief that one has no control over a situation may give rise to feelings of helplessness and depression (Seligman, 1975; Walker, 2001). Perceived control is reflected in many constructs such as locus of control (e.g. Health Locus of Control; Wallston, Wallston, & DeVellis, 1978) and self-efficacy (Bandura, 1997). For example, locus of control is defined as a belief about whether the occurrence of an outcome is due to one's own behaviour or forces outside of personal control. Self-efficacy is a belief in one's ability to perform a behaviour (Maibach & Murphy, 1995).

As such, self-efficacy is seen to reflect levels of perceived control as the ability to bring about a desired outcome requires a belief that one can perform the required action.

Perceived control and optimism appear to be related constructs. For example, Schwarzer's measure of generalised self-efficacy has demonstrated medium to high correlations with dispositional optimism measured using Scheier and Carver's (1985) Life Orientation Test (Schwarzer, 1994). So while these constructs are related to each other, the key theoretical difference between them is that perceived control reflects an individual's ability to bring about an outcome, whereas optimism is the anticipation of the occurrence of a desired outcome (Carver et al., 2000; Thuen & Rise, 2006). Carver et al. (2000) argue that much research pointing to the beneficial effect of perceived control measures this construct in such a way that it is confounded with outcome expectancies. As such it is impossible to know which construct contributed to the effect. These authors further argue that research pointing to the beneficial effects of perceived control may actually be generated by positive outcome expectancies.

In order to examine the relative contribution to distress by perceived control and expectancies, Carver et al. (2000) analysed data collected from two samples of women diagnosed with early stage breast cancer. The samples were recruited from the same clinics and all descriptive variables were similar. As such, the samples were treated as one. The aim was to determine specifically whether outcome expectancies or perceived control would be related to distress experienced by these women when facing a health crisis. Participants were recruited during their diagnostic visit to an oncology clinic and interviews were conducted the day before surgery and again seven to ten days post surgery. Further follow up interviews were conducted three, six and twelve months after surgery. In order to measure participants' outcome expectancies about whether or not the cancer would return, participants were asked to indicate on a nine point scale the

extent to which they believed they would remain cancer free in the future. To measure perceived control over the reoccurrence of cancer, participants first read a short passage about factors that might influence cancer outcomes in life. They were then asked to indicate whether factors within or outside of their personal control would determine whether they remain cancer free in the future. Psychological distress was also assessed at each time point. It was hypothesised that outcome expectancy, not control perceptions, would determine adjustment amongst the cancer patients. Specifically, if personal control was irrelevant then a main effect of expectancy was hypothesised to occur such that expecting to remain free of cancer would be related to lower distress. If personal control perceptions promoted wellbeing then a main effect for control would be detected where higher perceived control was related to lower distress. If control promoted well being in participants who expected good outcomes, the relationship was hypothesised to be interactive. That is, higher perceived control would be related to lower distress only amongst the participants who expected to remain free of cancer (Carver et al., 2000).

Results indicated that self reports of cancer outcome expectancy tended to be optimistic. As participants' cancers were of early stage disease status, such positive expectancies were as hypothesised. About half the participants indicated that influences outside of their personal control would determine their cancer outcome. A regression analysis using these independent variables (and their interaction) to predict distress indicated a significant and negative relationship between cancer expectancy and distress where greater beliefs in remaining cancer free was related to lower levels of psychological distress. However there were no significant effects for perceived control or the interaction between cancer expectancy and perceived control on distress. At the 3 month follow up outcome expectancy was again the only significant predictor. While

no predictor approached significance at the six month follow up, outcome expectancy again predicted distress at 12 months. It was therefore concluded that the expectation of remaining cancer free was related to better adjustment independent of perceptions of control. That is, the expectation of a positive outcome was the best predictor of lower distress (Carver et al., 2000).

Participants in this study did not have much time to adjust to their diagnosis and treatment before reporting expectancies and control beliefs. As receiving a cancer diagnosis is quite traumatic, the initial shock may have affected their reports of cancer expectancy and personal control. Hence, a second study was carried out with a different sample of women who had more time to adjust to their breast cancer diagnosis. The procedure was similar to study 1 however participants in this sample were instead given a questionnaire. Once again, cancer expectancy reports tended to be optimistic and almost half the participants indicated that influences outside of their own personal control would determine the outcome. In addition, a regression analysis demonstrated the expectancy of being cancer free was the only significant finding. Overall, these results indicate that in the context of early stage breast cancer positive expectations about remaining cancer free were associated with less distress compared to those who expected the cancer to return. This finding was independent of the perception of perceived personal control. In other words, women who had positive expectations about remaining cancer free and believed this outcome was under their control did not feel any less distress than women who had positive expectations about remaining cancer free and perceived this outcome as outside of their personal control. Carver and colleagues' (2000) research thus suggests it is the expectancy of a positive outcome that is important to adjustment, not beliefs about control over that outcome.

In a critique of this research, Tennen and Affleck (2000) suggest a significant issue that needs to be addressed when trying to determine the importance of personal control. Specifically, people may differ regarding their control appraisal targets. Some individuals may attempt to control the illness, while others may aim to control the consequences of illness such as pain or side effects of treatment. Finding control in low control situations may be the key to this argument. Tennen and Affleck (2000) further argue that the single item indicator of control used by Carver et al. (2000) fails in this sense as it does not consider the range of targets. This is an important argument to develop as it may be the key to the outcome expectancy versus control debate.

The target of control in the research by Carver and colleagues (2000) is an appraisal regarding the outcome of the illness, that is, reoccurrence of cancer. Participants were asked to indicate whether or not remaining cancer free was under their own personal control. It should be noted that there was no difference between the number of women who believed reoccurrence was under their own personal control and those who believed it was outside of their personal control. This finding is not surprising. When facing a health threat such as breast cancer, people do not have complete control over the *outcome* of their illness. The finding that perceived control was not related to distress in the research by Carver et al. (2000) makes sense as the target of control is, in reality, largely uncontrollable. Therefore the measurement of control may be of upmost importance due to the existence of multiple control appraisal targets. As individuals may aim to control a number of different targets throughout the course of their illness, research examining the effect of perceived control needs to incorporate this scope of targets. This has necessary implications for the findings reported by Carver et al. (2000). While there is only so much personal control patients have over their cancer outcome, they do have significantly more control over their

participation in treatment. Perhaps, control appraisals regarding treatment might have significant relationships with adjustment.

Research by Beckjord, Glinder, Langrock, and Compas (2009) adds some conceptual and empirical clarity to this argument. These researchers note that in the psycho oncology literature, there are two domains of perceived control that are examined in relation to understanding adjustment. The first is *locus of perceived control* (LPC) which identifies the source of perceived control over outcomes (who an individual feels is in control). The second is what they describe as *focus of perceived control* (FPC) which examines the target and extent of control appraisals (what an individual feels they can control). After a negative health event, such as a diagnosis of breast cancer, individuals will have to adjust to changes across multiple domains affected by the illness and illness treatment. Control appraisals, especially FPC, seem to be important in determining adjustment in these multiple domains (Stanton, Revenson, & Tennen, 2007). Many single factor measures of FPC have been used in the prediction of adjustment to cancer. For example, perceived control over pain (Hazard Vallerand, Hasenau, Templin, & Collins-Bohler, 2005) and perceived control over emotions (Watson & Greer, 1983). These unidimensional constructs cannot fully capture the importance of control appraisals to cancer adjustment across multiple domains. Multidimensional measures of FPC can offer a better understanding of the adjustment process. Furthermore, such measures can be used to develop targets for psychosocial interventions with cancer patients. This reason alone makes measures of multidimensional FPC extremely important to examine (Beckjord et al., 2009).

As well as understanding which control targets might relate to different aspects of psychosocial adjustment, a validated measure of FPC (in a relevant domain) will also clarify issues relating to conceptual relevance (Beckjord et al., 2009). For example,

Carver and colleagues' (2000) assertion that perceived control is not important to adjustment in early stage breast cancer patients was based on a single item indicator of LPC. Beckjord et al. (2009) suggest that the relationship between positive expectancies and adjustment may outweigh the influence of *who* a woman perceives is in control of her cancer outcomes. However, a woman's belief that she can bring about desired outcomes across different aspects of her life affected by cancer is likely to be strongly related to adjustment, more so than her expectancies about remaining free of breast cancer. Furthermore, the measurement of multidimensional FPC in previous studies is either not available for use or there are no psychometric data provided as evidence to warrant further use. This is in stark contrast to LPC. For example, the Multidimensional Health Locus of Control scales (Wallston, 2005; Wallston et al., 1978) are reliable measures of LPC and are extensively used in the oncology literature (eg. Naus, Price, & Peter, 2005; Williams-Piehota, Schneider, Pizarro, Mowad, & Salovey, 2004) and also in many other health domains such as physical activity, smoking behaviour, and alcohol consumption (e.g. Steptoe & Wardle, 2001).

Considering the above, Beckjord and colleagues (2009) aim was to develop a model to conceptualise FPC in breast cancer, test the model's psychometric properties and examine the direct and combined effects of FPC and positive expectancies in relation to adjustment to breast cancer. Their sample consisted of women who had been recently diagnosed with breast cancer (stages 0-III). Approximately 15 weeks post diagnosis, participants answered questions that measured perceived control, response to stress, emotional distress, positive expectancies (LOT-R) and quality of life. Medical information was also collected which included diagnosis, stage of disease, and type of treatment. FPC was operationalised as having six dimensions based on prior research (Newsom, Knapp, & Schulz, 1996). The six dimensions of FPC in breast cancer were

control over physical symptoms, emotions, relationships with others, medical decisions, life in general, and breast cancer outcomes (e.g. reoccurrence). Psychometric properties of the measurement model demonstrated good fit for a 6 dimension measure of FPC in breast cancer. Means for the subscales indicated that participants reported the most control over their medical decisions and least control over cancer outcomes and physical symptoms (Beckjord et al., 2009).

For the prediction of emotional distress, of all the FPC subscales only emotional perceived control had a significant relationship with emotional distress. Specifically, increases in emotional perceived control were significantly related to lower emotional distress. The effect of positive expectancies was also significant, where higher positive expectancies were related to lower emotional distress. There was no significant interaction between positive expectancies and emotional perceived control. For physical quality of life, it was again perceived control over the corresponding domain that had a significant effect. That is, greater perceived control over physical symptoms significantly predicted better physical quality of life. Surprisingly, positive expectancies significantly predicted physical quality of life, such that greater expectancies were related to poorer physical quality of life. There was no significant interaction between expectancies and perceived control over physical symptoms. For medical interaction quality of life, once again it was the medical decision subscale of the perceived control scale that had the greatest relationship with medical interaction quality of life. The relationship was such that increases in perceived control over medical decisions were related to better medical interaction quality of life. Higher positive expectancies were also related to greater medical interaction quality of life. However, there was no interaction between positive expectancies and perceived control over medical decisions on medical interaction quality of life (Beckjord et al., 2009).

Beckjord and colleagues (2009) study is unique in its design and test of a multidimensional tool that examines FPC in women suffering from breast cancer. Above all, this research demonstrates the importance of perceived control to adjustment. Specifically, perceived control needs to be considered as a multidimensional construct; otherwise the effect of perceived control on adjustment can be missed. The finding that positive expectancies were positively related to adjustment is in line with previous research, in particular that of Carver et al. (2000). However, while Carver found that LPC did not have predictive value in women with breast cancer, Beckjord and colleagues' (2009) research demonstrates the important role of focus of perceived control to adjustment in breast cancer. This work suggests that both the focus of perceived control and positive expectancies are important in this domain.

In summary, the research of Beckjord et al. (2009) has three important implications for future work looking at the effect of perceived control and outcome expectancies. The first is that the measurement of perceived control is important to consider – in particular the scope of possible targets in the illness or disease process. The second implication refers to the debate about control appraisals versus outcome expectancies. Specifically, it is not necessarily a question of optimism versus control. Instead, future discussion should be concerned with the usefulness of each concept in the domain of interest. As outlined by Beckjord and colleagues (2009), control appraisals are exceptionally useful as they give those working in the field a tool for intervention. Lastly, while this section has been restricted to the domain of medical threats (breast cancer in particular) the implications can be translated into other fields of enquiry.

3.5 Concluding remarks

The current chapter examined motivations for both avoiding and acquiring threatening information. The body of literature that examines this is not large and focuses on the role of positive beliefs – both adaptive and defensive. In a road safety context there seems to be no investigation of the factors that may facilitate or impede attention to threatening messages, excepting one study by Pedruzzi and Swinbourne (2009). Although this study largely focused on the hypothesized facilitating effects of optimism, the results suggest that there may be something unique about road safety threats. When considered in the context of the perceived control literature, specifically the finding that optimists seem to be quite flexible in their choice of coping strategies, it makes sense to examine this further in a road context. Specifically, it may be perceived control that can account for the inconsistent findings between the research of Pedruzzi and Swinbourne in a road context and that of the broader health literature.

Chapter 4

Testing fear appeal theory and the role of perceived control

4.1 Study context

The aim of the current work is to fill a gap in theory and practice by examining the factors that affect attention to threatening road safety messages. Evidence from the fields of health and social psychology, neuroscience, and advertising has suggested that there are multiple factors to consider in this approach. Specifically, the review of the literature identified the importance of threat and efficacy appraisals, individual and situational factors, coping frameworks and even social biases. The current study will therefore investigate the influence of these factors on attention to risk information. This will be done in light of the work by Pedruzzi and Swinbourne (2009) who suggested that road behaviours are qualitatively different to many health behaviours employed in the literature. This is largely because risk on the road is also a function of others' behaviour. The research will therefore begin by aiming to clarify these differences. This will be done by contrasting a road threat with a commonly employed health threat in the literature, that is, risk of Coronary Heart Disease (CHD).

The first aim is to test the hypotheses generated by the fear appeal literature to determine if baseline levels of risk and efficacy perceptions can impact upon the type of information to which participants attend. Specifically, it is expected that increases in perceived efficacy will be associated with danger control responses. A danger control response will be evidenced by greater recall of risk information than neutral information. It is also expected that increases in perceived threat will be associated with fear control responses. A fear control response will be evidenced by greater recall of neutral information. It is further hypothesized that an interaction effect will occur whereby recall of risk information (compared to neutral information) will be highest in

those who have low threat perceptions and high efficacy perceptions. Finally, fear control responses are expected to be most pronounced in those who have high threat perceptions and low efficacy perceptions.

The second aim is to extend upon Pedruzzi and Swinbourne (2009) by examining the effect perceived control has for optimists on attention to threatening information. It is proposed that controllability may determine the effect of optimism on attention to a message and thus attention will differ depending on the threat presented. It is therefore hypothesized that an interaction between perceived control and type of information will occur whereby recall of risk information will be lowest in the situation perceived as less controllable.

The final aim of this study is to investigate the effect of unrealistic optimism on attention to determine if those who are biased are in fact more likely to avoid risk relevant information. Pedruzzi and Swinbourne (2009) have previously demonstrated that unrealistic optimism did not affect recall of road risk messages. This is in contrast to some of the literature suggesting that unrealistic optimism was associated with less recall of risk information (e.g. Radcliffe & Klein, 2002). However, Pedruzzi and Swinbourne's methods differed to those employed in the health literature. Unrealistic optimism was measured as a bias, that is, an individual's perception of risk compared to the average other. The examples from the broad health literature demonstrated in Chapter 3 instead employ objective measures of risk related to risk and protective factors. Similar methods to Pedruzzi and Swinbourne (2009) will be used in this study. This will be done because the focus of the project is road safety, and research in this domain by Walton and McKeown (2001) demonstrated that regardless of actual driving behaviour, drivers who were biased in their beliefs about their driving ability believed that road campaign messages were intended for others. However, the effect of self-

reported behaviour will be employed in the current research as a possible moderator of the hypothesized relationship.

Prior to all analyses, the effect of gender on recall of information will be examined due to the literature suggesting that males are more likely to report that threatening road safety messages have more influence on others than on themselves. This hypothesis will be tested in the context of recall to ensure gender is not implicated in any relationship.

4.2 Method

4.2.1 Design. The study used a 2 x (2) factorial design; scenario (road behaviours versus CHD health behaviours) x type of information (risk information versus neutral information). All groups received neutral and risk information specific to each scenario. To control for order effects the delivery of information was counterbalanced.

4.2.2 Participants. A community sample of 431 participants was recruited from the Townsville region in North Queensland. Recruitment sites included online social networks, community markets and events and also university networks. Participants were approached by the experimenter or an assistant and, after informed consent was obtained, given the choice of filling out a paper questionnaire or receiving the address of an online URL where they could find the survey. Participants' data was only included in the final analysis if two-thirds of the questionnaire was completed thus 113 participants were excluded. Seven respondents reported living in a state other than Queensland or a country outside of Australia and were also removed from the analysis. The final sample consisted of 311 participants (117 males, 171 females, 23 participants did not indicate their gender) ranging in age from 16 to 69 years (M = 33.90, SD = 13.90).

4.2.3 Measures. The following is an overview of the measures included in the study.

4.2.3.1 ***Likelihood estimates.*** Participants were presented with a list of 15 positive and negative events for each threat type and asked to indicate the likelihood that each of the events would happen to them in the future (see Appendix A). These questions provided a measure of perceived risk or susceptibility. In each scenario, six questions regarded the likelihood of negative events and six questions regarded the likelihood of positive events. For the road scenario an example of a negative road related event included 'Please indicate the likelihood that you will be booked for speeding.' Positive road related events included items such as 'Please indicate the likelihood that you avoid a crash nearly caused by another driver.' For the CHD scenario, examples of negative and positive events included 'Please indicate the likelihood you will become overweight or obese' and 'Please indicate the likelihood you will have a healthy heart well into old age' respectively. The remaining three questions in each scenario concerned general positive and negative events. For example, 'Please indicate the likelihood you will own your own home' and 'Please indicate the likelihood you will have pneumonia.' Participants responded using a 7 point Likert scale (1 = extremely unlikely, 7 = extremely likely). Participants were also asked to indicate the likelihood the same events would happen to the average person of their age and gender. The difference score between these 'self' and 'other' questions provided a measure of unrealistic optimism (as per Hatfield & Job, 2001). Specifically, a positive score indicates an individual rates themselves as better off than their peers. A negative score would therefore indicate an individual rates themselves as worse off than their peers.

4.2.3.2 ***Estimates of control.*** Health locus of control was assessed in the CHD information conditions using the Multidimensional Health Locus of Control scale (MHLC) Form A (Wallston et al., 1978). In the road information conditions an adapted version of the Multidimensional Traffic Locus of Control Scale (T-LOC) was used (Özkan & Lajunen, 2005). Some editing was required in the T-LOC to make the scales comparable. For example, participants respond to items in the T-LOC using a 5 point scale with *not at all possible*, *neither possible nor impossible* and *highly possible* as anchors at points 1, 3 and 5. These anchors were replaced with *strongly disagree* to *strongly agree* across a 6 point Likert scale as in the MHLC Form A. There are 18 items in the MHLC and 16 items in the T-LOC. Both scales have three comparable subscales. These are 'internal or self', 'others', and 'chance or fate.' A fourth subscale on the T-LOC is 'vehicle and environment,' which aims to capture the extent road outcomes are attributed to external factors such as the vehicle or environment. As the number of items on each scale differs, scores were divided by the number of items on each respective subscale in order to calculate an average item score.

Locus of control is defined and measured as the source of perceived control over outcomes (Beckjord et al., 2009). Situational measures of control that are indicative of efficacy appraisals were also included in this study to measure confidence in influencing different road or heart health outcomes. Participants were asked to indicate how confident they were in their ability to control or influence a number of positive and negative outcomes. These outcomes were the same outcomes for which participants were asked to provide likelihood estimates. Participants responded on a 5 point Likert scale (1 = no confidence, 5 = complete confidence). All items used to assess estimates of control can be viewed in Appendix B.

4.2.3.3 ***Attentional stimuli.*** In each condition participants read 2 brief essays consisting of neutral and risk information respectively. Each essay consisted of 24 sentences with a Flesch-Kincaid grade level ranging from 8.1 to 8.6 and a Flesch reading ease of approximately 60%. Participants were randomized to the road or CHD scenario, however each scenario presented both neutral and risk information. The order of essay presentation (neutral, risk) was counterbalanced across participants. Neutral information was purely descriptive in character. In the road scenario neutral information concerned road practices pertaining to the state in which the study was conducted. For example, 'Most people (70%) without a registered vehicle use public transport for their usual journey to work or study.' In the CHD scenario information about the activities of the Heart Foundation of Australia was presented. For example, 'Every year the Heart Foundation distributes more than 1.3 million heart health brochures.' Risk information described the consequences of unsafe or unhealthy behaviours in each scenario. For example, 'In a 60km/hr speed limit area, your risk of dying in a car crash doubles with each 5km/hr increase in travelling speed' and 'If you are a regular smoker or are exposed to second hand smoke your risk of developing Coronary Heart Disease is 4 times that of non-smokers.' Information was taken from the Queensland Transport (www.tmr.qld.gov.au) or Heart Foundation (www.heartfoundation.org.au) websites. The essay information employed in each scenario is presented in Appendix C.

4.2.3.4 ***Distractor task.*** Participants responded to 22 statements about the emotional valency of the essay information (see Appendix D). This was used as a distractor task and also to assess how threatening participants found the information. Participants rated the statements on a 5 point Likert scale from *strongly disagree* to

strongly agree. Thus, higher numbers indicated greater agreement with the particular statement.

4.2.3.5 *Recall task.* Participants were given a surprise recall task after the distractor task which itself followed the reading of each essay. The recall task consisted of 12 multiple choice questions each having four answer choices. Participants were asked to circle or tick the answer they believed was correct based on their memory of the essay information. The questions (and their corresponding answer choices) for both neutral and risk essays in each scenario can be viewed in Appendix E. Attention was operationalized using the total number of correct answers. Chapters 2 and 3 outlined a number of studies that employed a variety of methods to measure attention to health stimuli. For example, reading time (Aspinwall & Brunhart, 1996) tracking eye movements (Luo & Isaacowitz, 2007) and even recent studies measuring event related brain potentials (Kessels et al., 2010). While these are perhaps more sophisticated measures they are most suitable for laboratory environments. The strength of using recall as a measure was the ability to recruit a large and varied sample within community contexts.

4.2.3.6 *Optimism.* The Life Orientation Test Revised (LOT-R) (Scheier et al., 1994) was incorporated as a measure of dispositional optimism (see Appendix F). The LOT-R consists of 10 items (4 items are filler items) scored so that higher scores indicate greater dispositional optimism.

4.2.3.7 *Social desirability.* The Marlowe –Crowne Social Desirability Scale, Short Form C (Reynolds, 1982) was used in order to check if social desirability was related to reports of risk and protective behaviours. The scale consists of 13 items scored so that higher scores indicate greater social desirability. Participants responded

by indicating whether or not each statement applied to them by circling yes or no (Appendix G). Sample items include 'I'm always willing to admit it when I make a mistake,' and 'I am sometimes irritated by people who ask favours of me.' Items 10 and 13 were discarded in calculating the total score due to the use of double negatives and thus confusion experienced by participants.

4.2.3.8 ***Coping.*** Coping styles were assessed using the brief COPE (Carver, 1997). The brief COPE consists of 28 items that measure 14 different coping responses. Higher scores indicate more regular use of the coping strategy. The interest in this scale were items that measured active coping processes, emotion focused coping and defensive processes such as denial. All items were therefore included in the survey except for the subscales that measured religion, substance use, planning and self-blame (Appendix H).

4.2.3.9 ***Protective / risk factors & behaviours.*** A road risk appraisal and heart health risk appraisal were completed in each condition (see Appendix I). These questions largely assessed modifiable risk and protective behaviours. In the road scenario group participants were asked how often they performed certain actions while driving. For example, questions assessed how often participants stopped completely at stop signs, reduced their travelling speed during periods of rain, drove whilst taking on a hand-held mobile phone, and how often they made regular checks in the rear vision mirror. Participants were also asked how often they exceeded the speed limit in different driving environments. Participants responded on a 7 point Likert scale ranging from *never* to *always*. Participants were further questioned about their accident and claim history, the length of time they had held a licence, and hours spent driving on a weekly basis.

In the CHD scenario group participants were asked to indicate how often they engaged in a range of behaviours. For example, eating foods such as cakes, chips and fried foods (*every day*, *2 or 3 times per week*, *once or less per week*), whether or not they met the specified daily fruit and vegetable requirements (*yes, no*) and smoking status (*I smoke every day, sometimes, I don't smoke*). Participants further indicated the hours per week spent engaging in moderate intensity physical activity. Participants were also asked to indicate fixed factors such as family history of heart disease.

4.3 Procedure

Ethics approval was obtained through the James Cook University Ethics Committee (see Appendix J). For the paper questionnaires a random sequence of the numbers 1 through 4 representing each of the 4 conditions was generated with the restriction that a number could not occur more than three times consecutively. Questionnaires were arranged and handed out in that order. For the online questionnaires participants were asked to choose a category of cards; spades, clubs, diamonds or hearts. Each suit had been randomly assigned to a condition. To control for order effects the order of suit presentation was randomized on the screen so that each time the sequence was presented it was in a different order. For both online and paper versions, questionnaire delivery was designed so that participants could not go back and check the essay information while completing the recall task.

4.4 Results

4.4.1 Statistical analyses. Data was analysed using SPSS version 22. When Levene's test of homogeneity was violated adjusted t values and degrees of freedom are reported.

4.4.2 Sample characteristics. Almost 60% of participants (n = 179) were randomized to the CHD scenario with 132 participants randomized to the road scenario. The four conditions and corresponding sample sizes can be seen in Table 4.1.

Table 4.1
Number of participants in each cell

	Order of information	
Scenario	Risk first	Neutral first
Road	n =56	n =76
CHD	n =114	n =65

For the road groups, almost all participants (94%) reported having access to a vehicle (car, motorbike or scooter) for their own use. Road participants reported being licensed for an average of 17 years (SD = 13.70) and approximately 60% of respondents had been in at least one accident as a driver. The remaining 40% had not been involved in an accident as a driver. When asked to consider their most severe accident, 54% reported being the driver and 31% reported being at fault. Many participants in the road scenario reported taking risks on the road. For example, when asked to report on their behaviour in the last 12 months, 65% of participants reported 'occasionally' to 'always' exceeding the speed limit on the highway. Almost half of the sample reported 'occasionally' to 'always' talking on a hand held mobile phone whilst driving and approximately 55% reported driving when tired 'occasionally' to 'nearly all the time.' About 20% of the sample reported having an insurance claim made against them while 8% reported they had lost their licence at some stage.

For the CHD groups, 40% of respondents reported a family history of heart disease in either 1st or 2nd degree relatives. Almost 37% reported a need to lose weight and the majority (46%) reported carrying excess weight around their stomach. Almost

half (48%) of respondents indicated they ate fatty foods such as cakes, chips and fried foods two to three times per week. A minority (10%) reported this behaviour daily. Half of the sample reported not eating the daily required amount of 5 vegetable servings as set out by Australian guidelines (NHMRC, 2013). Twenty - nine percent of the sample did not meet the minimum requirement of 3 ½ hours of moderate intensity exercise weekly (Department of Health, 2014). Almost 11% reported a history of high blood pressure while 14% reported high cholesterol levels.

Baseline differences on common variables were investigated between CHD and road groups. Table 4.2 indicates the number of males and females in each condition. The distribution of gender did not differ between scenarios ($\chi^2(1, N = 288) = .06$, $p = .81$). Descriptive statistics for age, optimism score and social desirability can be seen in Table 4.3. The difference between means was not significant across the scenarios for age ($t_{(288)} = 1.09$, $p = .28$), optimism ($t_{(288)} = -1.87$, $p = .06$) or social desirability ($t_{(286)} = 1.71$, $p = .09$).

Table 4.2
Number of males and females in each scenario

Scenario	Males	Females
Road	51	77
CHD	66	94

Table 4.3
Descriptive statistics for each scenario

	Scenario	
Characteristics	Road	CHD
Age *M (SD)*	34.91 (14.00)	33.11 (13.80)
Optimism score *M (SD)*	20.00 (3.83)	20.85 (3.87)
Social Desirability *M (SD)*	6.69 (2.60)	6.16 (2.59)

4.4.3 Manipulation check.

4.4.3.1 ***Valency ratings of attentional stimuli.*** Paired samples t tests were conducted to examine valency ratings for neutral and risk information. Mean difference scores and t statistics are reported in Table 4.4. Positive scores indicate risk information was rated higher by participants and negative scores indicate neutral information was rated higher. For both road and CHD scenarios, participants rated risk information as significantly more threatening and distressing than neutral information. In both scenarios risk information was reported as making participants feel significantly more anxious than neutral information. Risk information was also rated as significantly more interesting and informative across both scenarios. Neutral information was reported as making participants feel significantly more relaxed than risk information.

Table 4.4
Mean difference scores (risk – neutral) and t statistics

	M	*SD*	*t*	*df*	*p*
Road threat					
The information made me feel anxious	.47	1.05	5.09	129	.00
The information was threatening to me	.40	1.04	4.43	128	.00
I found the information distressing	.84	1.11	8.55	127	.00
The information made me feel relaxed	-.40	.94	-4.87	129	.00
I found the information interesting	.35	.85	4.64	128	.00
The information was informative	.20	.87	2.63	128	.01
CHD threat					
The information made me feel anxious	.59	1.00	7.60	167	.00
The information was threatening to me	.39	.90	5.61	165	.00
I found the information distressing	.46	.96	6.16	166	.00
The information made me feel relaxed	-.32	.97	-4.26	165	.00
I found the information interesting	.29	.93	3.94	164	.00
The information was informative	.23	.77	3.84	164	.00

4.4.4 Recall of information for men and women. As the interest of this study was the difference in recall between risk and neutral information, a variable was created where, for each participant, their score on the recall task for the neutral information was subtracted from their score for recall of risk information. Therefore, positive numbers on the output variable indicate that more risk information than neutral information was remembered. A score of zero indicates that recall did not differ between the risk and the neutral conditions. A negative score indicates more neutral information than risk information was remembered. Average scores on this variable for men and women in each scenario are reported in Table 4.5. For both road and CHD scenarios there was no effect of gender on the difference in recall respectively ($t_{(123)}$ = -.05, p = .96; $t_{(150)}$ = 1.55, p = .12).

Table 4.5
Mean difference in recall for men and women in each scenario

Scenario	Males	Females
	M (SD)	*M (SD)*
Road	-.29 (2.10)	-.26 (2.37)
CHD	1.17 (2.38)	.59 (2.23)

4.4.5 Findings regarding Fear appeal theory. Perceived threat usually consists of two components within the fear appeal literature. These are perceived susceptibility and perceived severity. As perceptions of severity were not measured in this study, perceived susceptibility was solely used to measure perceived threat. The items used in each scenario were 'Please estimate the likelihood that you will have a crash as the driver at fault' and 'Please estimate the likelihood that you will have a heart attack.' Efficacy appraisals also consist of two components; self-efficacy and response efficacy. In this study participants were asked to estimate control perceptions, specifically their

confidence in their ability to control or influence a number of outcomes in each scenario. Perceived control is reflected in levels of efficacy (Thuen & Rise, 2006). The items used in this analysis were confidence in one's ability to 'have 3 consecutive years of crash free driving' and confidence in one's ability to 'maintain a healthy heart.' Higher numbers indicate higher perceived threat and higher perceived efficacy. The difference in recall variable was used to indicate a fear or danger control response. Once again, positive numbers indicate more risk information is recalled, while negative numbers indicate more neutral information is recalled. Descriptive statistics for these variables are presented in Table 4.6.

Table 4.6
Descriptive statistics for the EPPM variables in each scenario

	Road *M (SD)*	CHD *M (SD)*
Difference in recall (risk - neutral)	-.28 (2.25)	.83 (2.28)
Threat appraisal	3.20 (1.02)	3.17 (1.27)
Efficacy appraisal	4.00 (.89)	3.85 (.91)

In order to test the hypothesis that threat and efficacy will have an interactive effect on the dependent variable, moderation analysis was employed using the PROCESS macro by Hayes (2013). For each scenario a regression model tested whether there was an association between threat and recall and whether this association depended on levels of efficacy. The macro centers the moderator and predictor variables and examines their interaction and relationship with the outcome. In interpreting the results of the moderation model, the primary focus is the coefficient for the interaction term. For both the road and CHD scenarios, the overall model was not significant ($F_{(3,121)} = 1.63$, $p = .19$; $F_{(3,154)} = 1.95$, $p = .12$). The main effects and interaction terms for each scenario are given in Table 4.7. As demonstrated in the table

there was a significant main effect of threat in the CHD scenario only. There was no evidence of a significant interaction in either scenario.

Table 4.7
Results from moderation analysis

	b	*SE*	*t*	*p*
Road scenario				
Efficacy (M)	.00	.22	.01	.99
Threat (X)	.23	.20	1.18	.24
Threat x efficacy	-.38	.21	-1.77	.08
CHD scenario				
Efficacy (M)	.35	.22	1.59	.11
Threat (X)	.39	.17	2.26	.03
Threat x efficacy	-.09	.18	-.47	.63

4.4.6 Findings for Optimism. For the final 311 participants, 21 participants did not have scores on optimism. For the remainder, scores on optimism ranged from a minimum of 10 to a maximum of 30 (M = 20.48, SD = 3.87). From this point high and low optimism was operationalized by including only the top and bottom 30% of scores on the LOT-R. Scores under 18 were classified as low (M = 16.18, SD = 2.01) and scores above 23 were classified as high (M = 24.96, SD = 1.90). A total of 182 participants were included in these categories.

4.4.6.1 *Recall.* The overall means and standard deviations for the number of items recalled by participants low and high in optimism for each condition are presented in Table 4.8. One sample t tests were used to assess if the difference in recall was significantly different to zero for participants classified as low and high on optimism. The dependent variable (difference in recall) was described earlier and

operationalized in such a way that positive numbers indicate more risk than neutral information was remembered. A score of zero indicates that equal amounts of risk and neutral information was recalled. For the road scenario the difference in recall was not significantly different to zero for participants low in optimism (M = -.14, SD = 2.19; $t_{(42)}$ = -.42, p = 0.68) and participants high in optimism (M = .06, SD = 2.29; $t_{(30)}$ = .16, p = .88). For the CHD scenario, recall was not significantly different to zero for participants low on optimism (M = .44, SD = 2.56; $t_{(47)}$ = 1.18, p = .24) however for participants high on optimism the difference in recall was significant (M = 1.06, SD = 2.02; $t_{(51)}$ = 3.77, p = .00). This indicates that for individuals high in optimism in the CHD scenario, risk information was significantly better recalled than was neutral information.

Table 4.8
Mean number of items recalled (scenario x information type x optimism)

	Road	CHD
	M (SD)	*M (SD)*
Low optimism		
neutral information	7.73 (2.45)	6.71 (3.06)
risk information	7.61 (2.54)	7.21 (2.67)
n	43	48
High optimism		
neutral information	8.29 (2.04)	7.17 (2.49)
risk information	8.35 (2.09)	8.24 (2.53)
n	31	52

4.4.6.2 ***Optimism and estimates of control.*** Mean scores on locus of control for participants low and high on optimism in each scenario are displayed in Table 4.9. To investigate the effect of optimism on locus of control in each scenario a MANOVA was

conducted. Scenario and categorical optimism classification were the independent variables and 'internal' locus of control and 'others' locus of control were the dependent variables. There was a significant main effect for scenario ($F_{(1,168)}$ =14.54, p = .00, η^2 = .08) but not for optimism ($F_{(1,168)}$ = 2.37, p = .13) on internal locus of control indicating that, on average, individuals reported higher levels of internal control over their health outcomes than over outcomes on the road. These main effects were modified by a significant interaction between scenario and optimism on internal locus of control ($F_{(1,168)}$ = 9.92, p = .00). The interaction indicates that optimism is associated with greater perceived personal control in the CHD scenario but not in the road scenario. Specifically, in the road scenario group, levels of perceived internal locus of control are similar for participants low and high in optimism. However, in the CHD scenario group participants high in optimism have greater scores on internal locus of control than those reporting low optimism (See Table 4.9).

For 'Others' locus of control there was a significant main effect of scenario ($F_{(1,168)}$ = 254.68, p = .00, η^2 = .60) indicating that individuals reported higher levels of powerful others control over road outcomes than over health outcomes. In addition, a main effect for optimism ($F_{(1,168)}$ = 8.44, p = .00, η^2 = .05) indicated that participants high in optimism reported significantly lower levels of Others control than participants low in optimism (Table 4.9). However, there was no interaction between type of scenario and level of optimism on Others locus of control ($F_{(1,168)}$ = .21, p = .65).

Table 4.9
Locus of control estimates (Scenario x optimism)

	Road *M (SD)*	CHD *M (SD)*
Internal locus of control		
Low optimism	4.08 (.91)	4.17 (.60)
High optimism	3.88 (1.21)	4.77 (.62)
Others locus of control		
Low optimism	4.78 (.70)	2.78 (.88)
High optimism	4.37 (.69)	2.49 (.78)

4.4.6.3 ***Optimism, coping and protective behaviours.*** For the road scenario, risk and precaution taking behaviours were respectively summed and averaged to create two separate indices. Scores range from 1 to 7 where higher numbers indicate the behaviour is more frequently performed (1 = never, 7 = always). On average, participants reported 'hardly ever' taking risks on the road (M = 2.14, SD = .72) and 'frequently' engaged in precautionary behaviour (M = 5.48, SD = 1.05). For the CHD scenario, five modifiable risk behaviours were summed to create a health protection index. The behaviours included the frequency of eating fatty foods, participant smoking behaviour, both fruit and vegetable consumption, and amount of exercise. Participant answers were scored in such a way so that higher numbers indicated healthier behaviours. Scores ranged from an absolute minimum of 4 to a total possible score of 12 (M = 9.75, SD = 1.48). In the road scenario there was no relationship between optimism and risk taking (r =.10, p = .27) or optimism and precaution taking (r =.14, p = .11). In the CHD scenario optimism was significantly and positively correlated with protective behaviours (r =.21, p = .00) indicating that as optimism scores increased so did protective behaviours.

Optimism was positively correlated with the active coping subscale of the brief COPE for the road (r=.27, p =.00) and CHD scenarios (r=.38, p=.00). This indicates that as scores on optimism increased, scores on active coping also tended to increase. Optimism was negatively correlated with behavioural disengagement and denial in the road scenario (r=-.41, p=.00; r=-.19, p=.03) and CHD scenario respectively (r=-.29, p=.00; r=-.16, p=.05). Thus for both scenarios higher scores on optimism tended to be related to lower scores on behavioural disengagement and denial.

4.4.7 Findings for unrealistic optimism / optimism bias. Initially, relative future risk estimates were calculated for each of the 15 events in the questionnaire. For negative events, self-ratings were subtracted from peer ratings. For positive events, peer ratings were subtracted from self ratings. A positive score on this difference variable therefore indicates that individuals rate themselves as better off than their peers regardless of whether the event was positive or negative in nature. Specifically, scores above zero represent unrealistic optimism. The mean difference scores and t statistics for the 15 events in each scenario are demonstrated in Tables 4.10 and 4.11. As demonstrated in the tables, there was convincing evidence of optimism bias in all events except for scores on three items concerning positive road events. In other words, participants largely rated negative events as significantly more likely to happen to others and positive events as significantly more likely to happen to themselves. In each scenario an unrealistic optimism index was then created for both positive and negative events only using the items that had demonstrated significant unrealistic optimism with p values <.05. The difference scores were then summed and averaged. Table 4.12 presents the unrealistic optimism indices for positive and negative events specific to the road and CHD scenarios. This process is similar to that reported by Hatfield and Job (2001).

Table 4.10
Mean difference scores and t statistics for relative future risk estimates (Road related events)

	M	*SD*	*t*	*df*	*p*
Negative events					
Be booked for speeding	1.46	1.55	10.87	131	.00
Have a crash, as the driver at fault	1.25	1.41	10.22	131	.00
Be killed in a crash, as the driver at fault	1.26	1.48	9.79	131	.00
Be booked for doing an illegal U turn	1.08	1.68	7.36	131	.00
Be killed in a crash, as the passenger	.53	1.42	4.32	130	.00
Be booked for driving with a blood alcohol content over the legal limit	2.50	1.98	14.52	131	.00
Positive events					
Stop quickly in an emergency while driving	.46	1.16	4.57	131	.00
Have 3 consecutive years of crash free driving	1.18	1.73	7.81	129	.00
Have 3 consecutive years without being booked	1.20	1.85	7.40	130	.00
Avoid a crash nearly caused by another driver	.18	1.26	1.60	130	.11
Drive safely if driving while tired	.16	1.29	1.43	130	.16
Run a red light without being booked	-.58	1.78	-3.77	131	.00

Table 4.11
Mean difference scores and t statistics for relative future risk estimates (CHD related events)

	M	*SD*	*t*	*df*	*p*
Negative events					
Develop high blood pressure	.69	1.80	5.08	174	.00
Become overweight or obese	1.78	1.83	12.80	172	.00
Have a heart attack	.57	1.57	4.78	172	.00
Die from a heart attack	.61	1.50	5.39	173	.00
Suffer from depression	.92	1.62	7.47	172	.00
Have an angina attack	.61	1.44	5.61	173	.00
Positive events					
Have a healthy heart well into old age	.62	1.64	5.02	172	.00
Have normal cholesterol levels	.72	1.69	5.58	172	.00
Maintain a healthy diet	1.28	1.64	10.29	172	.00
Engage in regular exercise	1.24	1.84	8.88	173	.00
Maintain a good social support network	.66	1.23	7.07	172	.00
Refrain from smoking	1.50	2.05	9.60	172	.00

Table 4.12
Optimism bias indices for road and CHD related events

Index	*M*	*SD*
Road related negative	1.36	1.06
Road related positive	.95	1.31
CHD related negative	.86	1.20
CHD related positive	1.01	1.11

A series of moderation analyses using the PROCESS macro by Hayes (2013) examined whether there was an association between optimism bias and the difference in recall, and, whether this association depended on self-reported behaviour. For the road scenario, optimism bias for negative events was used as an independent variable while the road risk taking index was used as a moderator variable. Results indicated the overall model was not significant ($F_{(3,118)} = 1.21$, $p = .31$). The main effects and interaction terms were not significant and are displayed in Table 4.13. The replacement of the negative events index with the positive events index and a moderator of precaution taking instead of risk taking yielded similar results ($F_{(3,117)} = 1.93$, $p = .13$). The main effects and interaction terms are again displayed in Table 4.13.

Table 4.13
Prediction of difference in recall by optimism bias and behaviour (Road scenario)

	b	*SE*	*t*	*p*
Road scenario				
Optimism Bias Negative	-.20	.19	-1.07	.29
Risk taking	.30	.31	.97	.33
Optimism Bias Negative x Risk taking	.38	.33	1.15	.25
Optimism bias Positive	-.14	.17	-.81	.42
Precaution taking	-.29	.20	-1.44	.15
Optimism bias Positive x Precaution taking	-.23	.18	-1.30	.20

For the CHD scenario, the above process was repeated with the respective optimism bias indices and the moderator of protective behaviour. The first model using optimism bias for heart related negative events was not significant ($F_{(3,132)} = .98$, $p = .40$). The main effects and interaction terms are displayed in Table 4.14. The replacement of the negative events index with the positive events index also demonstrated a non significant model ($F_{(3,131)} = 2.35$, $p = .08$). There were no significant main effects (see Table 4.14), however the interaction term between optimism bias for positive events and precaution taking was significant ($b = .35$, $p = .01$, C.I = .07; .63). The interaction indicated that the effect of optimism bias for positive heart events on the difference in recall was marginally significant at low levels of protective behaviour (conditional effect = -.63, $p = .06$). This indicated that at low levels of protective behaviour, increases in optimism bias for positive events was related to lower recall of risk information and greater recall of neutral information.

Table 4.14
Prediction of difference in recall by optimism bias and behaviour (CHD scenario)

	b	*SE*	*t*	*p*
CHD scenario				
Optimism Bias Negative	.08	.16	.57	.57
Protective behaviour	.06	.17	.35	.72
Optimism Bias Negative x Protective behaviour	.18	.13	1.41	.16
Optimism bias Positive	-.13	.20	-.64	.52
Protective behaviour	.17	.16	1.04	.30
Optimism bias Positive x Protective behaviour	.35	.14	2.51	.01

4.5 Discussion

The current study investigated the effect of a number of variables that may impact upon attention to risk messages. In particular, the outcome under investigation was the difference in recall between risk and neutral information. This research is valuable because the examination of inattention as a fear control response is largely missing from the body of literature. Further, the overall effectiveness of a message cannot be determined without examining the factors that influence fear control outcomes (Lewis et al., 2010). The first and foremost aim of health promotion messages is to gain audience attention. However, in order for audiences to process a message, they must also remember it (Elliott, 2011). Understanding the factors that lead to avoidance or acquisition of risk information is therefore necessary to inform the creation of effective communication attempts.

To begin with gender differences in recall of risk information were examined to rule out the possibility that gender was involved in attentional preferences for information type. In both scenarios, results demonstrated that men did not recall less

risk information in comparison to women. Research has shown that men tend to report that threatening road safety messages have greater influence on others than on themselves. This is very different to women who report that messages have greater influence on themselves than on others (Lewis, Watson, & Tay, 2007). Such a finding could suggest that men would avoid threatening road safety messages. However, the current research does not suggest that men were less likely to attend to threatening information compared to women.

Initially the implications of fear appeal theory were tested to determine whether attention to a risk message could be predicted by pre-existing levels of threat and efficacy. This was important to investigate because risk messages generally do not include efficacy components, and as such pre-existing perceptions of threat and efficacy can guide whether or not a person acts in a protective manner (Witte et al., 1998). Furthermore, differences in baseline levels of threat and efficacy will differ, not only for audience members, but also with regard to the specific behaviour under investigation (Peters et al., 2012). The latter point is particularly important to the design of health messages as threat appeals are largely applied across all scenarios and behaviours, regardless of the nature of the threat (Hastings et al., 2004).

In line with Peters and colleagues' (2012) reinterpretation of the fear appeal literature, it was hypothesized that for both scenarios pre-existing levels of efficacy would lead to danger control responses and this would be evidenced by a positive relationship between efficacy and recall of risk information. A main effect for threat was also hypothesized, whereby increases in pre-existing levels of threat would be associated with fear control responses, that is, greater recall of neutral information compared to risk information. Further, an interaction effect was expected to occur, where recall of risk information would be greatest amongst those who have low threat

perceptions and high efficacy perceptions. It was also hypothesized that recall of neutral information would be the greatest amongst those who have high threat perceptions and low efficacy perceptions. Results demonstrated no relationship between threat, efficacy and recall in the road scenario, however there was a small but significant main effect of threat on the difference in recall in the CHD scenario. This effect indicated that as participants' estimations of heart attack likelihood increased, recall of risk information (compared to neutral information) also tended to increase. There were no other significant findings.

The effect of threat in the CHD scenario was opposite to that predicted. The observed effect suggests that when faced with a threatening message about CHD risk, greater levels of pre-existing threat perceptions lead to greater attention. However, when considering the implications of this finding, the average level of efficacy needs to be considered. The average response for the efficacy appraisal was quite high (almost 4 on a scale of 1 to 5). As such the main effect of threat leading to increased recall of the risk information may need to be interpreted in light of the suggestions made by Peters and colleagues (2012). These researchers caution that pre-existing levels of threat and efficacy are rarely considered, and the manipulation of threat in a sample high in efficacy erroneously demonstrates a main effect for threat. Given how high efficacy was in the CHD scenario, it is likely the main effect demonstrated in the current study is in fact a simple effect of threat under high efficacy. The relatively low baseline levels of threat may also play a part in this finding. That is, the low baseline levels of threat may have allowed a successful threat manipulation to occur, and the high average efficacy meant defensiveness did not occur. As such participants engaged in a danger control response and likely paid more attention to the risk message. This was evidenced by greater recall of the risk information compared to the neutral information.

Interestingly, this finding did not occur for the road scenario. There are a few possible suggestions that may explain the difference. These suggestions largely target the measurement of threat. In this study the measure of threat did not include a component that assessed perceived severity. In both scenarios threat only included the assessment of perceived susceptibility. In the road context, assessing the likelihood of crashing at fault likely reflects some degree of biased responding. Research has demonstrated that most drivers have biased perceptions of driving skill (Harré et al., 2005; Job, 1990; Pedruzzi & Swinbourne, 2009). Perhaps then, the item assessing threat in the road context did not adequately reflect perceived susceptibility. It could also be argued that perceptions of severity were needed in order to adequately assess perceived threat. However, several studies in the public health arena examining the effectiveness of threat appeals have demonstrated that perceptions of severity are not as important as perceptions of vulnerability (de Hoog, Stroebe, & de Wit, 2007; Henley & Donovan, 2003; Pechmann, Zhao, Goldberg, & Reibling, 2003).

Further, road behaviours are qualitatively different to heart health behaviours. With health behaviours there is usually more of a tangible basis for risk estimates, for example family history of heart disease. In a road context, there are no such bases for estimating risk. Driving is a habitual behaviour that, for most people, requires little effort. Drivers know what they should do on the road, but they often do otherwise with little thought (Elliott, 2011). As such feelings about a threat may be more important than cognitive assessments such as the current item assessing likelihood. Affective responses are rapid and automatic in nature and as such tend to guide judgements of risk (Lawton, Conner, & Parker, 2007; Loewenstein, Weber, Hsee, & Welch, 2001). Windschitl (2003) has proposed that susceptibility should have two separate components; one that taps into the objective probability of a threat and one that

considers feelings about vulnerability to the threat. Research has distinguished between cognitive and affective measures of risk highlighting differences in their effects. For example, Farrell, Murphy, and Schneider (2002) found that men dismissed counselling about risk due to fear of the 'Big C' (Slovic, Peters, Finucane, & Macgregor, 2005). Recent research by Janssen, van Osch, Lechner, Candel, and de Vries (2012) failed to find any association between cognitive measures of likelihood and a number of health behaviour outcomes across three studies. However, they demonstrated significant relationships between affective measures of likelihood and the same outcomes. Future studies should therefore consider measures of vulnerability that capture feelings about a threat instead of assessing the likelihood of a threat.

In the same manner, measures of efficacy perceptions in each scenario may have also been subject to similar problems. The scope of targets an individual can control when conceptualizing a negative road or heart outcome extend well beyond those specified. Perhaps, identifying the correct target of control is of utmost importance in road safety research. For example, in the oncology literature, control appraisals regarding the reoccurrence of cancer had no relationship with adjustment (Carver et al., 2000). In contrast, Beckjord et al. (2009) demonstrated that control appraisals regarding emotions and medical decisions have been associated with adaptive outcomes. Likewise, the target of control in the road context may be incorrect. Additionally, having confidence in your ability to have three consecutive years of crash free driving requires an estimation of one's ability to perform a set of behaviours and a belief that those behaviours will have an effect on the outcome. This is also the case in estimating one's ability to maintain a healthy heart. While perceived control over these outcomes reflects levels of efficacy, these constructs may need to be measured separately in order to ensure that enacting the behaviour will in fact affect the outcome.

For example, Donovan and Henley (1997) noted that threat appeals usually present a negative outcome and a contingent behaviour. Specifically, the negative outcome is contingent on the individual's behaviour. Pre-existing beliefs about the success of the behaviour in preventing the outcome may be important to processing the message. Henley and Donovan (1999) have argued that the portrayal of death in threat appeals needs to be carefully considered for the above reason. Specifically the behaviours recommended in a campaign, may not be appraised as able to prevent the portrayed death outcome in the context of the campaign. Perhaps then, defining levels of efficacy and their relationships with the outcome is most important in order to choose the appropriate control target.

The second aim of this study was to examine the effect of optimism on recall of threatening health information and determine if perceived control was involved in the relationship. In the road scenario all participants, regardless of their level of optimism, correctly recalled similar amounts of risk and neutral information. This pattern was the same for individuals low on optimism in the CHD scenario condition. However, for participants high on optimism in the CHD scenario condition significantly more risk information than neutral information was recalled. The findings for recall of the CHD message support previous research findings suggesting that optimism facilitates attention to a threatening health message (Aspinwall & Brunhart, 1996). However, in the road scenario condition this was not the case. Optimism did not facilitate attention to a risk message in this domain. Similar findings with a road scenario have been demonstrated in previous research by Pedruzzi and Swinbourne (2009). In their study, participants high on optimism recalled significantly more neutral information in a between subjects design.

It seems that road and heart outcomes are fundamentally quite different and may be best understood by thinking about coping strategies when faced with a threat. As per Aspinwall and Brunhart (1996) it would be expected that optimism would facilitate attention to a health message. This was the case for the CHD condition but not for the road condition. Behaviourally, it has been demonstrated that perceived control mediates the effect of optimism (Solberg Nes & Segerstrom, 2006). The results in this study suggest that perceived control may also determine attention to a message by those higher on optimism. The significant main effect for type of scenario on ratings of internal locus of control suggests that participants in the road scenario endorsed significantly lower ratings of perceived internal control over a road outcome than over a health outcome. While there was no main effect for optimism on internal locus of control in the road scenario, the interaction between scenario and optimism indicates that participants (whether high or low in optimism) have similar estimates of internal control over road outcomes. However, for health outcomes it is the participants high in optimism that report significantly greater personal control. These were the participants that remembered significantly more risk information than neutral information. Perhaps, with regards to attention, the action oriented approach of optimists is limited to occasions when perceived internal control is high.

It seems there may be a role for additional influences controlling road and health outcomes. Results of the current study indicated that participants high on optimism endorsed significantly lower levels of powerful other's control over their road and health outcomes. However, the effect of scenario was quite profound. The role played by powerful others in controlling road outcomes was significantly higher in comparison to health outcomes. So, when the differences in perceived control are considered, it could be argued that optimists have shown flexibility in their choice of coping strategy.

That is, it makes no sense for optimists to pay attention to a message portraying an outcome that they perceive they can't control.

Further, the results examining the relationship between optimism and behaviour also need to be considered as they likely contribute to these findings. As demonstrated in the behavioural literature optimism tends to be associated with active coping strategies (Carver et al., 2000). Optimists by nature simply use and engage in more action oriented approaches to health. Furthermore, this seems to be mediated by perceived control (Solberg Nes & Segerstrom, 2006). In the current study optimism was positively related to the active coping subscale on the COPE and negatively related to denial and disengagement in both scenarios. However, optimism was only positively associated with protective behaviours in the CHD scenario condition. As scores on optimism increased, protective behaviours such as eating fresh fruit and vegetables and engaging in regular exercise also tended to increase. There was no relationship between optimism and protective or risk behaviours in the road condition. The difference regarding protective factors for road behaviours is that many of these behaviours sit within a legislative framework. For example, wearing a seatbelt and following the speed limit is fundamentally about compliance. As such, the additional opportunity to engage in protective behaviour is somewhat limited in comparison to healthy heart behaviour. However, this finding is different to prior research by Pedruzzi and Swinbourne (2009) who found that optimism was positively related to precaution taking on the road and negatively related to road risk taking.

These differences might be able to explain why optimists paid equal attention to both road risk and road neutral information in this study, but more attention to neutral information in the 2009 study. Specifically, if optimists perceive what they are doing behaviourally has no bearing on the outcome of having a car crash (due to low

perceptions of control) this may cause fear and anxiety. It makes sense that optimists should attend less to a risk message in comparison to a neutral message as this will alleviate their fear. In this sample, optimism was not related to precaution taking on the road. Perhaps then fear was not experienced and there was no reason to attend less to risk information. However, the low perceptions of control may have ensured that they didn't over attend to the risk information. This would suggest that the behaviour of optimists under different control conditions is also important to the attention process.

The final aim of this study was to examine if unrealistic optimism was related to lower recall of risk information. In particular to determine if behaviour could explain the null findings demonstrated by Pedruzzi and Swinbourne (2009) in a road context. In the current road scenario, results demonstrated no effect of unrealistic optimism and no interaction with behaviour. In the CHD scenario there was one significant interaction between optimism bias for positive events and protective behaviour. This interaction indicated that a belief that positive heart health events were more likely to happen to the self (compared to others) was related to less recall of risk information, but only at low levels of protective behaviour. This result is similar to the findings in the health literature demonstrating that unrealistic optimism is related to biased recall of risk information and images (e.g. Luo & Isaacowitz, 2007; Radcliffe & Klein, 2002) although the calculation of unrealistic optimism differed somewhat. In the Radcliffe and Klein (2002) study, participants' estimated likelihood of a heart attack compared to others was compared to a computerized score that calculated objective risk based on health behaviour, family history, and physiological information such as blood pressure. The current research suggests that the difference in perceptions and behaviour may have lead to biased processing of risk information. It should also be noted that the conditional effect of optimism bias on recall at low levels of behaviour was only

bordering on significance. It could be suggested that the overall high levels of protective behaviours in this sample is implicated in the non significant conditional effect.

While similar research has not been conducted in the road domain, Walton and McKeown (2001) found that those who have biased perceptions of their speed, relative to others, were more likely to report that a risky road message was intended for others. This was regardless of behaviour. Further evidence demonstrating a significant third person effect in road safety advertising (Lewis, Watson, & Tay, 2003; Lewis, Watson, & Tay, 2007) suggests that it is important to determine if unrealistic optimism in in fact related to inattention. This research supports the findings of Pedruzzi and Swinbourne (2009) demonstrating no direct effect of optimism bias on recall of risk information. However, the effect of behaviour should be considered further.

Although efforts were made in this research to account for behaviour, it is likely that the self-reported nature of the measurement played a role. Reported precautionary behaviour was high, and reported risk behaviour was on average, quite low. On inspection, social desirability was related to self-reports of behaviour, indicating that as social desirability increased, precaution taking also increased and risk taking tended to decrease. Future research should investigate the effect of more objective measures of behaviour, before excluding the possibility that behaviour is implicated in the relationship.

4.5.1 Concluding remarks. In conclusion, this study shows that perceptions of control may be central in determining optimists' attention to health messages. Furthermore, future research should focus on teasing out control perceptions in this domain – particularly with regard to levels of efficacy. While personality variables such as optimism may have some effect on which information is attended to in a health

campaign, this research demonstrates that the situational constraints of the threat will likely determine the effect of such dispositions. This is important to note as most studies investigating optimism and coping responses do not report stressor characteristics such as perceived control (Solberg Nes & Segerstrom, 2006). The control estimates used in the current research do give some insight into the characteristics of these threats however they are a rudimentary approach. The T-LOC (Özkan & Lajunen, 2005) is a relatively new measure designed to measure locus of control in a road scenario and needs further tests of validity, particularly in Australian samples. The MHLC (Wallston et al., 1978) measures locus of control estimates for general health; it is not specific to heart health. Determining adequate measures of perceived control that can be used to predict attention to health threats is therefore necessary. This discovery might be made by investigating levels of efficacy – in particular understanding perceptions of control over contingent behaviours and outcomes that are reflective of self and response efficacy. This could provide a framework for use in creating campaigns that are less likely to cause individuals to switch their attention elsewhere. This would be especially applicable to the area of road safety where concerns as to the suitability of fear campaigns have been raised (Castillo-Manzano et al., 2012; Elliott, 2003; Wundersitz & Hutchinson, 2011). The current research suggests these concerns are warranted especially as the primary aim of mass media communications is to gain audience attention (Elliot, 2011).

By contrasting threats that differ in perceived controllability this study has demonstrated that optimism alone cannot explain the differences in attentional preferences for different scenarios. Participants demonstrated greater recall of risk information in the situation they perceived they could do something about – their own physical health. It seems that road threats are quite different. They are characterized by

low levels of perceived individual control and high levels of perceived control attributed to other people. In order to create robust communications that individuals attend to, control appraisals warrant further investigation.

Chapter 5

What do individuals perceive they can control in a road and CHD context?

5.1 Study context

In chapter 4 fear appeal theory and the role of optimism and perceived control in attentional preferences for risk information was investigated. Results demonstrated that optimists paid greater attention to a risk message about heart health when perceived personal control over health outcomes was high. In contrast this relationship was not observed in a road scenario, where perceptions of personal control over a road crash were significantly lower. These control perceptions were comparatively low regardless of level of optimism. This research was valuable as it highlighted that optimism alone cannot explain attentional preferences for risk information. The results in chapter 4 also demonstrated that increases in pre-existing beliefs about susceptibility were related to increases in attention to risk messages in a CHD scenario condition where efficacy for maintaining a healthy heart was high. This relationship was not found in a road scenario condition even where efficacy for having three years of crash free driving was similarly high. Taken together, these results suggest that control appraisals warrant further investigation when considering effective road safety messages.

Threat appeals consist of contingent behaviours and negative outcomes. Specifically, the negative outcomes portrayed in the threat appeal are contingent upon the behaviour enacted by the individual (Donovan & Henley, 1997). As such the effectiveness of the appeal may depend upon the perceived ability of the behaviours to prevent the outcome. This relationship will be explored in the current study to ensure that perceived control over the contingent behaviours is in fact related to perceived control over negative outcomes. Specifically, a number of behaviours and outcomes in both CHD and road contexts will be assessed with regard to level of control.

The aim of the current study is therefore to examine the relationships between control over a number of behaviours and outcomes in a road context and compare these relationships to the health threat of CHD commonly employed in the literature on health communication. Contrasting these threats may help explain why fear appeals are more suitable to threats like the consequences of heart disease. There are three types of control appraisal targets under investigation in this study. These are defined as 'behavioural control' and control over two types of outcomes. These are 'proximal outcomes' and 'distal outcomes.' Proximal outcomes are defined as markers that indicate an individual is engaging in risky behaviour. For example, overweight and obesity is an indicator that an individual is not active enough. A speeding fine indicates an individual has not been adhering to the speed limit. Distal outcomes are defined as the extreme outcomes most often exemplified in health campaigns. Examples are heart attacks and road crashes. The current investigation examines patterns of responding on these variables with the aim of understanding specifically how perceived control over road outcomes differs to perceived control over heart outcomes.

It is hypothesised that perceived control over all behaviours and outcomes relating to heart health will be high. Each heart target is hypothesised to be positively related to each other, where increases in behavioural control will be related to increases in control over both proximal and distal heart outcomes. Additionally, as heart markers also indicate risk of distal heart outcomes, control over the proximal markers of heart problems is expected to mediate the relationship between behavioural control and control over a distal heart outcome. In comparison to a heart context it is hypothesised that behavioural control and proximal outcomes in a road context will be similarly high and related to each other. Although in an applied context speeding is related to and causes crashes, the results from Chapter 4 suggest that individuals largely attribute

these outcomes as due to the role of others. It is therefore expected that control over distal road outcomes will be appraised as low and not related to control over behaviour. No mediation will be tested nor is it expected to occur in this context for the following reasons. Proximal outcomes such as fines are not necessarily indicators of risk for road outcomes such as crashes. Furthermore, in an applied context these indicators are not portrayed as leading to distal road outcomes in road campaigns.

5.2 Method

5.2.1 Participants. A sample of 236 participants was recruited from the Townsville region in North Queensland via the advertisement of an online survey. The survey link was largely advertised on online social networks, university newsletters, and community events pages. Participants could click on the advertised link to proceed to the survey. Of this sample, 31 participants requested to fill out a paper questionnaire. The majority (85%) of the sample were Queensland residents while 25 participants reported living elsewhere in Australia. There were 3 participants who reported living overseas while 4 individuals did not give any information about their place of residence.

The sample consisted of 156 females and 76 males (4 participants did not indicate their gender) ranging in age from 18 to 73 years (M = 38.97, SD = 13.89). Eight percent of the respondents reported their highest level of education was year 10. A further 22% reported completing year 12. Almost 33% had completed an undergraduate degree. About 8% of the sample reported having a trade qualification while the remaining 27% reported completing some other form of education. Cases were examined for missing values. A total of 29 participants were missing data on one or more of the variables of interest. These participants were older than those without missing data ($t_{(233)}$ = -2.01, p = .05). However the distribution of gender did not differ between groups (χ^2 (1, N = 232) = 2.19, p = .15). Analyses were performed to ensure

that those with missing data did not differ with regard to car crash involvement or heart attack experience. Table 5.1 presents the number of participants with missing data who reported car crash or heart attack experience, in comparison to those without missing data. There were no significant differences between groups for both distributions (χ^2 (1, N=235) = .10, p = .75); χ^2 (1, N=233) = .38, p = .54). Missing data was dealt with using list wise deletion thus resulting in a final sample of 207 participants.

Table 5.1
Number of participants with and without missing data who experienced car crashes and heart attacks

Event	Missing data	No missing data
Been involved in a car crash	50	6
Has experienced a heart attack	3	0

5.2.2 Measures. The complete questionnaire is provided in Appendix K. Only the questions included in this study will be described below. In addition to basic demographic information, participants were asked to consider how much control they had in influencing a number of behaviours and outcomes. These behaviours are grouped and listed below.

5.2.2.1 ***Behavioural control / self efficacy.*** Participants were asked to consider a number of health and road behaviours and indicate their ability to control or influence each one. Participants responded on a 7 point Likert scale (1 = no confidence, 7 = complete confidence). The health behaviours were 'engaging in regular exercise,' 'eating a variety of fresh fruit and vegetables,' 'eating a healthy diet,' and 'refraining from smoking.' Road behaviours included 'driving without talking on a mobile phone,' 'driving without texting,' 'driving over the speed limit,' and 'driving with a blood

alcohol level over the legal limit.' All health behaviours were positively framed however two of the road behaviours were framed as risk behaviours.

5.2.2.2 ***Control over proximal markers and distal outcomes.*** A number of outcomes framed as 'health outcomes and life events' were presented to the participants. These outcomes regarded health and road related events that were either proximal or distal in nature. The proximal markers related to heart health were 'developing high blood pressure,' 'becoming overweight or obese,' and 'having unhealthy levels of cholesterol.' The distal outcome of interest here was 'having a heart attack.' With regard to road behaviours proximal outcomes were 'being booked for speeding,' 'being booked for drink driving,' 'being booked for talking on a mobile phone while driving,' and 'being booked for texting while driving.' The distal outcome in this context was 'being involved in a road crash.' Participants were asked to think about the outcomes happening to them and indicate their ability to control or influence each one. Participants responded on a 7 point Likert scale (1=no confidence, 7 = complete confidence). When appropriate, participants were also asked to indicate whether or not the event had happened to them.

5.3 Procedure

Ethics approval was obtained through the James Cook University Ethics Committee and is included in Appendix L. Participants were directed to an online version of the survey titled 'Community perceptions about illness and life events,' which was hosted at Survey Gizmo. Participants were asked to think about the outcomes and events happening to them before indicating their ability to control or influence each one.

5.4 Results

5.4.1 Statistical methods & data preparation. Data was analysed using both SPSS and AMOS (version 22). In order to test the effects of behavioural control on the proximal and distal outcomes, mediation models were tested using Structural Equation Modelling (SEM) with AMOS. The strength of this approach, in comparison to creating composite variables, is that latent variables can be tested and a Confirmatory Factor Analysis (CFA) can be performed simultaneously. Furthermore, SEM can provide more accurate estimates of relationships as it models the error variance specific to each variable. The overall models were tested with Maximum Likelihood Estimation using the covariance matrix. Univariate and multivariate non normality were assessed by examining normality statistics in AMOS (see Byrne, 2010). To adjust for inflated standard errors when data was identified as multivariate non normal, Bollen-Stine bootstrapping procedures were employed (Bollen & Stine, 1992). Sample size considerations for SEM require at least 10 participants per estimated parameter as less than this can result in power and model stability issues (Kline, 2011). In consideration of this, no more than 20 estimated parameters were modelled with the current sample.

Model fit was assessed with chi square indices, Bentler's Comparative Fit Index (CFI; Bentler, 1990), the Adjusted Goodness of Fit Index (AGFI), the Root Means Square Error of Approximation (RMSEA) and the Standardised Root Mean Square Residual (SRMR). For CFI, values obtained should be greater than .95 (.90 at minimum) AGFI should be above .90, RMSEA less than .06 and SRMR less than .05 (Byrne, 2010). Latent variables were created for CHD behavioural self-efficacy, CHD marker control, Road behavioural self-efficacy, and Road marker control. CFA was performed to evaluate the validity of the latent variables used in each structural model.

Mediation effects were assessed using bootstrapped bias-corrected 95% confidence internals.

5.4.2 Differences between CHD and Road appraisals. Participants' average ratings of control for the behaviours and both proximal and distal outcomes are presented in Table 5.2. Internal consistencies are also presented for the latent variable measures. The mean scores on each index were compared for both types of threats using paired samples t tests. Participants' ratings of control were significantly greater for the road behaviours in comparison to the CHD behaviours ($t_{(206)} = -4.28$, $p = .00$). Participants also had significantly greater ratings of control for the road markers compared to the CHD markers ($t_{(206)} = -9.64$, $p = .00$). However, for the distal outcomes the profile was different. Participants reported significantly greater control over having a heart attack compared to being involved in a car crash ($t_{(206)} = 4.56$, $p = .00$).

Table 5.2
Means, standard deviations and internal consistencies for each measure

CHD measures	Mean (*SD*)	α
Control over behaviours	5.70 (1.00)	.71
Control over proximal markers	5.08 (1.31)	.82
Control over a heart attack	4.22 (1.47)	
Road measures		
Control over behaviours	6.06 (1.05)	.71
Control over proximal markers	6.03 (1.19)	.84
Control over a car crash	3.66 (1.51)	

5.4.3 Tests of the hypothesised models.

5.4.3.1 *CHD model.* The model and pathways under investigation are illustrated in Figure 5.1 (page 145) along with their standardised coefficients. Specifically, the

strength of one variable on another in the structural part of the model is represented by the regression weights between the latent variables. Results demonstrated no significant relationship between control over the behaviours and control over a heart attack outcome, however the remaining structural pathways were significant ($p < .00$). The factor loadings represent the strength of the loading of an item on the factor it is measuring in the measurement part of the model. All loadings were significant ($p < .00$). Item reliabilities are presented in Table 5.3 (page 144). These reliabilities are equivalent to squaring the standardised factor loadings. The very low reliability of the 'control over refraining from smoking' item indicates it is likely a very poor measure of the behavioural control factor and should be dropped from the model. The item 'control over engaging in regular exercise' is a weak measure of the construct but adequate for the purpose of evaluating the structural model. Fit statistics demonstrated good model fit with $\chi^2(16) = 20.45$, $p = .20$; CFI = .99; AGFI = .95; RMSEA = .04; SRMR = .04. Overall, the hypothesised model accounted for 39% of the variance in perceived control over a heart attack outcome ($R^2 = .39$). Bias corrected confidence intervals supported a significant indirect effect of behavioural control on perceived control over a heart attack outcome via perceived control over the markers (Standardised indirect effect = .23, 95% CI = .12; .36).

Table 5.3
Item reliabilities for items in the CHD measurement model

Item	Estimate
Engaging in regular exercise	.36
Eating a variety of fresh fruit and vegetables	.68
Eating a healthy diet	.91
Refraining from smoking	.04
Developing high blood pressure	.73
Becoming overweight or obese	.44
Having unhealthy levels of cholesterol	.69

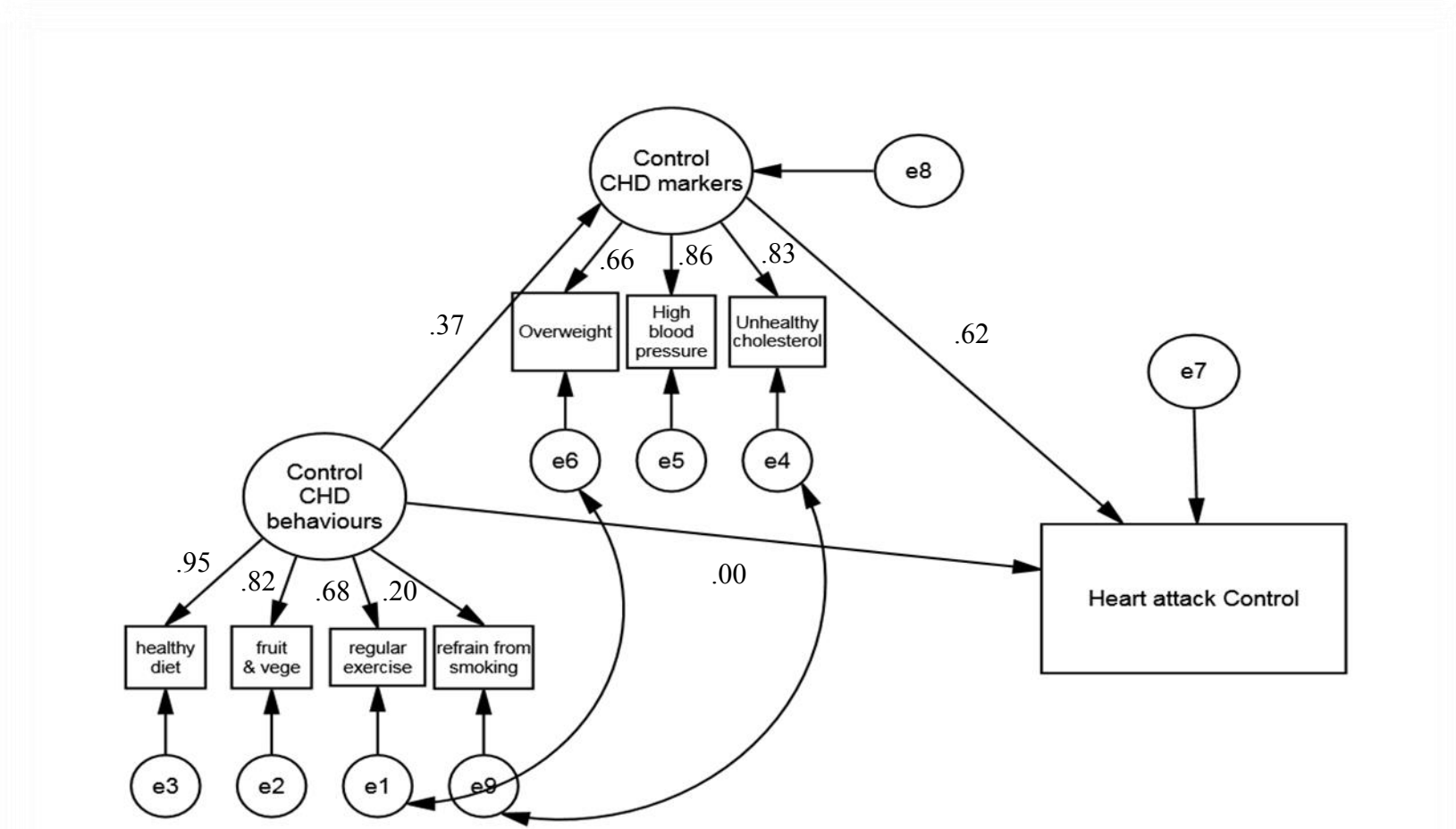


Figure 5.1. CHD model including standardised coefficients for structural pathways and factor loadings.

5.4.3.2 *Road model.* Normality testing demonstrated significant evidence of multivariate non normality. Mardia's multivariate kurtosis index was 82.33 (C.R. = 42.09). As such Bollen-Stine bootstrap was employed to adjust for the lack of multivariate normality. The hypothesised model and pathways are illustrated in Figure 5.2 (see pg. 147) along with their standardised coefficients. The direct pathway between the latent variables 'control over road behaviours' and 'control over road markers' was significant. This relationship indicates that as perceived control over road behaviours increases, perceived control over proximal road markers tends to increase as well. The pathway between markers and car crash was not significant (p = .23). The relationship between behaviours and car crash was also not significant (p = .79). The factor loadings for each item onto the respective latent factors were all significant ($p <$ .00). The item reliabilities are reported in Table 5.4 (pg. 148). In particular, control over speeding and control over drink driving seem to be poor measures of the 'behaviours' construct. Likewise, control over being booked for speeding and control over being booked for drink driving are also weak measures of the 'control over road markers' construct. These items require further investigation. Model fit statistics indicated a poor fitting model with χ^2 (25) = 177.68, p = .00; CFI = .84; AGFI = .72; RMSEA = .17; SRMR = .12. Bollen-Stine bootstrap produced an adjusted p value of .00 further supporting poor model fit.

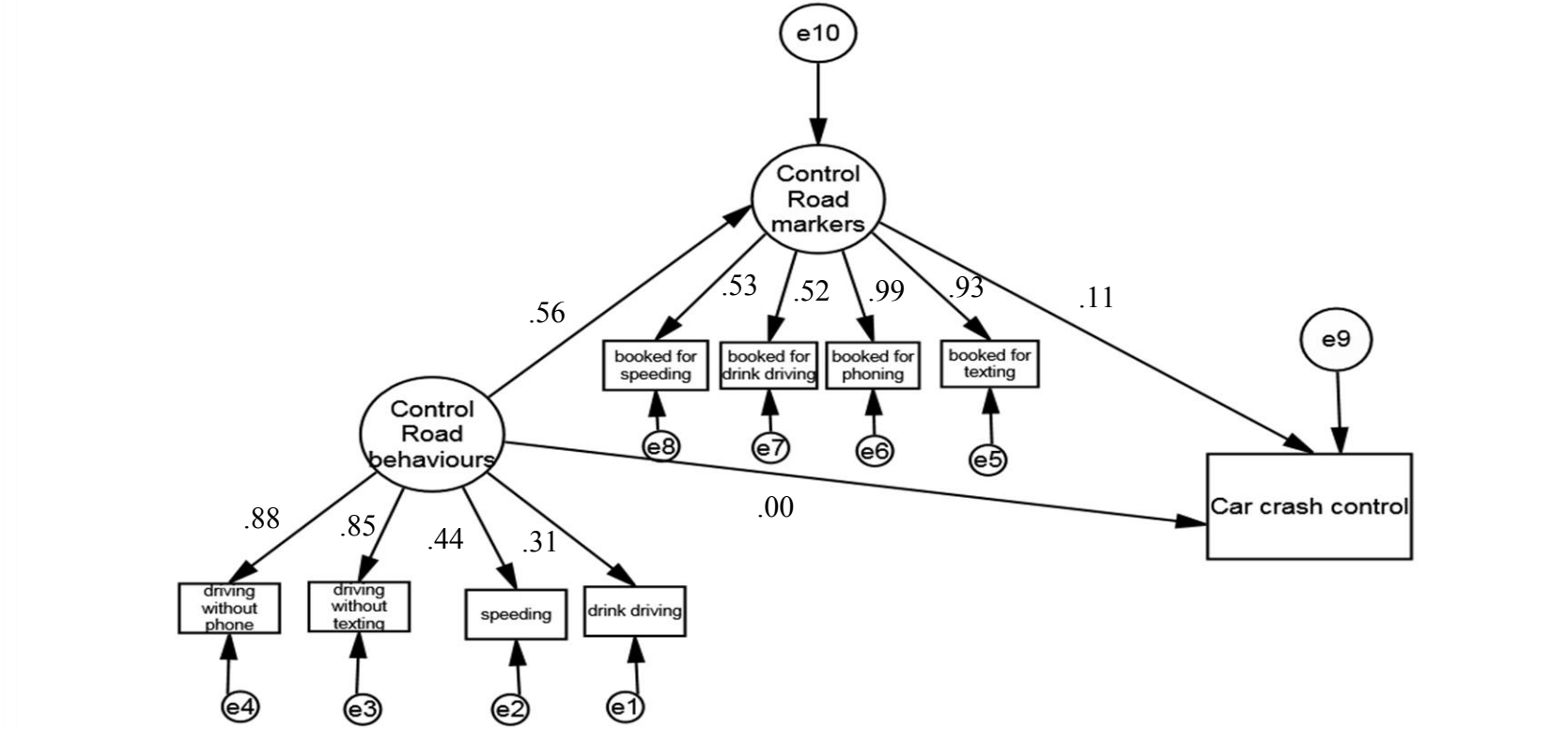


Figure 5.2. Road model including standardised coefficients for structural pathways and measurement model.

Table 5.4
Item reliabilities for items in the road measurement model

Item	Estimate
Driving without talking on a mobile phone	.78
Driving without texting	.72
Driving over the speed limit	.20
Driving with a blood alcohol level over the legal limit	.10
Being booked for speeding	.28
Being booked for drink driving	.27
Being booked for talking on a mobile phone while driving	.97
Being booked for texting while driving	.87

The zero order correlations between the behavioural control and marker control items were further investigated. These correlations (using Spearman's rho) are presented in Table 5.5. These relationships were investigated due to the poor model fit, and poor item reliability of the speeding and drinking driving items for both the behaviours and markers constructs. The model output suggests that the items assessing use of a phone while driving or being booked for using a phone while driving account for most of the variance in the behavioural control and marker control factors. The correlation between control over 'driving without talking on a mobile phone,' and control over 'driving without texting' was significant, positive and particularly strong. In addition, the correlation between control over 'being booked for talking on a mobile phone while driving,' and control over 'being booked for texting while driving' was significant, positive and strong. Of further importance here is that the behavioural items correlated significantly with their respective marker outcomes. For example, perceived control over speeding and perceived control over being booked for speeding was significantly and positively correlated. All behavioural items were significantly and positively correlated with their corresponding markers.

Table 5.5
Correlations between items in the measurement model

Item	1	2	3	4	5	6	7	8
Speeding	1							
Driving without phone	.43	1						
Driving without texting	.40	.75	1					
Drink driving	.38	.26	.33	1				
Booked for speeding	.55	.33	.31	.28	1			
Booked for drink driving	.31	.26	.26	.46	.48	1		
Booked for phoning	.34	.55	.52	.33	.48	.47	1	
Booked for texting	.33	.47	.57	.34	.41	.43	.89	1

Note. All items are significant at the 0.01 level

5.5 Discussion

The aim of the current study was to consider a range of control targets in both road and heart related contexts and define and contrast their relationships. This was performed in order to understand if an individual's ability to perform a preventative behaviour was in fact related to controlling the negative outcomes portrayed in health and safety campaigns. Results from this study demonstrate how different the relationships between behavioural control and control over proximal and distal outcomes are in a road context in comparison to a physical health threat like CHD.

Firstly, while behavioural control was relatively high in both contexts, participants' ratings of perceived behavioural control in a road context were significantly higher than those in the CHD context. This makes sense when the behaviours are contrasted. Much more deliberate effort is required to exercise regularly and eat healthy foods in comparison to the effort required to enact road behaviours such as driving without talking on a phone. In a road context, these behaviours are also enforced by legislative / compliance frameworks which will affect motivation to carry out such behaviours. Furthermore, the performance of health behaviours is affected by barriers such as cost and time. Additionally, control over the proximal markers in the road context was significantly higher than the heart context. This too makes sense because outcomes such as high blood pressure and cholesterol can occur in the presence of the protective behaviour. For example, a diagnosis of high blood pressure can be partly due to a genetic predisposition for the disease. In contrast, being booked for speeding or drink driving cannot occur unless an individual performs the risky behaviour. However, results demonstrated a switch in the profile when the distal outcomes were considered. Participants' perceptions of control over having a heart

attack were significantly higher than their perceived control over being involved in a car crash. This finding may be explained by examining the relationships between the variables in each context.

Although there was no direct relationship between behavioural control and control over a heart attack outcome, the indirect effect via control over the proximal markers is vital to the appraisal process. The results suggest that when appraising a heart threat an individual perceives that what they do behaviourally allows them to control negative heart outcomes via controlling the markers that indicate they are at risk. Therefore, what an individual does behaviourally has some bearing on controlling the occurrence of a heart attack outcome. This did not occur in appraisals of a road context in these results. Fine outcomes are not perceived as a marker of crash risk as proximal markers are perceived with regard to heart attack risk. The low perceptions of control over a car crash outcome when compared to a heart attack outcome therefore makes sense – the behaviours individuals perceive they can perform have no bearing on controlling the outcome of a car crash. The only significant relationship in the road model was the relationship between behavioural control and control over fine outcomes. That is, the performance of behaviours such as speeding, are perceived as being able to influence the occurrence of a fine for such behaviour.

The implications of these finding are widespread, impacting upon both theory and practice. The first consideration involves control perceptions, efficacy and the hypotheses of the EPPM. Perceived control over an outcome or situation consists of one's ability to enact a set of behaviours, and a belief that the behaviour will be effective in preventing the outcome. These beliefs are reflected in self-efficacy and response efficacy respectively (Boer & Seydel, 1996; Maloney et al., 2011). These components are extremely important to fear appeal theory which hypothesises that

without high efficacy, fear control, rather than danger control responses, are likely to occur (Witte & Allen, 2000). The investigation of a number of control targets in this study, allowed for the identification of outcomes characterised by high perceived control, but most importantly, it allowed the relationships between these targets to be determined. The results suggest that what is important is not *how much* perceived control the individual has, but ensuring that the relationship between self-efficacy for performing a behaviour is in fact related to controlling the outcome. This is important to focus on because most research using models such as the EPPM sums the components of self-efficacy and response efficacy in order to test the relationship between efficacy and danger control or fear control outcomes. While this might apply more with health behaviours where outcomes are largely under individual control, the current research demonstrates how this could be problematic in a road context. In a road context individuals believe, correctly, that others contribute to their road crash outcomes. As such, self-efficacy for performing a preventative or risk behaviour on the road has no relationship with a road crash outcome. Beliefs such as these prior to receiving a risk message, might therefore act as potential barriers to acceptance of the message. In the current context, these beliefs may cause individuals to switch off from fear appeals or switch their attention elsewhere.

These findings also have major implications for health promotion interventions particularly in the field of road safety. Opinions regarding the best methods of driver education and intervention vary widely. For example, many caution that fear appeals are not appropriate for use in road safety (Elliott, 2005; Hoekstra & Wegman, 2011; Job, 1990; Wundersitz & Hutchinson, 2011) and as such suggest that new creative methods are necessary. Others suggest that in the correct circumstances fear appeals can be quite effective (Elliott, 2003; Witte & Allen, 2000) and the crux of the issue is

understanding the factors that facilitate effectiveness. Results from this study suggest that focusing on outcomes such as road crashes would be ill informed as such outcomes appear to have no relationship with behavioural control. As this study demonstrates a strong relationship between control over what people do on the road and fine outcomes, outcomes related to graphic crashes and deaths should instead be replaced with outcomes related to financial and point penalties. Taken together with the findings from study 1, that attention to a message seems to increase in situations defined by high perceived personal control, changing the focus of a road message to fine outcomes may lead to increased attention. Therefore it makes sense to present these threatening legal sanctions in a further study, to investigate if high perceptions of control (related to financial and point penalty outcomes) will result in increased attention.

While this study has important implications for the focus of road safety campaigns, there are some limitations. First, the item assessing control over a car crash allowed for the perception that another person can cause a crash. Future work should employ items that exclude this possibility by having self and other as two distinct variables. If the relationship between behavioural control and occurrence of a car crash changes when perceiving fault, it has direct implications for interventions. It suggests that making fault salient could result in more effective campaigns. This should be addressed in a retest of the model. In addition, some of the items used in the model were not reliable indicators of the latent variables. For example, the item 'refraining from smoking' was a poor indicator of control over CHD behaviours. This item would probably have more weight in a sample of smokers where this behaviour is relevant. Likewise, the items related to speeding and drink driving were poor indicators of the behaviours and markers constructs. This may be a consequence of the phone offence items used for each construct. These items were very similar, highly correlated, and as

such accounted for most of the variance in both the behaviour and marker latent variables. In future work employing latent modelling techniques a wider variety of behaviours could be measured. In addition the behavioural items in the road context were framed differently. Two items were framed as protective behaviours while the remaining two were framed as risk behaviours. It could be that the poor reliability of the risk items may be an effect of frame. This too should be addressed in future work. However most importantly, each road behaviour was respectively related to its appropriate fine outcome.

In fact, it would be interesting and highly useful to develop a more robust measurement tool specifically for use in a road context that examines the identified targets of road perceived control for use with different population groups. This tool could then be used to better develop road safety interventions. The tools currently available largely measure personality traits and driving styles in a road context (Taubman-Ben-Ari, Mikulincer, & Gillath, 2004). While these tools may be useful in examining the personality correlates of driving behaviour, a behaviour - situation model would be exceptionally handy for use in developing effective road campaigns at the population level. Nevertheless, the current measurement model adequately demonstrates the purpose of this stage of the PhD project. This model provided a thorough understanding of the relationships between control targets in a road context compared to a heart health context. This study demonstrates that individual control over road outcomes is best defined by a behaviour – fine framework where individuals are not able to attribute outcomes to the 'other person.' As such, interventions should focus on and expand this relationship.

Chapter 6

A multidimensional focus of control: Contrasting car crash outcomes with outcomes highlighting legal sanctions

6.1 Study context

There are three aims of the current study. The first is to retest the structural model developed in study 2 with a new sample. Specifically, it is hypothesized that behavioural control will have a strong and positive relationship with control over fine outcomes as previously demonstrated. No other significant relationships are expected to occur in the structural model. The second aim is to test the hypothesis that shifting the target of the threatening information to a fine outcome will result in increased recall, particularly by participants who have high perceptions of control over fine outcomes. It is also hypothesized that vulnerability to being fined will be positively related to recall of a fine message, due to high perceptions of perceived control over fine outcomes.

While study 1 demonstrated no relationship between perceived likelihood of a crash at fault and recall of crash information, a different hypothesis is offered for the current study. As the current study will employ items measuring feelings about risk, it is expected that increased feelings of vulnerability for a road crash will be related to less recall of risk information. It is further expected that this relationship will be most pronounced for those who have low perceptions of control over crash outcomes. In addition, potential audience profiles (with reference to risk perceptions, efficacy perceptions and risk behaviour) will be investigated to fully understand how these cognitive precursors might affect attention to road risk messages.

6.2 Method

6.2.1 Design. This study employed a within subjects design. All participants in the study received two different threatening messages regarding the risks of dangerous driving. To control for order effects the delivery of information was counterbalanced.

6.2.2 Participants. Participants were recruited mainly from the North Queensland region in Australia. Recruitment occurred largely via advertisements on local radio and news channels, online forums, newsletters and local car enthusiast websites and Facebook pages. Advertisements were also put up around the University and psychology students could participate for credit points. As the survey was conducted as an online survey, advertisements included the address of the online URL. Initially, 339 participants chose to participate by clicking the start button. Of these, 43 participants did not provide any further information. Another 24 of the participants indicated they lived outside of Australia and were thus removed from the analysis. Further exclusion criteria (described below, see statistical methods and data preparation) screened out an extra 44 participants, resulting in a final sample size of 228 participants. There were 77 males and 133 females in the sample (18 people did not give information about gender). Participants ranged in age from 17 years to 71 years (M = 34.89, SD= 15.17) and approximately 30% of participants indicated their highest level of education was an undergraduate degree.

6.2.3 Measures. The following is an overview of the measures included in the study. The complete questionnaire is presented in Appendix M.

6.2.3.1 ***Perceived risk of negative road outcomes.*** Perceived likelihood of both fine and crash outcomes was measured. To measure perceived likelihood participants were asked to indicate the response that best represented their *thoughts*. Questions

included ‘How likely is it that you will get booked for a traffic offence in the next 3 years’ and ‘How likely is it that you will get booked for a traffic offence in your lifetime?’ For a crash outcome participants were asked to indicate ‘How likely is it that you will be involved in a serious car crash in your lifetime’ and ‘How likely is it that you will die in a serious car crash.’ Participants responded using a 7 point Likert scale (1 = extremely unlikely, 7 = extremely likely).

6.2.3.2 ***Feelings about risk / threat.*** The survey also measured the affective valence of risk (e.g. Janssen et al., 2012; Windschitl, 2003). Two statements assessed perceived vulnerability. These were ‘I feel quite vulnerable to getting booked for a traffic offence’ and ‘I feel quite vulnerable to being involved in a serious car crash.’ Three statements aimed to capture how worried participants felt about a negative road outcome. These were ‘I am worried about getting booked for a traffic offence,’ ‘I am worried about being involved in a serious car crash’ and ‘I am worried about dying in a serious car crash.’ For both perceived vulnerability and worry, participants were asked to indicate the response that best reflected their *feelings* (1 = strongly disagree, 7 = strongly agree).

6.2.3.3 ***Multidimensional focus of control.*** The three target categories tested in study 2 were employed in this study. These were control over road behaviours, and control over fine and crash outcomes. Participants were asked to consider specific road behaviours and outcomes and indicate their ability to control or influence each one. To assess perceived control over road behaviours, 8 items were used employing different frames. Four items were framed as protective behaviours and three items were framed as risk behaviours. One item was excluded as it likely assessed driving ability instead of control over road behaviours. Examples of items included ‘driving over the speed limit,’ ‘driving to the speed limit,’ ‘driving without using a mobile phone’ and ‘being

distracted by a mobile phone whilst driving.' Three items assessed control over fine outcomes. Examples of items were 'being booked for speeding,' and 'being booked for using a mobile phone while driving.' Three items assessed control over crash outcomes. These included 'being involved in a car crash' and 'having a crash as the driver at fault.' Participants responded on a 7 point Likert scale (1 = no confidence, 7 = complete confidence).

6.2.3.4 ***Attentional stimuli.*** All participants read 2 brief essays. One essay presented risk information related to dangerous driving and fine outcomes. For example, "If you are even 1km/hr over the speed limit you are speeding. Penalties will be issued on the spot. The minimum fine for speeding is $146 and 1 demerit point." Another essay presented risk information regarding dangerous driving and crash outcomes. For example "In a 60km/hr speed limit area, your risk of dying in a car crash doubles with each 5km/hr increase in travelling speed. The faster you drive, the harder you hit." The essays consisted of 27 and 23 sentences respectively with Flesch-Kincaid grade levels of 7.3 and 7.5. Reading ease scores were 64% and 66%. The order of essay presentation was counterbalanced across subjects. The information included in the essays was taken from road safety reports and advertising. The source of this information was located on government websites. These included the Queensland Transport website (www.tmr.qld.gov.au) and the Transport Accident Commission (www.tac.vic.gov.au).

6.2.3.5 ***Distractor task.*** Participants responded to 14 statements about the valency of each essay. These items were condensed from study 1 for use as a distractor task. They were also used to assess how threatening the information was to the participants. Participants rated the statements on a 5 point Likert scale from *strongly*

disagree to *strongly agree*. Thus, higher numbers indicated greater agreement with the statement.

6.2.3.6 *Recall task.* Participants were given a surprise recall task consisting of 12 multiple choice questions for each essay. Each item in the recall task had four response choices. The recall task was given after the filler task of each essay. Participants were asked to indicate the answer they believed was correct based on the essay information. Attention was operationalized using the total number of correct answers.

6.2.3.7 *Protective / risk factors & behaviours.* A road risk appraisal assessed modifiable risk and protective behaviours. For example, participants were asked to indicate how often they ran a red or yellow traffic light. When answering these questions, participants were asked to think about their driving over the last 12 months. Participants responded on a 7 point Likert scale ranging from *never* to *always*. Participants were also questioned about their fine, accident and claim history, licence duration, and hours spent driving on a weekly basis. The full list of questions is available in Appendix M.

6.3 Procedure

Ethics approval was obtained through the James Cook University Ethics Committee (see Appendix N). The survey was hosted at Survey Monkey and participants were directed to an online link 'Road threats: Feelings, thoughts and behaviours' which first described the study. To begin the survey participants were instructed to click on a 'heads' or 'tails' icon on the screen. This allowed the random allocation of participants to receive either the crash or fine information first. The location of presentation of heads and tails on the screen was also randomized.

Questionnaire delivery was designed so that participants could not go back and check the essay information while completing the recall task.

6.4 Results

6.4.1 Statistical methods and data preparation. Data was analysed using SPSS and AMOS (versions 22). When Levene's test of homogeneity was violated alternative test statistics and post hoc analyses were performed. For the analyses employing SEM techniques latent variables were created for 'control over behaviour' and 'control over fine outcomes'. For behavioural control, protective items were grouped separately to risk items. Therefore, any effects of frame could be included and accounted for. In order to qualify for analysis, participants had to have scores on the measurement model items and at least one recall score. Participants who did not attempt 5 or more questions in the recall task were also excluded. Sample size considerations for SEM require at least 10 participants per estimated parameter (Kline, 2011). As such, no more than 22 estimated parameters should be modelled with the current sample. The final model consisted of 19 estimated parameters. Model fit was assessed using the same indices described in Study 2 (See section 5.4.1).

6.4.2 Sample characteristics. Counterbalancing resulted in 126 participants receiving the crash information first while 102 participants received the fine information first. About 90% of the sample reported having access to a car for their own personal use. Approximately 10% reported having access to a motorbike while 4 participants reported access to a scooter. Participants reported being licenced for .5 to 59 years (M = 17.04, SD = 15.00) and also reported high amounts of driving activity. On average participants spent over 9 hours driving as a driver per week (SD = 9.26). Approximately 60% of respondents reported they had been booked for a traffic offence. The most frequently reported offence was speeding. While 40% of respondents

indicated they had never been in an accident as a driver, the remainder had been in at least one accident as a driver. When asked to think about the most severe accident they had been involved in, 66% of respondents reported being the driver. Almost half (48%) of these individuals reported they were at fault. About 18% of respondents reported having an insurance claim made against them in the past and 10% reported losing their licence at some stage. Participants' self reports of driving behaviour over the last 12 months are displayed in Table 6.1.

Table 6.1
Proportion of participants x self-reported driving behaviour over the previous 12 months

	Frequency						
Behaviour	Never	Hardly ever	Occasionally	Quite often	Frequently	Nearly all the time	Always
Run a red or yellow light	12.3%	43%	28.1%	5.7%	3.1%	0%	0%
Keep driving when tired	12.3%	29.4%	31.1%	11.4%	5.3%	1.3%	1.3%
Do an illegal U turn	30.7%	32.9%	19.7%	3.5%	4.4%	.4%	.4%
Drive and use a handheld phone	35.5%	26.3%	15.8%	7.5%	5.3%	1.8%	0%
Exceed highway speed limit	14.5%	20.6%	32.5%	12.7%	6.1%	4.4%	1.3%
Exceed residential speed limit	23.2%	34.2%	19.3%	8.8%	4.4%	2.2%	0%
Exceed school zone speed limit	51.8%	30.3%	4.8%	3.5%	1.8%	0%	0%
Drive after drinking alcohol	61%	20.2%	6.6%	1.8%	.9%	.4%	1.3%
Stay at least 3 seconds behind the vehicle ahead	1.8%	8.3%	9.6%	14.0%	12.7%	28.1%	17.5%
Stop completely at a stop sign	3.9%	7.9%	3.9%	7.5%	6.6%	24.1%	38.2%

6.4.3 Retest of measurement models and structural pathways. In a similar manner to study 2, control over road behaviours and control over fine outcomes were modelled as latent variables. Crash outcomes were kept as manifest variables. Participants' average ratings of control for the latent variables and crash items are presented in Table 6.2. Internal consistencies are also presented for the latent variables.

Table 6.2
Means, standard deviations and internal consistencies for each measure

Measures	Mean *(SD)*	α
Control over risk behaviours	5.18 (1.60)	.72
Control over protective behaviours	6.02 (.86)	.64
Control over fine outcomes	5.80 (1.36)	.81
Control over being involved in a car crash	4.15 (1.49)	
Control over having a crash as the driver at fault	4.86 (1.57)	
Control over dying in a car crash	3.75 (1.71)	

CFA was performed in AMOS to again evaluate the validity of the latent variables used in the structural model. As the framing of the items used to create the behavioural control variable did not alter the results, the risk behaviour items were chosen in this analysis. Additionally, control over risk behaviours is more appropriate to use due to the risk frame largely employed in road campaigns. The item 'control over having a crash as the driver at fault' was employed in this analysis to rule out the possibility that fault could be attributed to another person. Normality statistics in AMOS demonstrated evidence of multivariate non normality – specifically positive kurtosis (Mardias coefficient = 32.02, C.R. = 21.54). As such Bollen-Stine

bootstrapping procedures were used (Bollen & Stine, 1992). The measurement model and pathways under investigation are presented in Figure 6.1 (page 165). The standardized coefficients for the structural pathways are included in the figure. There was no relationship between behavioural control and control over having a car crash as the driver at fault. The direct pathway between behavioural control and control over fine outcomes was significant. This relationship indicated that as perceived control over risk behaviours increased, so did control over fine outcomes. This accounted for 45% of the variance in control over a fine outcome ($R^2 = .45$). There was a significant and positive relationship between control over fine outcomes and control over having a crash as the driver at fault. This relationship indicated that as control over fine outcomes increases, control over a car crash at one's own fault tends to increase as well.

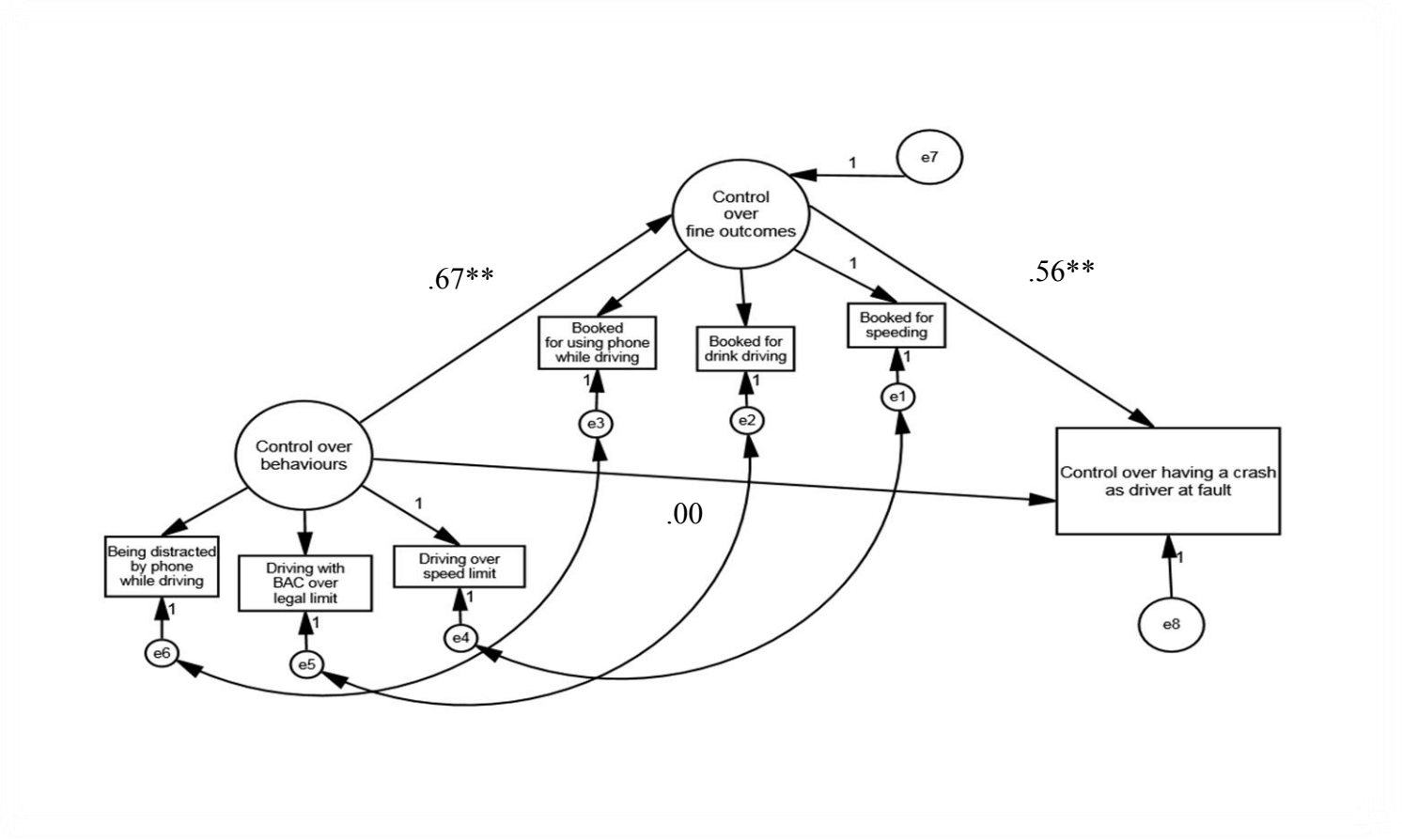


Figure 6.1. Measurement model and structural pathways tested for hypothesised model of road control.

** p <.00

The factor loadings for each item onto their respective latent variable are displayed in Table 6.3. All loadings were significant (p<.00). Item reliabilities are reported in Table 6.4. Modification Indices were examined to assess any source of model mis-specification. These indices give an indication of the residual covariance, and represent the decrease in the value of the chi-square that would result if the parameter was freed. An examination of the modification indices suggested to co-vary the error terms as specified in Figure 6.1. The highest cross loading was between e3 and e6 (coeff = .31). Model fit statistics indicate good model fit with χ^2 (9) = 17.19, p = .05; CFI = .99; AGFI = .94; RMSEA = .06; SRMR = .03. The Bollen-Stine bootstrap procedure to correct for non normality produced an adjusted p value of .27, thus also suggestive of adequate model fit. The entire model accounted for 29% of the variance in control over a road crash outcome (R^2 = .29).

Table 6.3
Factor loadings for each item onto their respective latent variables

Control over risk behaviours	Factor loading
Driving over the speed limit	.71
Being distracted by a mobile phone whilst driving	.82
Driving with a blood alcohol level over the legal limit	.62
Control over fine outcomes	
Being booked for speeding	.63
Being booked for using a mobile phone while driving	.87
Being booked for drink driving	.81

Table 6.4
Item reliabilities for items in the measurement model

Item	Estimate
Control over driving over the speed limit	.50
Control over being distracted by a mobile phone whilst driving	.67
Control over driving with a blood alcohol level over the legal limit	.39
Control over being booked for speeding	.40
Control over being booked for using a mobile phone while driving	.75
Control over being booked for drink driving	.65

6.4.4 Manipulation check.

6.4.4.1 ***Valency ratings of attentional stimuli.*** Paired samples t tests were conducted to examine the equivalence of the messages with regard to how they made participants feel. The average valency ratings and t statistics can be seen in Table 6.5. Participants rated both messages as equally 'threatening' and 'overwhelming.' There was also no difference between the ratings of how anxious the information made participants feel. Crash information was rated as significantly more distressing than the fine information. It was also rated as significantly more interesting and more informative. Participants' ratings on 'the information was new to me' were significantly higher for fine information compared to crash information. Fine information was also reported as making participants feel significantly more relaxed than crash information.

Table 6.5
Mean scores on valency ratings and paired sample t statistics

	Fine information	Crash information			
	M (SD)	*M (SD)*	*t*	*df*	*p*
The information was threatening to me	2.39 (1.00)	2.35 (.99)	-.53	216	.60
I found the information overwhelming	2.35 (.97)	2.26 (.92)	1.41	216	.16
The information made me feel anxious	2.61 (1.02)	2.72 (1.05)	1.46	214	.15
I found the information distressing	2.19 (.95)	2.52 (1.06)	4.38	216	<.00
I found the information interesting	3.52 (.92)	3.80 (.71)	5.11	215	<.00
The information was informative	3.85 (.79)	3.99 (.70)	2.94	213	<.00
The information was new to me	2.84 (1.15)	2.47 (1.11)	-4.06	216	<.00
The information made me feel relaxed	2.37 (.91)	2.20 (.85)	-2.79	215	.01

6.4.5 Recall and integration of fear appeal theory. Participants' average recall of information was examined for both messages. For the crash information, participants correctly identified an average of 8 items (M = 8.55, SD = 2.59). Recall was similar for fine information (M = 8.29, SD = 2.65). There was no significant difference, on average, between the groups on the number of items recalled ($t_{(211)}$ = -1.47, p = .14).

6.4.5.1 ***Moderation using fear appeal theory.*** A moderation analysis was conducted to test the effect of the different control targets as moderators of the relationship between threat and recall of the respective information. This was performed using the PROCESS macro by Hayes (2013). The macro centers the moderator and predictor variables and calculates the main effects and interaction term.

For fine information, perceived vulnerability was hypothesized to have an indirect effect on recall via control over fine outcomes. The number of years licensed was included as a covariate in the model. Results demonstrated the variables accounted for a significant amount of variance in recall (R^2 = .12, $F_{(4,202)}$ = 6.23, p =.00). There was a significant main effect for vulnerability (b = .20, p = .04, CI; .01 - .40) indicating that as scores on vulnerability increased, so did recall of fine information. There was also a significant main effect of control over fine outcomes on recall of fine information (b = .33, p = .03, CI = .03; .62). This relationship was positive whereby increases in control over fine outcomes were associated with increases in recall of fine information. There was no significant interaction between vulnerability and control (b = .02, p = .78, CI = -.13; .17). The covariate also had a significant influence on attention (b = .05, p = .00, CI = .02; .07).

For crash information, control over a crash at fault was used as the measure of efficacy. Years licensed was again included as a covariate. The model was not

significant ($F_{(4,200)}$ = .47, p = .75). There were no main effects for threat (b = .23, p = .25, CI = -.16; .62) or control (b = .01, p = .96, CI = -.26; .27). There was no interaction between the variables (b = .01, p = .95, CI = -.28; .30). There was also no effect of the covariate (b = .01, p = .39, CI = -.02; .04).

6.4.6 Cluster analyses: Examining profiles of drivers. Cluster analyses profiling groups based on their driving behaviour, perceived threat and perceived control appraisals were conducted for each control target (crash versus fine). This was performed in order to examine possible target audiences. Road safety experts have suggested that audiences should be segmented by attitudinal and demographic variables (Delhomme et al., 2009). Initially, the way the information made participants feel was also used to create the groups, however, this did not add anything significant to the creation of groups. This is probably due to the finding that feelings that the information was threatening were, on the whole, quite low. Therefore, these variables were not used to form clusters. Driving behaviour was operationalised using road risk and precaution taking indices. These indices were created using items from Table 6.1. Specifically the first 8 items assessed road risk tasking and the final two items assessed road precaution taking. These items were respectively summed and the average was taken. Threat appraisals were included using perceived vulnerability and perceived likelihood for fine and crash outcomes. Perceived control appraisals included control over road risk behaviours, control over fine outcomes and control over having a crash as the driver at fault. Control over road risk behaviours and control over fine outcomes were an averaged aggregate of the items used for the latent variables in the modelling section (see Table 6.3). All variables could range from scores of 1 to 7.

6.4.6.1 ***Clustering for legal sanction (fine) target.*** Four clusters were specified in accordance with applications of the Extended Parallel Process Model (Rimal & Real,

2003; Chapter 1). However, as the differences between the four groups were minimal and difficult to distinguish, 3 clusters were generated. The profile means for each group based on the 3 cluster solution are presented in Table 6.6 with their respective group numbers. The first group has been called 'Law abiding and in control.' This group reported the highest levels of precaution taking and the lowest levels of risk taking. They had low levels of perceived vulnerability and low levels of fine likelihood. They had the highest levels of perceived control over risky road behaviours and also fine outcomes. The second group has been called 'Aware.' This group reported similar risk taking levels to the law abiding group but were lower on precaution taking. The Aware group was distinguished by high levels of perceived vulnerability for a traffic offence. They also reported high control over road behaviours and fine outcomes. The final group 'Indifferent' had the highest levels of risk taking and lowest levels of precaution taking – although they were similar to the Aware group. This group reported low levels of vulnerability to a traffic offence and low levels of likelihood of a traffic offence. They were characterized by particularly low perceptions of control over road behaviours and fine outcomes.

Table 6.6
Profile means for sample clusters (fine target)

	Cluster		
Variable	Law abiding (n = 74)	Aware (n = 93)	Indifferent (n = 42)
Risk taking	1.96	2.38	2.47
Precaution taking	5.82	4.92	4.85
Perceived vulnerability	2.26	4.98	3.36
Perceived likelihood	2.84	4.32	3.86
Control over risk behaviours	6.21	5.46	2.89
Control over fine outcomes	6.58	5.99	3.89

In order to examine how these groups differed on attention to fine information, an ANOVA was performed. As Levene's homogeneity of variance was violated (p=.01) an adjusted F statistic (Welch statistic) was employed. In addition, the Games-Howell procedure was used to conduct post hoc analyses (Field, 2013). The mean scores on recall for each group can be seen in Table 6.7. The differences between the means were not significant ($adjF_{(2,99.95)} = 2.90$, $p = .06$).

Table 6.7
Mean scores on recall of fine information for each group

	Law abiding	Aware	Indifferent
Recall *M (SD)*	8.54 (2.47)	8.65 (2.36)	7.36 (3.14)

6.4.6.2 ***Clustering for crash target.*** Once again, three clusters were generated. The profile means for each group are displayed in Table 6.8. All variables had a significant effect in forming the clusters except for control over crash outcomes. The first group which was given the descriptor 'Reckless,' reported the highest levels of risk taking and the lowest levels of precaution taking. This group did not feel particularly vulnerable to a crash, nor did they think it was likely or unlikely. They further reported the lowest levels of control over risky road behaviours. The second group which was given the descriptor 'Unconcerned' reported less risk taking compared to the Reckless group and much higher levels of precaution taking. However, they reported low vulnerability to a car crash and low likelihood of being involved in a car crash. They further reported high control over road behaviours. The final group, were given the descriptor 'Scared but efficacious,' and had similar levels of risk and precaution taking to the 'Unconcerned' group. However, this group was characterized by high levels of perceived vulnerability. They also reported high levels of control over risky road behaviour.

Table 6.8
Profile means for sample clusters (crash target)

	Cluster		
Variable	Reckless (n = 38)	Unconcerned (n = 71)	Scared (n = 101)
Risk taking	2.69	2.19	2.12
Precaution taking	2.71	5.84	5.76
Perceived vulnerability	3.95	2.72	5.77
Perceived likelihood	3.82	3.28	4.44
Control over risk behaviours	4.65	5.58	5.18
Control over crash outcomes*	4.53	4.97	4.87

**Note.* This variable was not significant (p=.35)

Differences between the three groups on recall of crash information was explored using ANOVA. Levene's test of homogeneity of variances was not significant (p = .10). Means for recall of crash information for each group can be seen in Table 6.9. The differences between the means were significant ($F_{(2,206)}$ = 4.39, p = .01). Post hoc analyses demonstrated that the Reckless group had significantly lower scores on recall than both the Unconcerned (p = .02, CI = -2.62; -.21) and Scared groups (p = .02, CI = -2.43; -.15).

Table 6.9
Mean scores on recall of crash information for each group

	Reckless	Unconcerned	Scared
Recall *M (SD)*	7.47 (2.93)	8.89 (2.52)	8.76 (2.38)

6.5 Discussion

The main aim of this study was to test the hypothesis that shifting the focus of a road message (highlighting the risk of crashing) to information that highlighted the risk of legal sanctions such as fine / demerit outcomes would result in greater recall of the

legal sanction information. It was hypothesized that specific relationships between perceived risk, perceived control and recall would emerge. Initially, as a reliability check, the structural model that identified different control targets in a road context in Study 2 was retested. Additionally, some of the item reliability issues were addressed in the current study. Two separate items were used in study 2 to assess perceived control over 'driving without talking on a mobile phone' and 'driving without texting.' These items were highly correlated and accounted for most of the variance in the behavioural control factor. This was also the case for their corresponding items in the marker control factor. The current study replaced these items with perceived control over 'being distracted by a mobile phone' for the behaviours factor and perceived control over 'being booked for using a mobile phone while driving' for the marker control factor. Further study 2 demonstrated that perceived control over 'driving over the speed limit' and 'driving with a blood alcohol level over the speed limit' were both poor indicators of the behavioural control construct. Their corresponding items for the marker control construct were similarly weak. These items were retained in the current study however all items were worded using a risk frame. Study 2 employed items using both risk and protective frames.

A retest of the measurement model and structural pathways demonstrated results that were for the most part as hypothesized. The relationship between perceived behavioural control and perceived control over legislative outcomes was particularly strong, accounting for 45% of the variance in perceived control over being fined. This finding suggests as belief in the ability to control risky road behaviours increases, so does belief in the ability to control fine outcomes. Specifically, being able to control the performance of risky road behaviours such as speeding, distraction, and drink driving, is perceived as being effective in controlling whether or not an individual is

fined for such behaviour. In contrast there was no relationship between perceived behavioural control and perceived control over a crash outcome. This relationship was not evident even though the crash outcome was framed as the respondent's fault. This finding highlights the qualitatively different nature of road risks. Road crashes are largely due to human error and risk taking. For example, the speeding behaviour of drivers is responsible for 40% of road deaths every year in Australia (NSW Centre for Road Safety, 2015). However, findings of this study indicated that people perceive that their behaviours are not able to prevent the occurrence of these outcomes. This finding alone should provide a warning against the consistent use of crashes in Australian road safety campaigns. Specifically, when control over the occurrence of an outcome is low, emotion focused coping is likely. In the context of road safety, a safe outcome requires active coping responses such as compliance with safe road behaviour.

The significant and positive relationship between perceived control over fine outcomes and perceived control over crashing at fault was unexpected. This relationship indicated that increases in the perceived ability to control fine outcomes were related to increases in the perceived ability to control crashing as the driver at fault. The meaning of this relationship is difficult to interpret in light of the null findings between perceived behavioural control and perceived control over crashing at fault. However, the relationship could be a result of the fault frame attributed to the crash outcome. While these outcomes are related, their relationships with behaviour are, as demonstrated, completely different.

The increased reliability of the measurement model, compared to study 2, could be a result of the consistent frame employed for the items in this study. In study 2 the behavioural control factor consisted of behaviours framed in both positive and negative ways. The model from this study used items that were framed as risk behaviours only.

In addition, the current study freed pathways between the respective behaviour and fine outcomes as suggested by the modification indices. This was not performed in study 2 due to sample size considerations. However, it makes sense that residual error would be shared by the specified items. For example, perceived control over speeding behaviour allows an individual to control the occurrence of being booked specifically for speeding. This likely contributed to the better model fit in the current study. It is also possible that the better reliability of the measurement model is due to the change in sample.

In terms of recall, manipulation checks firstly identified some differences in feelings about each essay. It was expected that most ratings would be similar as both types of information presented a threat, just the target of the threat had changed. As hypothesized, both essays were rated as equally threatening and equally overwhelming. This was also the case for reports relating to how anxious the information made participants feel. In contrast, crash information was rated as significantly more 'distressing' than fine information. This finding is not entirely surprising as the crash outcomes used referred specifically to death and injury. Fine outcomes instead referred to money and point penalties. Death and injury outcomes are likely appraised as more severe than money and point penalties. Crash information was rated as significantly more interesting and informative. This was surprising considering the finding that individuals' beliefs of control in performing risk behaviours were not able to alleviate the occurrence of a crash outcome. However, road safety research has demonstrated that participants report it is beneficial to use road crash outcomes in marketing (Van Putten & Jones, 2007). This has been attributed to a third-person effect where people believe the information is more relevant or intended for 'other people.' Perhaps this belief is responsible for participants' reports that the crash information was more

interesting and informative. Further, participants' ratings on 'the information was new to me' were significantly higher for the fine information. Road crashes are frequently reported in the media in a sensationalist fashion (Johnston, Muir, & Howard, 2014). Instead, while individuals are likely very aware that risky driving can lead to financial and point penalties, the exact financial cost or demerit points are rarely advertised. Perhaps then, this information was more novel to participants.

It was hypothesized that overall significantly more fine information would be remembered than crash information. However, no difference between the average scores on recall for both essays was detected. This could be due to the finding that participants rated crash information as more informative and interesting. It is likely that perceptions of control and audience profiles need to be considered in order to contrast any differences – and the results demonstrated this. Recall of fine information was predicted by feelings of perceived vulnerability to being fined. Specifically as vulnerability increased, recall of fine information also increased. The main effect for control perceptions on recall of fine information indicated that as perceptions of control over fine outcomes increased, so too did scores on recall of fine information. The main effect for vulnerability is not surprising considering the average level of control over fine outcomes was particularly high (Table 6.2). This finding could instead be interpreted as a simple effect of threat under high efficacy (Peters et al., 2012). This demonstrates that feeling at risk for a fine outcome leads to increases in recall of threatening fine information because individuals tend to perceive they can do something about the outcome, so the information is worth remembering.

The number of years licensed was also related to increased recall of fine information. This was opposite to the result expected. Specifically this variable was included to eliminate the possibility that individuals who had been licensed for many

years would in fact switch off from the information. It was expected this would happen due to habituation. That is, it was hypothesised that these participants had likely seen this type of information in the past. Perhaps, these participants were instead searching the information for changes in road policy that would be important for them to acknowledge.

Findings for recall of crash information were not as hypothesized. It was expected that feeling at risk for a crash would be related to less recall of crash information, particularly when perceived control over crash outcomes was low. Results in this study demonstrated no relationship between threat and recall. Furthermore, there was no relationship between perceived control over crashing as the driver at fault and recall of crash information. That is, there was no evidence of a fear control response by those perceiving the highest threat and lowest efficacy perceptions at baseline. There could be a number of reasons for this finding. Firstly, it could be that the information was not threatening enough to warrant a fear control response. The valency ratings reported by the participants (Table 6.5) demonstrated the average response was lower than the midpoint of the scale. On average, participants 'disagreed' that the essay material was threatening. So while perceiving risk was not related to a fear control response in this context, it would be hasty to rule out the possibility that reduced attention could occur when the threat stimulus is in fact threatening.

Muthusamy and colleagues (2009) found that fear messages did not change attitudes, intentions or behaviour in undergraduate students in Namibia who had high pre-existing levels of fear about AIDS. This is likely because efficacy perceptions could not surpass the high level of threat (Witte, 1996). In the current study feelings about vulnerability to a road crash were around the midpoint of the scale. However, Peters and colleagues (2012) warn that the presentation of a threatening message may

lead to defensive responses even when pre-existing threat levels are low. Specifically, the low levels of efficacy would result in a fear control response. A threatening fine outcome is unlikely to result in a fear control response (regardless of pre-existing risk beliefs) because individuals perceive their behaviour to be effective in preventing the outcome. This suggests that increasing the perception an individual will be fined for risky road behaviour might be a useful approach for road safety messages. It is likely that audiences will pay attention to such a message because they perceive there is something they can do about the outcome. Instead messages that aim to demonstrate high risk of a road crash outcome will not guarantee attention because individuals do not perceive that they are entirely able to prevent a crash outcome.

The results of the cluster analysis employing fine appraisals pointed to three distinct groups based upon behaviour, perceived risk and efficacy perceptions. While no group was identified as high on risk taking, the 'Indifferent' group represented a group of drivers who had the lowest scores on precaution taking. This group of drivers (who comprised 20% of the participants classified) was not particularly concerned about their risk of being fined. In comparison to the other groups, they had especially low perceptions of control over risk behaviour and low perceptions of control over fine outcomes. Further, their indifferent attitude means that they could easily transition to a more risk taking group. This profile makes them a group at which road risk messages could be particularly targeted to limit their transition to a higher risk taking group. Specifically campaign designers would hope these individuals would pay attention to a road risk message in order to become aware of their risk and change their behaviour accordingly. When examining the difference in recall of the fine message, the results of this study suggested that all groups attended to the information similarly. Specifically,

the ‘Indifferent’ group recalled as much information as the ‘Law abiding’ and ‘Aware’ groups.

The cluster analysis employing crash appraisals also identified three distinct groups. In this context control over crash outcomes did not significantly contribute to the classification of participants. The target group here would be the ‘Reckless’ group. This group comprised 18% of the individuals classified. The ‘Reckless’ group had the highest levels of risk taking and extremely low levels of precaution taking in comparison to the ‘Unconcerned’ and ‘Scared’ groups. They also had lower levels of behavioural control. When examining the differences in recall of the crash message, the ‘Reckless’ group demonstrated significantly less recall of the crash information compared to the ‘Unconcerned’ and ‘Scared’ groups.

Taken together, the findings of the cluster analyses suggest that information campaigns pointing to the risk of being fined may be especially important to use with audiences characterised by low levels of precautionary behaviour and/or attitudes involving low vulnerability and low perceived behavioural control. Although the Indifferent group had the lowest levels of precaution taking, and average levels of threat and efficacy, they attended as much as the others. Instead the Reckless group (defined using crash appraisals) had significantly lower recall of the message that was particularly relevant to them due to their risk profile.

This research suggests that the risk communication methods consistently employed in road safety advertising need to be reconsidered. The cost of continuing to use crashes and deaths in road safety communication is too high. Specifically, the intended audience for road risk campaigns may switch off or turn their attention elsewhere. Campaigns that demonstrate risky behaviour leading to fine outcomes (and increasing the perception of this happening) should instead be employed more often as

a technique in road safety communication. This has recently happened in the state of Victoria (see TACVictoria, 2014). The Victorian government have employed enforcement themes in their public service announcements warning the public that police efforts will be amplified to enforce new penalties for risky driving behaviour Some of these penalties include licence suspension if travelling more than 25 km / hr over the speed limit. This is in addition to fines and penalty points (State Government Victoria, 2015).

In conclusion this study demonstrates that messages highlighting the risk of crashing may be ineffective as individuals perceive that they have little influence over these outcomes. Specifically, those individuals for whom the threat is most relevant attended less to this type of information in comparison to groups of people who were already doing the right thing. Instead a target group (identified using fine appraisals) seemed to attend as much as those individuals who were already doing the right thing or who were more aware of their risk.

Chapter 7

What does this work mean for health promotion practices?

7.1 Thesis overview

The following chapter presents an overview of the research program with a focus on the main aims and findings. A brief summary of findings for each study is presented, followed by the implications for both theory and health promotion practices. Limitations of the research are identified and suggestions for future research are made. The aim of this research was to identify the factors that influence attention to risk information specifically in the context of road safety messages. In examining attention to road safety messages, Pedruzzi and Swinbourne (2009) demonstrated that threats highlighting the consequences of risky road behaviour might operate differently to some threats highlighting the consequences of risky health behaviour. In particular threats portraying road crashes were hypothesised to have qualitatively different perceived control appraisals. Specifically, the role of the other driver in traffic incidents was noted as likely to cause low perceptions of control over negative road outcomes. These recommendations were considered in light of a number of factors that were hypothesised to affect attention to threatening messages in the context of road safety. These factors spanned fear appeal theory, the dispositional trait of optimism, situational factors and also the effect of social biases.

7.2 Study 1: Testing fear appeal theory and the role of perceived control

The first study compared threatening road crash outcomes with threatening heart related outcomes. Results from this study demonstrated the importance of examining further factors other than the trait of optimism. The main effect of perceived likelihood in predicting the recall of more risk information compared to neutral information for the CHD message condition suggested that perceiving a negative heart outcome as likely

was related to greater attention to a heart attack risk message. This relationship did not exist for the road message condition. Perceiving a road crash (at one's own fault) to be likely was not related to greater recall of road risk information than neutral information. This suggested that individuals who perceived a road crash to be likely were not motivated to attend more to the threatening message than the neutral message, distinguishing road threats from heart threats.

The findings regarding the effect of optimism led to similar suggestions. The significant relationship between dispositional optimism and recall of risk information in the CHD message scenario but not the road message scenario suggested that optimism alone could not explain the difference in attentional preferences. In light of evidence suggesting that the adaptive effect of optimism is reserved for controllable stressors (Solberg Nes & Segerstrom, 2006) the effect of perceived control in each scenario was investigated. As hypothesised, road crash outcomes in the road message scenario were appraised quite differently in terms of locus of perceived control in comparison to control appraisals of health outcomes in the CHD message scenario. Optimism was only associated with greater perceived personal control in the CHD scenario. Participants perceived relatively little personal control over their own crash outcomes in comparison to their own health outcomes. Furthermore, individuals reported the belief that other people largely determined their road crash outcomes. The interpretation and implications from this interactive relationship are twofold. Firstly, the adaptive effect of optimism on attention in the literature may actually be due to perceived control. Secondly, these results suggest that examining attentional preferences of optimists for a road threat is not particularly useful. The results are better explained through perceived control appraisals.

The investigation of optimism bias first demonstrated that in both scenarios, participants rated negative events as more likely to happen to others and positive events as more likely to happen to themselves. However of interest to this research was the hypothesis that such beliefs would lead to biased processing of risk information. Radcliffe and Klein (2002) demonstrated the hypothesized effect in a study that investigated heart attack risk and recall of such information. Their study employed objective physiological indicators of risk to calculate unrealistic optimism. In a road safety context, Pedruzzi and Swinbourne (2009) demonstrated that optimism bias (measured using comparative risk ratings) was unrelated to the recall of threatening road safety information.

The hypothesis made in the current work (Study 1, chapter 4) was that behaviour might change the relationship between optimism bias and recall of risk information. The exclusion of an index of behaviour might be responsible for the null findings demonstrated by Pedruzzi and Swinbourne (2009). However, the results in chapter 4 demonstrated no main effect of optimism bias and no interaction with behaviour in the road scenario condition. In the CHD scenario condition, results demonstrated an interaction effect between optimism bias for positive heart related events and protective behaviour. This relationship indicated that for those individuals engaging in low levels of protective heart behaviours, a belief that positive heart health events were more likely to happen to the self (compared to others) was related to lower recall of risk information compared to neutral information. This was interpreted as a defensive response. As there was no main effect for optimism bias (measured using comparative risk ratings) it is likely that behaviour needs to be considered in this process. Further as social desirability was correlated with self-reported behaviour in the road scenario condition, future work should aim to incorporate measures of behaviour that don't rely

on self-report. This is important as the effect in the CHD condition suggested that social biases (calculated using behavioural measures of risk) might negate the intended effects of risk communication campaigns.

7.3 Study 2: What do individuals perceive they can control in a road and CHD context?

The investigation of a number of control appraisal targets related to both CHD and road behaviours demonstrated the qualitatively different nature of road crash outcomes. In general, perceptions of control for influencing CHD behaviours were related to controlling heart attack outcomes, via the proximal markers that indicate a person is at risk. That is, the belief that one can carry out CHD protective and risk behaviours allows an individual to influence the likelihood of a heart attack outcome. Such a relationship does not occur for road crash outcomes. Individuals did not perceive the performance of protective and risky road behaviour as related to road crash outcomes. Further, controlling more proximal outcomes of risk behaviour such as fines did not allow an individual to perceive they could influence the likelihood of a crash. However, an individual's belief in their ability to perform risk and protective road behaviour was, on the whole, related to their beliefs in influencing markers of risk such as fine outcomes. This study demonstrates that the portrayal of crash outcomes in road safety communication messages is counterintuitive because even high perceptions of self-efficacy for road behaviours are perceived to have little bearing on crash outcomes. Instead, the results suggest that changing the focus of threatening road messages to outcomes demonstrating legal sanctions such as fines and demerit points should have greater effects.

7.4 Study 3: A multidimensional focus of control: Contrasting car crash outcomes with outcomes highlighting legal sanctions

The final study demonstrated that feelings of vulnerability for a fine outcome were positively associated with attention to risk information highlighting the legal sanctions of risky road behaviour. There was also a significant positive relationship between control over fine outcomes and attention to the information regarding the legal sanctions of risky road behaviour. No such relationships were detected between appraisals of crash outcomes and attention to a risk message highlighting such outcomes. The significant relationship between perceived vulnerability and attention suggests that feeling vulnerable about receiving a legal penalty (specifically fines and demerit points) for a traffic offence tended to be related to increased attention to a risk message demonstrating such outcomes. As perceptions of control over fine outcomes were overall quite high, this effect was interpreted in light of these appraisals. Feeling at risk for a fine outcome likely lead to increases in recall of threatening fine information because, on average, individuals tended to perceive they could do something about the outcome.

Cluster analyses demonstrated that those who held low perceptions of control over driving behaviours and fine outcomes (along with the lowest levels of precaution taking) did not recall less threatening fine information in comparison to other groups of drivers. This suggests that threatening fine information is particularly appropriate to use with this group of drivers. As the aims of risk communication messages are to gain audience attention and create an awareness of risk, (Delhomme et al., 2009) threatening messages outlining legal sanctions may help to prevent these individuals progress to a more risk taking group. In contrast those at greatest risk (low on protective behaviour) who had the lowest perceived control over their behaviour correctly recalled

significantly less crash information in comparison to other groups of drivers. This finding suggests that threatening crash information is the least appropriate strategy to use with this group of drivers.

7.5 Overall implications of findings for theory

The first theoretical implication of this research regards the effect of optimism on protective behaviour. Coping theory suggests that active coping responses are likely when perceived control is high (Lazarus & Folkman, 1984; Zeidner & Saklofske, 1996) and empirical evidence has demonstrated this relationship (Solberg Nes & Segerstrom, 2006). Research examining optimism and active coping has incorporated the effects of control in the behavioural literature (Chapter 3, Section 3.3.1). In contrast, when adaptive behaviour is conceptualised as attention to a risk message, the literature has largely concentrated only on the effect of optimism. Additionally, this literature largely investigates attention to *health* risk information. To the knowledge of this author, the relationship between perceived control and attention to a risk message has not been considered in a road safety context or the broader context of health behaviours. By contrasting these scenarios, the current research suggests that optimism alone cannot explain attention to a risk message and future research should incorporate the effect of perceived control.

Additionally, examining perceived control appraisals allows an avenue for intervention across many health promotion contexts (Beckjord et al., 2009; Lewis et al., 2010). As a dispositional trait, optimism is not easily changed or manipulated. While the empirical literature focuses on affirming the self to bring about positive beliefs, this approach is difficult to apply outside of the laboratory to health promotion and advertising interventions. Furthermore, the current research suggests that control appraisals lead to increased attention to a threatening road risk message, more so than

positive beliefs. As demonstrated in study 3, control appraisals had direct effects on attention to a road risk message. Many studies have investigated the effects of a number of personality traits on risk taking behaviour within a driving context (Jonah, 1997; Machin & Sankey, 2008; Oltedal & Rundmo, 2006; Schwebel, Severson, Ball, & Rizzo, 2006; Ulleberg & Rundmo, 2003). Such research is interesting, however it offers little gain regarding the development and application of theory. The use of a theoretical framework based on empirical evidence is necessary to inform best practice promotion methods in road safety (Delhomme et al., 2009). Unfortunately, solid theoretical foundations are rarely used to guide campaigns in this field (Elliott, 2011; Wundersitz et al., 2010). The current research highlighting the importance of control appraisals demonstrates a theoretical approach that can be used to facilitate attention to road safety campaigns.

When considering perceived control appraisals as facilitators of attention, the target of control must be correctly identified. Individuals must believe that their behaviour will bring about an outcome, if they are to attend to a message. The relationship between negative outcomes being contingent on a behaviour that an individual can bring about has not been made explicit in fear appeal theory. While perceived efficacy is measured as the combined effects of self-efficacy and response efficacy, the current research demonstrated null effects when the target of such appraisals was a road crash outcome. The relationship between threat, control appraisals, and attention was not demonstrated when individuals believed that their behaviour had little influence on the outcome. Many researchers have noted conflicting findings in fear appeal research (e.g. see Chapter 1, Section 1.3.1). Peters and colleagues (2012) demonstrated the importance of baseline levels of threat and efficacy in explaining these inconsistencies. The effect of a threat appeal cannot be understood

without considering the beliefs already inherent to segments of the population. The current research demonstrates that baseline levels of threat and efficacy were important in the prediction of attention. However, these relationships were only evident when the appropriate target of control was specified. As individuals largely believed that their behaviour would influence road outcomes such as financial and point penalties, appraisals of control regarding such outcomes were significant in predicting attention to risk information. These findings should be considered in future tests of fear appeal theory employing various outcomes. Inappropriate control targets may also partly explain the inconsistencies of previous research.

The framework used in the current research conceptualized control in a multidimensional fashion where control appraisals were considered in terms of behavioural control and control over both proximal and distal outcomes. This framework has offered insight into the measurement of perceived control within the context of an experimental design. However, as demonstrated by Beckjord and colleagues' (2009) use of multidimensional focus of perceived control in an oncology context, such a measurement tool could be effective for use in a number of health promotion contexts. Specifically it could aid the identification of appropriate outcomes to represent in health promotion advertising.

In a road safety context, a diverse group of self-report measures of driving behaviour and cognition have been developed in the last few decades. The diversity of these scales reflect the complex and multidimensional nature of driving (Taubman-Ben-Ari et al., 2004). The measurement tools that do operationalise the construct of perceived control are quite different to the measure developed and used in the current work. For example, the Traffic Locus of Control measure (Özkan & Lajunen, 2005) has proved to be useful in this research as it effectively demonstrated the low perceived

control individuals reported over their own crash outcomes. However, it does not precisely identify the behaviours and outcomes individuals perceive they can control on the road. The Self Efficacy Scale for Driver Competence (Sundström, 2008) measures perceived competence for specific driving tasks. However, there is no inclusion of outcomes that apply to a road context. Instead the framework employed in the current body of research allows inferences to be made regarding the selection of outcomes for the development of effective road messages. Further, this framework could also be used to predict the more general message acceptance outcomes frequently employed in the literature.

The final implication for theory is the use of attention to indicate the possibility of a fear control response. In the road safety literature fear control responses have been investigated by assessing individuals' intentions to 'switch off' from risk messages (Lewis et al., 2010; Tay & Watson, 2002). This research has largely ignored baseline appraisals of threat and efficacy inherent to populations. Measures that assess attention may be more indicative of a naturalistic viewing environment where individuals can choose to avoid or acquire such information. Furthermore, risk sensitization becomes more apparent as information is increasingly processed (Blumberg, 2000). As defensive coping responses are hypothesized to block risk sensitization, examining interruptions in the processing of information is important. The current work also demonstrates the importance of baseline appraisals of threat and efficacy as cognitive precursors to fear and danger control responses.

7.6 Implications for health promotion practices: Road safety

This research suggests that in a road safety context, campaign designers should concentrate their efforts on increasing the perception that people will be penalized with financial and point penalties for risky road behaviours. The greater the belief people

have that their behaviour leads to these outcomes, the lower the likelihood of a defensive response. However, it is suggested that these messages should also remind audiences that they have complete control over the occurrence of fine outcomes. While this research demonstrated that an 'Indifferent' group of participants characterized by low perceived control over fine outcomes, recalled the same amount of fine information as the remaining groups (study 3), there are other factors in the environment that may activate beliefs that interfere with pre-existing control perceptions. For example, there are groups in the community that actively seek out concealed speed cameras and warn others of their whereabouts ("Masked protesters," 2014). Likewise, social media campaigns exist to block fine efforts by the police (O'Rourke, 2015). Anecdotal evidence suggests that many motorists perform these behaviours because they believe that hidden traffic cameras exist for 'revenue raising.' It could be suggested that groups such as these are less likely to believe that being fined is a result of their own behaviour. As such, advertising efforts should remind people that these outcomes are under their own personal control.

The implementation of such efforts may involve roadside billboards, messages, and increased policing efforts. For example, the use of speed monitoring devices on the road are an instant cue to slow down. This feedback method may also act to remind people that they will be caught if they continue to speed. The execution of these methods will need to constantly evolve for a number of reasons. Currently, radar scrambling devices can be easily purchased which stop traffic cameras from detecting speeding cars. As such, it is necessary to be aware of the behaviours performed to escape negative consequences (Job & Sakashita, 2009).

7.7 Implications for health promotion practices: Generally

It is possible that these research findings are not unique to the road safety context. There may be other health threats characterized by similar control appraisals. For example, a study by the Cancer Council NSW found that people put too much causal weight on factors such as chemicals in food, and stress as increasing cancer risk, instead of risk factors such as overweight, exercise, and alcohol consumption ("People focus on wrong cancer risks," 2015). Pedruzzi (unpublished data, 2014) found that people believe that the performance of certain bowel cancer risk behaviours are not related to the occurrence of bowel cancer outcomes. As such, it is possible that audiences will ignore threatening messages demonstrating these outcomes. The increasing prevalence of lifestyle diseases such as bowel cancer, will require greater investment in future evidence based promotion methods. The identification of outcomes significantly related to behaviour in this context may be especially useful for the development of health promotion messages.

7.8 Limitations

The main limitation of this work regards the selection of the sample. While research examining road safety behaviour in regional samples has been called for (Veitch, Sheehan, Turner, Siskind, & Pashen, 2005) it might be hasty to draw conclusions to urban and metropolitan areas. The driving environment in North Queensland is quite different in comparison to busy metropolitan areas. Specifically, North Queensland is characterized by long stretches of road with easy access to highway driving. These roads have considerably less traffic and the driving environment consists of fewer lanes, crossings, traffic lights and intersections. However, being a regional area, more random road risks are prevalent. For example, highways can be crossed by wildlife at any time of the day thus impacting on driving

conditions without warning. Further, poorly designed roads are often damaged or inaccessible as a result of severe weather events such as storms and cyclones. These events contribute to a driving environment that can be more unpredictable than some urban areas. This may have affected control appraisals. Future work should be carried out in an urban environment to ensure the validity of the framework across diverse driving environments and thus samples.

The second limitation of this research concerns the self-reported nature of behaviour in the road context. Results suggest that the samples are largely characterized by low risk taking groups. The accuracy of this finding is difficult to determine due to the often reported biased beliefs in driving ability. As such efforts should be made to obtain more objective measures of driving behaviour. Additionally, more diverse samples could be recruited from the community where risky road behaviours are prevalent (e.g. young males who are part of 'hooning' cultures).

The design of this research may be better suited to a laboratory setting. This experiment was made 'portable' with a significant portion of the research conducted online and in the community. This approach was used in order to recruit a large heterogeneous community sample. The disadvantage of this approach was that the experimental conditions under which the survey was completed were not kept consistent. However, had the work been conducted in a laboratory setting, the variability and representativeness of the sample may have been lost. The priority of this research was to obtain a large community sample. Lastly, the messages employed in each scenario may have lacked ecological validity. Road safety messages used in mass media approaches often portray bloody outcomes and explicit car crash scenes in televised commercials. The risk messages used in this research were not rated as highly threatening – likely due to the fact they were formatted as reading materials. As such, it

is possible that defensive responses to threatening messages occurring in the 'real world' may have been diminished in this research.

7.9 Concluding remarks

The current research filled a gap in the literature regarding attention as an indicator of a fear control response. It also identified the factors that facilitate attention to risk messages in a road safety context. As noted by a number of researchers, threat appeals tend to be the favoured method of mass media communication in road safety (Castillo-Manzano et al., 2012; Hoekstra & Wegman, 2011; Lewis, Watson, Tay, et al., 2007; Lewis et al., 2008a) and this approach seems likely to continue into the future. The current research suggests that as far as attention is concerned, the portrayal of threatening outcomes in road safety is not necessarily problematic. However, the proviso is that the specified outcome must be appraised as controllable by the individual.

References

Achat, H., Spiro, A., DeMolles, D. A., & Sparrow, D. (2000). Optimism and depression as predictors of physical and mental health functioning: The normative aging study. *Annals of Behavioral Medicine, 22*(2), 127-130. doi:10.1007/BF02895776

Algie, J., & Rossiter, J. R. (2010). Fear patterns: a new approach to designing road safety advertisements. *Journal of Prevention & Intervention in the Community, 38*(4), 264-279. doi:10.1080/10852352.2010.509019

Armor, D. A., & Taylor, S. E. (1998). Situated optimism: Specific outcome expectancies and self-regulation. *Advances in experimental social psychology, 30*, 309-379.

Aspinwall, L. G., & Brunhart, S. M. (1996). Distinguishing Optimism from Denial: Optimistic Beliefs Predict Attention to Health Threats. *Personality and Social Psychology Bulletin, 22*(10), 993-1003. doi:10.1177/01461672962210002

Bandura, A. (1997). *Self-efficacy: The exercise of control*. San Francisco: Freeman.

Beckjord, E. B., Glinder, J., Langrock, A., & Compas, B. E. (2009). Measuring multiple dimensions of perceived control in women with newly diagnosed breast cancer. *Psychology and health, 24*(4), 423-438. doi:10.1080/08870440701832634

Bedi, G., & Brown, S. L. (2005). Optimism, coping style and emotional well-being in cardiac patients. *Br J Health Psychol, 10*, 57-70. doi:10.1348/135910704X15266

Ben-Ahron, V., White, D., & Phillips, K. (1995). Encouraging drinking at safe limits on single occasions: the potential contribution of protection motivation theory. *Alcohol and alcoholism, 30*(5), 633-639.

Bentler, P. M. (1990). Comparative Fit indexes in strctural models. *Psychol Bull, 107*, 238-246.

BITRE. (2014). *Road Deaths Australia 2013 Statistical Summary*. Retrieved from https://bitre.gov.au/publications/ongoing/files/RDA_Summary_2013_AT.pdf:

Block, L. G., & Williams, P. (2002). Undoing the effects of seizing and freezing: Decreasing defensive processing of personally relevant messages. *Journal of Applied Social Psychology, 32*(4), 803-833.

Blumberg, S. J. (2000). Guarding against Threatening HIV Prevention Messages: An Information-Processing Model. *Health Education & Behavior, 27*(6), 780-795. doi:10.1177/109019810002700611

Boer, H., & Seydel, E. R. (1996). Protection motivation theory. In M. Connar & P. Norman (Eds.), *Predicting Health Behavior: Research and Practice With Social Cognition Models.* (pp. 95-120). Buckingham, PA: Open University Press.

Bollen, K. A., & Stine, R. A. (1992). Bootstrapping goodness-of-fit measures in structural equation models. *Sociological Methods & Research, 21*(2), 205-229.

Brown, S. L. (2001). Emotive Health Advertising and Message Resistance. *Australian Psychologist, 36*(3), 193-199. doi:10.1080/00050060108259655

Brown, S. L., & Locker, E. (2009). Defensive responses to an emotive anti-alcohol message. *Psychology & Health, 24*(5), 517-528. doi:10.1080/08870440801911130

Brown, S. L., & Smith, E. Z. (2007). The inhibitory effect of a distressing anti-smoking message on risk perceptions in smokers. *Psychology and health, 22*(3), 255-268. doi:10.1080/14768320600843127

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (Second ed.). New York: Routledge.

Cameron, M. H., Haworth, N., Oxley, J., Newstead, S., & Le, T. (1993). *Evaluation of Transport Accident Commission Road Safety Television Advertising*. Retrieved from http://www.monash.edu.au/miri/research/reports/muarc052.html:

Carey, R. N., McDermott, D. T., & Sarma, K. M. (2013). The impact of threat appeals on fear arousal and driver behavior: a meta-analysis of experimental research 1990-2011. *PLoS One, 8*(5), e62821. doi:10.1371/journal.pone.0062821

CARRS-Q. (2012). State of the Road: Rural and Remote Road Safety. Queensland: Centre for Accident Research & Road Safety

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International journal of behavioral medicine, 4*(1), 92-100. doi:10.1207/s15327558ijbm0401_6

Carver, C. S., Harris, S. D., Lehman, J. M., Durel, L. A., Antoni, M. H., Spencer, S. M., & Pozo-Kaderman, C. (2000). How Important is the Perception of Personal Control? Studies of Early Stage Breast Cancer Patients. *Personality and Social Psychology Bulletin, 26*(2), 139-149. doi:10.1177/0146167200264001

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clin Psychol Rev, 30*(7), 879-889. doi:10.1016/j.cpr.2010.01.006

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *J Pers Soc Psychol, 56*(2), 267-283.

Castillo-Manzano, J. I., Castro-Nuño, M., & Pedregal, D. J. (2012). How many lives can bloody and shocking road safety advertising save? The case of Spain. *Transportation research part F: traffic psychology and behaviour, 15*(2), 174-187. doi:10.1016/j.trf.2011.12.008

Centers for Disease Control and Prevention. (1997). *HIV couseling and testing in publicly funded sites*. Retrieved from Atlanta, GA:

Cho, H., & Salmon, C. T. (2006). Fear appeals for individuals in different stages of change: Intended and unintended effects and implications on public health campaigns. *Health Commun, 20*(1), 91-99. doi: 10.1207/s15327027hc2001_9

Cismaru, M., & Lavack, A. M. (2007). Interaction effects and combinatorial rules governing Protection Motivation Theory variables: a new model. *Marketing Theory, 7*(3), 249-270. doi:10.1177/1470593107080344

Cohen, F., Kearney, K. A., Zegans, L. S., Kemeny, M. E., Neuhaus, J. M., & Stites, D. P. (1999). Differential immune system changes with acute and persistent stress for optimists vs pessimists. *Brain Behav Immun, 13*(2), 155-174.

Cohen, G. L., Aronson, J., & Steele, C. M. (2000). When beliefs yield to evidence: Reducing biased evaluation by affirming the self. *Personality and Social Psychology Bulletin, 26*(9), 1151-1164. doi:10.1177/01461672002611011

Croyle, R. T., Loftus, E. F., Barger, S. D., Sun, Y.-C., Hart, M., & Gettig, J. (2006). How well do people recall risk factor test results? Accuracy and bias among cholesterol screening participants. *Health Psychology, 25*(3), 425-432. doi:10.1037/0278-6133.25.3.425

Croyle, R. T., Sun, Y.-C., & Louie, D. H. (1993). Psychological minimization of cholesterol test results: moderators of appraisal in college students and community residents. *Health Psychology, 12*(6), 503-507.

Davison, W. P. (1983). The third-person effect in communication. *Public Opinion Quarterly, 47*(1), 1-15.

de Hoog, N., Stroebe, W., & de Wit, J. B. F. (2007). The impact of vulnerability to and severity of a health risk on processing and acceptance of fear-arousing communications: A meta-analysis. *Review of General Psychology, 11*(3), 258-285. doi:10.1037/1089-2680.11.3.258

Dejong, W., & Atkin, C. K. (1995). A review of national television PSA campaigns for preventing alcohol-impaired driving, 1987-1992. *Journal of public health policy, 16*(1), 59-80. doi:10.2307/3342977

Dejong, W., & Wallack, L. (1999). A critical perspective on the drug czar's antidrug media campaign. *J Health Commun, 4*(2), 155-160. doi:10.1080/108107399127020

Delaney, A., Lough, B., Whelan, M., & Cameron, M. (2004). *A review of mass media campaigns in road safety* (0732617308). Retrieved from http://www.monash.edu.au/miri/research/reports/muarc220.pdf:

Delhomme, P., De Dobbeleer, W., Forward, S., Simoes, A., Adamos, G., Areal, A., . . . Walter, E. (2009). *Manual for Designing, Implementing and Evaluating Road Safety Communication Campaigns*. Retrieved from Brussels, Belgium:

Department of Health. (2014). *Australia's Physical Activity and Sedentary Behaviour Guidelines*. Australian Government Retrieved from http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#apaadult.

Di Milia, L. (2006). Shift work, sleepiness and long distance driving. *Transportation research part F: traffic psychology and behaviour, 9*(4), 278-285.

Donovan, R., & Henley, N. (1997). Negative outcomes, threats and threat appeals: Widening the conceptual framework for the study of fear and other emotions in social marketing communications. *Social Marketing Quarterly, 4*(1), 56-67.

Donovan, R., & Henley, N. (2003). *Social marketing: Principles and practice*. Melbourne: IP Communications.

Donovan, R., Jalleh, G., & Henley, N. (1999). Executing effective road safety advertising: are big production budgets necessary? *Accident Analysis & Prevention, 31*, 243-252.

Earl, A., Albarracín, D., Durantini, M. R., Gunnoe, J. B., Leeper, J., & Levitt, J. H. (2009). Participation in counseling programs: high-risk participants are reluctant to accept HIV-prevention counseling. *Journal of Consulting and Clinical Psychology, 77*(4), 668-679. doi:10.1037/a0015763

Elder, R. W., Shults, R. A., Sleet, D. A., Nichols, J. L., Thompson, R. S., & Rajab, W. (2004). Effectiveness of mass media campaigns for reducing drinking and driving and alcohol-involved crashes: a systematic review. *American Journal of Preventive Medicine, 27*(1), 57-65. doi:10.1016/j.amepre.2004.03.002

Elliott, B. J. (2003). *The Psychology of Fear Appeals Re-Visited*. Paper presented at the Road Safety Research, Policing and Education Conference, Sydney.

Elliott, B. J. (2005). *The use of threat (fear) to reduce adolescent risk taking: A Literature review*: Unpublished report prepared for VicRoads.

Elliott, B. J. (2011). Beyond reviews of road safety mass media campaigns: Looking elsewhere for new insights. *Journal of the Australasian College of Road Safety, 22*(4), 11-18.

Eppright, D. R., Hunt, J. B., Tanner Jr, J. F., & Franke, G. R. (2002). Fear, coping, and information: A pilot study on motivating a healthy response. *Health Marketing Quarterly, 20*(1), 51-73. doi:10.1300/J026v20n01_05

Falk, E. B. (2010). Communication neuroscience as a tool for health psychologists. *Health Psychology, 29*(4), 355-357. doi:10.1037/a0020427

Farrell, M. H., Murphy, M. A., & Schneider, C. E. (2002). How underlying patient beliefs can affect physician-patient communication about prostate-specific antigen testing. *Effective Clinical Practice, 5*, 120-132.

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.). London: Sage Publications.

Floyd, D. L., Prentice-Dunn, S., & Rogers, R. W. (2000). A meta-analysis of research on protection motivation theory. *Journal of Applied Social Psychology, 30*(2), 407-429.

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: cognitive appraisal, coping, and encounter outcomes. *J Pers Soc Psychol, 50*(5), 992-1003. doi:10.1037/0022-3514.50.5.992

Friedman, L. C., Nelson, D. V., Baer, P. E., Lane, M., Smith, F. E., & Dworkin, R. J. (1992). The relationship of dispositional optimism, daily life stress, and domestic environment to coping methods used by cancer patients. *Journal of Behavioral Medicine, 15*(2), 127-141. doi:10.1007/BF00848321

Fry, T. (1996). Advertising wearout in the transport accident commission road safety campaigns. *Accident Analysis & Prevention, 28*(1), 123-129.

Glendon, A. I., & Cernecca, L. (2003). Young drivers' responses to anti-speeding and anti-drink-driving messages. *Transportation research part F: traffic psychology and behaviour, 6*(3), 197-216. doi:10.1016/s1369-8478(03)00026-3

Good, A., & Abraham, C. (2007). Measuring defensive responses to threatening messages: A meta-analysis of measures. *Health Psychol Rev, 1*(2), 208-229. doi:10.1080/17437190802280889

Gore, T. D., & Bracken, C. C. (2005). Testing the theoretical design of a health risk message: Reexamining the major tenets of the extended parallel process model. *Health Education & Behavior, 32*(1), 27-41. doi:10.1177/1090198104266901

Government of Western Australia. (2012). Live lighter: Grabbable Gut. Retrieved from https://livelighter.com.au/

Greenwald, A. G., & Leavitt, C. (1984). Audience involvement in advertising: Four levels. *Journal of Consumer Research, 11*, 581-592.

Harré, N., Foster, S., & O'Neill, M. (2005). Self-enhancement, crash-risk optimism and the impact of safety advertisements on young drivers. *British journal of Psychology, 96*(2), 215-230. doi:10.1348/000712605X36019

Harris, P. R., & Napper, L. (2005). Self-affirmation and the biased processing of threatening health-risk information. *Personality and Social Psychology Bulletin, 31*(9), 1250-1263.

Hastings, G., & MacFadyen, L. (2002). The limitations of fear messages. *Tobacco Control, 11*(1), 73-75. doi:10.1136/tc.11.1.73

Hastings, G., Stead, M., & Webb, J. (2004). Fear appeals in social marketing: Strategic and ethical reasons for concern. *Psychology & Marketing, 21*(11), 961-986. doi:10.1002/mar.20043

Hatfield, J., & Job, R. F. S. (2001). *Reduction of road related optimism bias and risk taking: Final report*. Retrieved from Canberra:

Hazard Vallerand, A., Hasenau, S., Templin, T., & Collins-Bohler, D. (2005). Disparities between black and white patients with cancer pain: the effect of perception of control over pain. *Pain Medicine, 6*(3), 242-250. doi:10.1111/j.1526-4637.2005.05038.x

Helgeson, V. S., & Taylor, S. E. (1993). Social comparisons and adjustment among cardiac patients. *Journal of Applied Social Psychology, 23*(15), 1171-1195. doi:10.1111/j.1559-1816.1993.tb01027.x

Henley, N., & Donovan, R. (1999). Threat appeals in social marketing: Death as a 'Special Case'. *International Journal of Nonprofit and Voluntary Sector Marketing, 4*(4), 300-319.

Henley, N., & Donovan, R. (2003). Young people's response to death threat appeals: Do they really feel immortal? *Health Education Research, 18*(1), 1-14.

Hightow, L. B., Miller, W. C., Leone, P. A., Wohl, D., Smurzynski, M., & Kaplan, A. H. (2003). Failure to return for HIV posttest counseling in an STD clinic population. *AIDS Education and Prevention, 15*(3), 282-290. doi:10.1521/aeap.15.4.282.23826

Hill, D., Chapman, S., & Donovan, R. (1998). The return of scare tactics. *Tobacco Control, 7*(1), 5-8. doi:10.1136/tc.7.1.5

Hoekstra, T., & Wegman, F. (2011). Improving the effectiveness of road safety campaigns: Current and new practices. *IATSS Research, 34*(2), 80-86. doi:10.1016/j.iatssr.2011.01.003

Hovland, C., Janis, I. L., & Kelly, H. (1953). *Communication and Persuasion*. New Haven: Yale University Press.

Hutchinson, T. P., & Wundersitz, L. N. (2011). Road safety mass media campaigns: Why are results inconclusive, and what can be done? *International journal of injury control and safety promotion, 18*(3), 235-241. doi:10.1080/17457300.2010.540330

Isaacowitz, D. M. (2005). The gaze of the optimist. *Personality and Social Psychology Bulletin, 31*(3), 407-415. doi:10.1177/0146167204271599

Janis, I. L. (1967). Effects of fear arousal on attitude change: Recent developments in theory and experimental research. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 3, pp. 166-225). New York: Academic Press.

Janssen, E., van Osch, L., Lechner, L., Candel, M., & de Vries, H. (2012). Thinking versus feeling: Differentiating between cognitive and affective components of perceived cancer risk. *Psychology & Health, 27*(7), 767-783. doi:10.1080/08870446.2011.580846

Jenkinson, C., Layte, R., Wright, L., & Coulter, A. (1996). *The UK SF-36: An analysis and interpretation manual*. Oxford: Health Services Research Unit.

Job, R. F. S. (1988). Effective and ineffective use of fear in health promotion campaigns. *American Journal of Public Health, 78*(2), 163-167. doi:10.2105/AJPH.78.2.163

Job, R. F. S. (1990). The application of learning theory to driving confidence: The effect of age and the impact of random breath testing. *Accident Analysis & Prevention, 22*(2), 97-107.

Job, R. F. S., & Sakashita, C. (2009). *The Psychology of Punishment: The Category Shift Problem in Road Safety and how to address it*. Paper presented at the Road Safety 2020: Smart Solutions, Sustainability, Vision, Perth, Western Australia.

Johnston, I., Muir, C., & Howard, E. (2014). *Eliminating Serious Injury and Death from Road Transport: A Crisis of Complacency*. Boca Raton, FL: CRC Press.

Jonah, B. A. (1997). Sensation seeking and risky driving: a review and synthesis of the literature. *Accident Analysis & Prevention, 29*(5), 651-665. doi:10.1016/S0001-4575(97)00017-1

Keller, P. A., & Block, L. G. (1996). Increasing the persuasiveness of fear appeals: The effect of arousal and elaboration. *Journal of Consumer Research*, 448-459.

Keogh, L. A., Southey, M. C., Maskiell, J., Young, M.-A., Gaff, C. L., Kirk, J., . . . Giles, G. G. (2004). Uptake of offer to receive genetic information about

BRCA1 and BRCA2 mutations in an Australian population-based study. *Cancer Epidemiology Biomarkers & Prevention, 13*(12), 2258-2263.

Kessels, L. T., Ruiter, R. A., & Jansma, B. M. (2010). Increased attention but more efficient disengagement: neuroscientific evidence for defensive processing of threatening health information. *Health Psychology, 29*(4), 346-354. doi:10.1037/a0019372

Kline, R. B. (2011). *Principles and practice of Structural Equation Modeling*. New York: The Guilford Press.

Krugman, H. (1965). The impact of television advertising: Learning without involvement. *Public Opinion Quarterly, 29*, 349-356.

Lawton, R., Conner, M., & Parker, D. (2007). Beyond cognition: predicting health risk behaviors from instrumental and affective beliefs. *Health Psychol, 26*(3), 259-267. doi:10.1037/0278-6133.26.3.259

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Leotti, L. A., Iyengar, S. S., & Ochsner, K. N. (2010). Born to choose: the origins and value of the need for control. *Trends Cogn Sci, 14*(10), 457-463. doi:10.1016/j.tics.2010.08.001

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 5, pp. 119-186). New York: Academic Press.

Lewis, I. M., Watson, B., & Tay, R. (2003). *The third person effect and the acceptance of threatening road safety television advertising: Are current advertisements ineffective for male road users?* Paper presented at the Road Safety Research, Policing and Education Conference, Sydney.

Lewis, I. M., Watson, B., & Tay, R. (2007). Examining the effectiveness of physical threats in road safety advertising: The role of the third-person effect, gender, and age. *Transportation research part F: traffic psychology and behaviour, 10*(1), 48-60.

Lewis, I. M., Watson, B., Tay, R., & White, K. M. (2007). The Role of Fear Appeals in Improving Driver Safety: A Review of the Effectiveness of Fear-arousing (threat) Appeals in Road Safety Advertising. *International Journal of Behavioral Consultation and Therapy, 3*(2), 203-222.

Lewis, I. M., Watson, B., & White, K. M. (2008a). An examination of message-relevant affect in road safety messages: Should road safety advertisements aim to make us feel good or bad? *Transportation research part F: traffic psychology and behaviour, 11*(6), 403-417. doi:10.1016/j.trf.2008.03.003

Lewis, I. M., Watson, B., & White, K. M. (2008b). *Predicting the acceptance and rejection of emotion-based anti-speeding messages: The role of attitudinal beliefs and personal involvement*. Paper presented at the Australian Road Safety Research, Policing and Education Conference, Adelaide, South Australia.

Lewis, I. M., Watson, B., & White, K. M. (2010). Response efficacy: the key to minimizing rejection and maximizing acceptance of emotion-based anti-speeding messages. *Accident Analysis & Prevention, 42*(2), 459-467. doi:10.1016/j.aap.2009.09.008

Lewis, I. M., Watson, B., & White, K. M. (2013). Extending the explanatory utility of the EPPM beyond fear-based persuasion. *Health Commun, 28*(1), 84-98. doi:10.1080/10410236.2013.743430

Lewis, I. M., Watson, B., White, K. M., & Tay, R. (2007). Promoting Public Health Messages: Should We Move Beyond Fear-Evoking Appeals in Road Safety? *Qualitative Health Research, 17*(1), 61-74.

Liberman, A., & Chaiken, S. (1992). Defensive processing of personally relevant health messages. *Personality and Social Psychology Bulletin, 18*(6), 669-679. doi:10.1177/0146167292186002

Live Lighter. (2012). A world first campaign to tackle obesity [Press release]. Retrieved from https://livelighter.com.au/news/a-world-first-campaign-to-tackle-obesity

Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychol Bull, 127*(2), 267-286. doi:10.1037/0033-2909.127.2.267

Luo, J., & Isaacowitz, D. M. (2007). How optimists face skin cancer information: Risk assessment, attention, memory, and behavior. *Psychology & Health, 22*(8), 963-984. doi:10.1080/14768320601070951

Machin, M. A., & Sankey, K. S. (2008). Relationships between young drivers' personality characteristics, risk perceptions, and driving behaviour. *Accident Analysis & Prevention, 40*(2), 541-547. doi:10.1016/j.aap.2007.08.010

Maddux, J. E. (1993). Social cognitive models of health and exercise behavior: An introduction and review of conceptual issues. *Journal of Applied Sport Psychology, 5*(2), 116-140. doi:10.1080/10413209308411310

Maibach, E., & Murphy, D. A. (1995). Self-efficacy in health promotion research and practice: conceptualization and measurement. *Health Education Research, 10*(1), 37-50. doi:10.1093/her/10.1.37

Maloney, E. K., Lapinski, M. K., & Witte, K. (2011). Fear appeals and persuasion: A review and update of the extended parallel process model. *Social and Personality Psychology Compass, 5*(4), 206-219. doi:10.1111/j.1751-9004.2011.00341.x

Masked protesters warn drivers of upcoming speed cameras in protest of WA Government revenue raising. (2014, 28, August). *Perth now*. Retrieved from http://www.perthnow.com.au/news/western-australia/masked-protesters-warn-drivers-of-upcoming-speed-cameras-in-protest-of-wa-government-revenue-raising/story-fnhocxo3-1227040659341

McGuire, W. J. (1968). Personality and susceptibility to social influence. In E. Borgatta & W. Lambert (Eds.), *Handbook of Personality Theory and Research* (pp. 1130-1187). Chicago: Rand McNally.

McGuire, W. J. (1969). The nature of attitudes and attitude change. In G. Lindzey & E. Aronson (Eds.), *The Handbook of Social Psychology* (Vol. 3, pp. 136-314). Reading, MA: Addison-Wesley.

McKay, D. L., Berkowitz, J. M., Blumberg, J. B., & Goldberg, J. P. (2004). Communicating cardiovascular disease risk due to elevated homocysteine levels: Using the EPPM to develop print materials. *Health Education & Behavior, 31*(3), 355-371. doi:10.1177/1090198104263353

McMahan, S., Witte, K., & Meyer, J. a. (1998). The perception of risk messages regarding electromagnetic fields: extending the extended parallel process model to an unknown risk. *Health Commun, 10*(3), 247-259. doi:10.1207/s15327027hc1003_4

McQueen, A., & Klein, W. M. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self and Identity, 5*(4), 289-354. doi:10.1080/15298860600805325

McQueen, A., Vernon, S. W., & Swank, P. R. (2013). Construct definition and scale development for defensive information processing: An application to colorectal cancer screening. *Health Psychology, 32*(2), 190-202. doi:10.1037/a0027311

Miles, H., Winstock, A., & Strang, J. (2001). Identifying young people who drink too much: The clinical utility of the five-item Alcohol Use Disorders Identification Test (AUDIT). *Drug and Alcohol Review, 20*(1), 9-18. doi:10.1080/09595230123211

Miller, S. M. (1987). Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat. *J Pers Soc Psychol, 52*, 345-353.

Miller, S. M. (1995). Monitoring versus blunting styles of coping with cancer influence the information patients want and need about their disease. Implications for cancer screening and management. *Cancer, 76*(2), 167-177. doi:10.1002/1097-0142(19950715)76:2<167::AID-CNCR2820760203>3.0.CO;2-K

Miller, S. M., Fleisher, L., Roussi, P., Buzaglo, J. S., Schnoll, R., Slater, E., . . . Popa-Mabe, M. (2005). Facilitating informed decision making about breast cancer risk and genetic counseling among women calling the NCI's Cancer Information Service. *J Health Commun, 10*, 119-136. doi:10.1080/07366290500265335

Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and Intervention in Health-Related Behavior: A Meta-analytic Review of Protection Motivation Theory. *Journal of Applied Social Psychology, 30*(1), 106-143. doi:10.1111/j.1559-1816.2000.tb02308

Mooren, L., Grzebieta, R., & Job, R. F. S. (2013, 28-30 August, 2013). *Can Australia be a global leader in road safety?* Paper presented at the 2013 Australasian Road Safety Research, Policing & Education Conference, Brisbane, Queensland.

Morman, M. T. (2000). The influence of fear appeals, message design, and masculinity on men's motivation to perform the testicular self-exam. *Journal of Applied Communication Research, 28*(2), 91-116. doi:10.1080/00909880009365558

Morris, K., & Swann, W. (1996). Denial and the AIDS crisis: On wishing away the threat of AIDS. In S. Oskamp & S. C. Thompson (Eds.), *Understanding and Preventing HIV Risk Behavior.* (pp. 57-79). Thousand Oaks, CA: Sage.

Muthusamy, N., Levine, T. R., & Weber, R. (2009). Scaring the already scared: Some problems with HIV/AIDS fear appeals in Namibia. *Journal of Communication, 59*(2), 317-344. doi:10.1111/j.1460-2466.2009.01418.x

National Health and Medical Research Council. (2013). *Australian Dietary Guidelines*. Canberra: National Health and Medical Research Council.

Naus, M. J., Price, E. C., & Peter, M. P. (2005). The moderating effects of anxiety and breast cancer locus of control on depression. *J Health Psychol, 10*(5), 687-694. doi:10.1177/1359105305055324

New South Wales Government. (n.d.). Speeding - No One Thinks Big Of You. *Strategic Communications.* Retrieved from http://www.advertising.nsw.gov.au/campaigns/speeding-no-one-thinks-big-you

Newsom, J. T., Knapp, J. E., & Schulz, R. (1996). Longitudinal analysis of specific domains of internal control and depressive symptoms in patients with recurrent cancer. *Health Psychology, 15*(5), 323-331. doi:10.1037/0278-6133.15.5.323

Nielsen, J., & Shapiro, S. (2009). Coping with fear through suppression and avoidance of threatening information. *Journal of experimental psychology: applied, 15*(3), 258-274. doi:10.1037/a0017018

Norman, P., Boer, H., & Seydel, E. R. (2005). Protection motivation theory. In M. Conner & P. Norman (Eds.), *Predicting Health Behaviour* (2 ed., pp. 81-126). Berkshire, England: McGraw-Hill Professional Publishing

NSW Centre for Road Safety. (2015). Speeding: Biggest killer on our roads. Retrieved from http://roadsafety.transport.nsw.gov.au/speeding/

O'Rourke, J. (2000, 17, December). Shock tactics to stop carnage. *The Sun Herald*.

O'Rourke, J. (2015, 4, January). Block Their Shot: Social media campaign blocking mobile speed cameras from clocking drivers. *The Daily Telegraph*. Retrieved from http://www.dailytelegraph.com.au/news/nsw/block-their-shot-social-media-campaign-blocking-mobile-speed-cameras-from-clocking-drivers/story-fnpn118l-1227173575482

Oltedal, S., & Rundmo, T. (2006). The effects of personality and gender on risky driving behaviour and accident involvement. *Safety science, 44*(7), 621-628. doi:10.1016/j.ssci.2005.12.003

Özkan, T., & Lajunen, T. (2005). Multidimensional Traffic Locus of Control Scale (T-LOC): Factor structure and relationship to risky driving. *Personality and Individual Differences, 38*(3), 533-545. doi:10.1016/j.paid.2004.05.007

Pechmann, C., Zhao, G., Goldberg, M. E., & Reibling, E. T. (2003). What to convey in antismoking advertisements for adolescents: The use of protection motivation theory to identify effective message themes. *Journal of Marketing, 67*(2), 1-18. doi:10.1509/jmkg.67.2.1.18607

Pedruzzi, R. (2014). [Community perceptions about illness and life events]. *Unpublished raw data*.

Pedruzzi, R., & Swinbourne, A. L. (2009). *It won't happen to me: optimism, biases, and recall of road-risk information*. Paper presented at the Australian College of Road Safety Conference: Road safety 2020: smart solutions, sustainability, vision, Perth, Australia.

People focus on wrong cancer risks: survey. (2015, 2, April). *news.com.au*. Retrieved from http://www.news.com.au/national/breaking-news/people-focus-on-wrong-cancer-risks-survey/story-e6frfku9-1227289350362

Peters, G. J., Ruiter, R. A., & Kok, G. (2012). Threatening communication: a critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychol Rev, 7*(Suppl 1), S8-S31. doi:10.1080/17437199.2012.703527

Phillips, R., & Torquato, R. (2009). *A review of 45 anti-speeding campaigns*. Retrieved from Oslo, Norway:

Phillips, R., Ulleberg, P., & Vaa, T. (2011). Meta-analysis of the effect of road safety campaigns on accidents. *Accident Analysis & Prevention, 43*(3), 1204-1218. doi:10.1016/j.aap.2011.01.002

Phipps, S., & Zinn, A. B. (1986). Psychological response to amniocentesis: Effects of coping style. *American Journal of Medical Genetics, 25*, 143-148.

Plotnikoff, R. C., & Higginbotham, N. (2002). Protection motivation theory and exercise behaviour change for the prevention of heart disease in a high-risk, Australian representative community sample of adults. *Psychol Health Med, 7*(1), 87-98. doi:10.1080/13548500120101586

Posner, M. I. (1980). Orienting of attention. *Quarterly journal of experimental psychology, 32*(1), 3-25.

Prentice-Dunn, S., Floyd, D. L., & Flournoy, J. M. (2001). Effects of persuasive message order on coping with breast cancer information. *Health Education Research, 16*(1), 81-84. doi:10.1093/her/16.1.81

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change in smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*, 390-395.

Radcliffe, N. M., & Klein, W. M. P. (2002). Dispositional, Unrealistic, and Comparative Optimism: Differential Relations with the Knowledge and Processing of Risk Information and Beliefs about Personal Risk. *Personality and Social Psychology Bulletin, 28*(6), 836-846. doi:10.1177/0146167202289012

Reed, M. B., & Aspinwall, L. G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion, 22*(2), 99-132.

Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of clinical psychology, 38*(1), 119-125. doi:10.1002/1097-4679(198201)38:1<119::AID-JCLP2270380118>3.0.CO;2-I

Rigby, K., Brown, M., Anagnostou, P., Ross, M. W., & Rosser, B. R. S. (1989). Shock tactics to counter AIDS: The Australian experience. *Psychology and health, 3*(3), 145-159. doi:10.1080/08870448908400375

Rimal, R. N., & Real, K. (2003). Perceived risk and efficacy beliefs as motivators of change. *Human Communication Research, 29*(3), 370-399. doi:10.1111/j.1468-2958.2003.tb00844.x

Roberto, A. J., Zimmerman, R. S., Carlyle, K. E., Abner, E. L., Cupp, P. K., & Hansen, G. L. (2007). The effects of a computer-based pregnancy, STD, and HIV prevention intervention: A nine-school trial. *Health Commun, 21*(2), 115-124. doi:10.1080/10410230701306990

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology, 91*(1), 93-114. doi:10.1080/00223980.1975.9915803

Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo & R. Petty (Eds.), *Social psychophysiology: A sourcebook* (pp. 153-177). London, UK: Guilford.

Ropka, M. E., Wenzel, J., Phillips, E. K., Siadaty, M., & Philbrick, J. T. (2006). Uptake rates for breast cancer genetic testing: a systematic review. *Cancer Epidemiology Biomarkers & Prevention, 15*(5), 840-855. doi:10.1158/1055-9965.EPI-05-0002

Rosser, B. R. S. (1992). The Effects of Using Fear in Public AIDS Education on the Behaviour of Homosexually Active Men. *Journal of Psychology & Human Sexuality, 4*(3), 123-134. doi:10.1300/J056v04n03_09

Rossi, R., Gastaldi, M., & Gecchele, G. (2011). Analysis of driver task-related fatigue using driving simulator experiments. *Procedia-Social and Behavioral Sciences, 20*, 666-675.

Rothman, A., & Schwarz, N. (1998). Constructing perceptions of vulnerability: Personal relevance and the use of experiential information in health judgments. *Personality and Social Psychology Bulletin, 24*(10). doi:10.1177/01461672982410003

Ruiter, R. A., Abraham, C., & Kok, G. (2001). Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology & Health, 16*(6), 613-630. doi:10.1080/08870440108405863

Ruiter, R. A., & Kok, G. (2005). Saying is not (always) doing: cigarette warning labels are useless. *The European Journal of Public Health, 15*(3), 329-329. doi:10.1093/eurpub/cki095

Ruiter, R. A., Verplanken, B., Kok, G., & Werrij, M. Q. (2003). The role of coping appraisal in reactions to fear appeals: Do we need threat information? *J Health Psychol, 8*(4), 465-474. doi:10.1177/13591053030084006

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*(3), 219-247. doi:10.1037/0278-6133.4.3.219

Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive therapy and research, 16*(2), 201-228. doi:10.1007/BF01173489

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a reevaluation of the Life Orientation Test. *J Pers Soc Psychol, 67*(6), 1063-1078. doi:10.1037/0022-3514.67.6.1063

Scheier, M. F., Matthews, K. A., Owens, J. F., Magovern, G. J., Lefebvre, R. C., Abbott, R. A., & Carver, C. S. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: the beneficial effects on physical and psychological well-being. *J Pers Soc Psychol, 57*(6), 1024-1040. doi:10.1037/0022-3514.57.6.1024

Scheier, M. F., Weintraub, J. K., & Carver, C. S. (1986). Coping with stress: divergent strategies of optimists and pessimists. *J Pers Soc Psychol, 51*(6), 1257-1264.

Schneider, S., Gadinger, M., & Fischer, A. (2012). Does the effect go up in smoke? A randomized controlled trial of pictorial warnings on cigarette packaging. *Patient Educ Couns, 86*(1), 77-83.

Schneider, T. R., Salovey, P., Pallonen, U., Mundorf, N., Smith, N. F., & Steward, W. T. (2001). Visual and Auditory Message Framing Effects on Tobacco Smoking. *Journal of Applied Social Psychology, 31*(4), 667-682. doi:10.1111/j.1559-1816.2001.tb01407.x

Schwarzer, R. (1994). Optimism, Vulnerability, and self-beliefs as health-related cognitions: A systematic overview. *Psychology & Health, 9*(3), 161-180. doi:10.1080/08870449408407475

Schwebel, D. C., Severson, J., Ball, K. K., & Rizzo, M. (2006). Individual difference factors in risky driving: The roles of anger/hostility, conscientiousness, and sensation-seeking. *Accident Analysis & Prevention, 38*(4), 801-810. doi:10.1016/j.aap.2006.02.004

Segerstrom, S. C. (2001). Optimism and attentional bias for negative and positive stimuli. *Personality and Social Psychology Bulletin, 27*(10), 1334-1343. doi:10.1177/01461672012710009

Segerstrom, S. C., Taylor, S. E., Kemeny, M. E., & Fahey, J. L. (1998). Optimism is associated with mood, coping, and immune change in response to stress. *J Pers Soc Psychol, 74*(6), 1646. doi:10.1037/0022-3514.74.6.1646

Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death*. San Francisco: W.H. Freeman.

Sherman, D. A., Nelson, L. D., & Steele, C. M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin, 26*(9), 1046-1058. doi:10.1177/01461672002611003

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychol Bull, 129*(2), 216-269. doi:10.1037/0033-2909.129.2.216

Slovic, P., Peters, E., Finucane, M. L., & Macgregor, D. G. (2005). Affect, risk, and decision making. *Health Psychology, 24*(4 Suppl), S35-S40. doi:10.1037/0278-6133.24.4.S35

Smith, G. (2009, September 4). Made in Britain for just a few thousand pounds: The graphic road safety film that's taken the world by storm. *Daily Mail Australia*. Retrieved from http://www.dailymail.co.uk/news/article-1211183/Made-Britain-just-thousand-pounds-The-graphic-road-safety-film-thats-taken-world-storm.html

Solberg Nes, L. S., & Segerstrom, S. C. (2006). Dispositional optimism and coping: a meta-analytic review. *Pers Soc Psychol Rev, 10*(3), 235-251. doi:10.1207/s15327957pspr1003_3

Sparks, G. G., & Spirek, M. M. (1988). Individual differences in coping with stressful mass media: An activation-arousal view. *Human Communication Research, 15*(2), 195-216. doi:10.1111/j.1468-2958.1988.tb00181.x

St John Ambulance Australia. (2014). Confronting campaign highlights importance of first aid. Retrieved from http://stjohn.org.au/newsroom/2014/04/29/confronting-campaign-highlights-importance-of-first-aid/

Stanton, A. L., Revenson, T. A., & Tennen, H. (2007). Health psychology: psychological adjustment to chronic disease. *Annual review of psychology, 58*, 565-592. doi:10.1146/annurev.psych.58.110405.085615

State Government Victoria. (2015). Cameras save lives. Retrieved from www.camerassavelives.vic.gov.au/home/fines+and+penalties/fine+amounts/

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. *Advances in experimental social psychology, 21*(2), 261-302.

Steptoe, A., & Wardle, J. (2001). Locus of control and health behaviour revisited: a multivariate analysis of young adults from 18 countries. *British journal of Psychology, 92*(4), 659-672. doi:10.1348/000712601162400

Steptoe, A., Wright, C., Kunz-Ebrecht, S. R., & Iliffe, S. (2006). Dispositional optimism and health behaviour in community-dwelling older people: associations with healthy ageing. *Br J Health Psychol, 11*(Pt 1), 71-84. doi:10.1348/135910705X42850

Stylianou, M. (2010). The return of the Grim Reaper: How memorability created mythology. *History Australia, 7*(1), 10.11-10.18.

Sundström, A. (2008). Construct validation and psychometric evaluation of the self-efficacy scale for driver competence. *European Journal of Psychological Assessment, 24*(3), 198-206. doi:10.1027/1015-5759.24.3.198

Sutton, S. (1992). Shock tactics and the myth of the inverted U. *British Journal of Addiction, 87*(4), 517-519. doi:10.1111/j.1360-0443.1992.tb01953.x

Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. A. (2010). Information avoidance: Who, what, when, and why. *Review of General Psychology, 14*(4), 340-353. doi:10.1037/a0021288

TACVictoria. (2014, December, 1). The party's over this holiday season [video file]. Retrieved from https://www.youtube.com/watch?v=-7ERMwnoxSI

Taubman-Ben-Ari, O., Mikulincer, M., & Gillath, O. (2004). The multidimensional driving style inventory—scale construct and validation. *Accident Analysis & Prevention, 36*(3), 323-332. doi:10.1016/S0001-4575(03)00010-1

Tay, R. (2005). Mass media campaigns reduce the incidence of drinking and driving. *Evidence-Based Healthcare and Public health, 9*(1), 26-29.

Tay, R., & Watson, B. (2002). Changing drivers' intentions and behaviours using fear-based driver fatigue advertisements. *Health Marketing Quarterly, 19*(4), 55-68. doi:10.1300/J026v19n04_05

Taylor, S. E., & Brown, J. D. (1994). Positive illusions and well-being revisited: Separating fact from fiction. *Psychol Bull, 116*(1), 21-27. doi:10.1037/0033-2909.116.1.21

Tennen, H., & Affleck, G. (2000). The Perception of Personal Control: Sufficiently Important to Warrant Careful Scrutiny. *Personality and Social Psychology Bulletin, 26*(2), 152-156. doi:10.1177/0146167200264003

Thompson, S. C., & Spacapan, S. (1991). Perceptions of control in vulnerable populations. *Journal of Social Issues, 47*(4), 1-21. doi:10.1111/j.1540-4560.1991.tb01831.x

Thuen, F., & Rise, J. (2006). Psychological adaptation after marital disruption: the effects of optimism and perceived control. *Scandinavian journal of psychology, 47*(2), 121-128. doi:10.1111/j.1467-9450.2006.00499.x

Tindle, H. A., Chang, Y.-F., Kuller, L. H., Manson, J. E., Robinson, J. G., Rosal, M. C., . . . Matthews, K. A. (2009). Optimism, cynical hostility, and incident coronary heart disease and mortality in the Women's Health Initiative. *Circulation, 120*(8), 656-662. doi:10.1161/circulationaha.108.827642

Ulleberg, P., & Rundmo, T. (2003). Personality, attitudes and risk perception as predictors of risky driving behaviour among young drivers. *Safety science, 41*(5), 427-443. doi:10.1016/S0925-7535(01)00077-7

van 't Riet, J., & Ruiter, R. A. (2013). Defensive reactions to health-promoting information: An overview and implications for future research. *Health Psychol Rev, 7*(sup1), S104-S136. doi:10.1080/17437199.2011.606782

Van Putten, K., & Jones, S. C. (2007). *"Because it shows us the consequences": Why the Australian public believe the ends justifies the means in road safety advertising*. Paper presented at the Proceedings of the Social entrepreneurship, social change and sustainability: International Nonprofit and Social Marketing Conference, Brisbane.

Veitch, C., Sheehan, M. C., Turner, R., Siskind, V., & Pashen, D. (2005). *The economic, medical and social costs of road traffic crashes in rural north Queensland: a 5-year multi-phase study*. Paper presented at the National Rural Health Conference, Alice Springs.

WALGA. (2008). Do Double Demerits Work? *Synovate Pty Ltd, Double Demerits Evaluation 2007; November 2007*. Perth, Western Australia.

Walker, J. (2001). *Control and the psychology of health: Theory, measurement and applications*. Philadelphia: Open University Press

Wallston, K. A. (2005). The validity of the multidimensional health locus of control scales. *J Health Psychol, 10*(5), 623-631. doi:10.1177/1359105305055304

Wallston, K. A., Wallston, B., & DeVellis, R. (1978). Development of the Multidimensional Health Locus of Control (MHLC) Scales. *Health Education Monographs, 6*(2), 160-170. doi:10.1177/109019817800600107

Walton, D., & McKeown, P. (2001). Drivers' biased perceptions of speed and safety campaign messages. *Accident Analysis & Prevention, 33*(5), 629-640. doi:10.1016/S0001-4575(00)00076-2

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care, 30*, 473-483.

Watson, M., & Greer, S. (1983). Development of a questionnaire measure of emotional control. *Journal of Psychosomatic Research, 27*(4), 299-305. doi:10.1016/0022-3999(83)90052-1

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *J Pers Soc Psychol, 39*(5), 806-820. doi:10.1037/0022-3514.39.5.806

Weinstein, N. D. (1989). Effects of personal experience on self-protective behavior. *Psychol Bull, 105*(1), 31-50. doi:10.1037/0033-2909.105.1.31

WHO. (2004). *World report on road traffic injury prevention*. Retrieved from http://apps.who.int/iris/bitstream/10665/42871/1/9241562609.pdf:

WHO. (2013a). *Global status report on road safety 2013: Supporting a decade of action*. Retrieved from http://www.who.int/violence_injury_prevention/road_safety_status/2013/en/:

WHO. (2013b). *WHO report on the global tobacco epidemic, 2013: enforcing bans on tobacco advertising, promotion and sponsorship* (9241505877). Retrieved from http://www.who.int/tobacco/global_report/2013/en/:

Wiebe, D. J., & Black, D. (1997). Illusional Beliefs in the Context of Risky Sexual Behaviors. *Journal of Applied Social Psychology, 27*(19), 1727-1749. doi:10.1111/j.1559-1816.1997.tb01622.x

Williams-Piehota, P., Schneider, T. R., Pizarro, J., Mowad, L., & Salovey, P. (2004). Matching health messages to health locus of control beliefs for promoting mammography utilization. *Psychology & Health, 19*(4), 407-423. doi:10.1080/08870440310001652678

Windschitl, P. D. (2003). *Measuring and conceptualizing perceptions of vulnerability/likelihood.* Paper presented at the National Cancer Institute's Workshop on Conceptualizing (and Measuring) Perceived Risk, Washington, DC.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communications Monographs, 59*(4), 329-349. doi:10.1080/03637759209376276

Witte, K. (1996). Predicting risk behaviors: Development and validation of a diagnostic scale. *J Health Commun, 1*(4), 317-342. doi:10.1080/108107396127988

Witte, K., & Allen, M. (2000). A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns. *Health Education & Behavior, 27*(5), 591-615. doi:10.1177/109019810002700506

Witte, K., Berkowitz, J. M., Cameron, K. A., & McKeon, J. K. (1998). Preventing the spread of genital warts: Using fear appeals to promote self-protective behaviors. *Health Education & Behavior, 25*(5), 571-585. doi:10.1177/109019819802500505

Witte, K., Peterson, T. R., Vallabhan, S., Stephenson, M. T., Plugge, C. D., Givens, V. K., . . . Jarrett, R. (1992). Preventing tractor-related injuries and deaths in rural populations: Using a persuasive health message framework in formative evaluation research. *International quarterly of community health education, 13*(3), 219-251. doi:10.2190/UHU7-W9DM-0LGM-0GV3

Woolley, J. E. (2001). *Literature review on best practice with mass media*. Retrieved from Adelaide:

Wundersitz, L. N., & Hutchinson, T. P. (2011). What can we learn from recent evaluations of road safety mass media campaigns? *Journal of the Australasian College of Road Safety, 22*(4), 40-47.

Wundersitz, L. N., Hutchinson, T. P., & Woolley, J. E. (2010). *Best practice in road safety mass media campaigns: A literature review*. Retrieved from http://casr.adelaide.edu.au/publications/list/?id=1165:

Ylöstalo, P., Ek, E., & Knuuttila, M. (2003). Coping and optimism in relation to dental health behaviour–a study among Finnish young adults. *European journal of oral sciences, 111*(6), 477-482. doi:10.1111/j.0909-8836.2003.00083.x

Zeidner, M., & Saklofske, D. (1996). Adaptive and maladaptive coping. In M. Zeidne & N. S. Endler (Eds.), *Handbook of coping: Theory research applications* (pp. 505-531). New York: Wiley.

Appendices

Appendix A: Likelihood estimates

Road scenario condition

*Please estimate the likelihood that the following events will **happen to you** in the future, by marking the appropriate box on the right.*

	Extremely unlikely	Very unlikely	Unlikely	Neither likely or unlikely	Likely	Very likely	Extremely likely
1. Be booked for speeding							
2. Travel overseas in the next 5 years							
3. Have a crash, as the driver at fault							
4. Have pneumonia							
5. Be able to stop quickly in an emergency while driving							
6. Be killed in a crash, as the driver at fault							
7. Have 3 consecutive years of crash – free driving							
8. Have 3 consecutive years without being booked							
9. Be booked for doing an illegal U-turn							
10. Avoid a crash nearly caused by another driver							
11. Own your own home							
12. Drive safely if driving while tired							
13. Run a red light without being booked							
14. Be killed in a crash, as the passenger							
15. Be booked for driving with a blood alcohol content over the legal limit							

CHD scenario condition

*Please estimate the likelihood that the following events will **happen to you** in the future, by marking the appropriate box on the right.*

	Extremely unlikely	Very unlikely	Unlikely	Neither likely or unlikely	Likely	Very likely	Extremely likely
1. Develop high blood pressure							
2. Travel overseas in the next 5 years							
3. Become overweight or obese							
4. Have pneumonia							
5. Have a healthy heart well into old age							
6. Have normal cholesterol levels							
7. Have a heart attack							
8. Die from a heart attack							
9. Maintain a healthy heart							
10. Engage in regular exercise							
11. Own your own home							
12. Maintain a good social support network							
13. Suffer from depression							
14. Have an angina attack							
15. Refrain from smoking							

Appendix B: Estimates of control

Road scenario condition

'Locus of control'

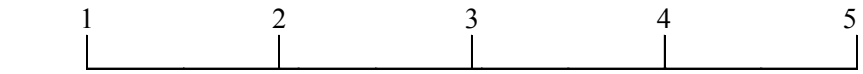
*Each item below is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, then the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item.*

	Strongly disagree	**Moderately disagree**	**Slightly disagree**	**Slightly agree**	**Moderately agree**	**Strongly agree**
1. Whether or not I get into a car accident depends mostly on shortcomings in my driving skills	1	2	3	4	5	6
2. Whether or not I get into a car accident depends mostly on my own risk taking while driving	1	2	3	4	5	6
3. Whether or not I get into a car accident depends mostly on shortcomings in other drivers' driving skills	1	2	3	4	5	6
4. Whether or not I get into a car accident depends mostly on other drivers' risk taking while driving	1	2	3	4	5	6
5. Whether or not I get into a car accident depends mostly on bad luck	1	2	3	4	5	6
6. Whether or not I get into a car accident depends mostly on dangerous roads	1	2	3	4	5	6
7. Whether or not I get into a car accident depends mostly on my speeding behaviour	1	2	3	4	5	6
8. Whether or not I get into a car accident depends mostly on other drivers' speeding behaviour	1	2	3	4	5	6
9. Whether or not I get into a car accident depends mostly on if I drive too close to the car in front	1	2	3	4	5	6
10. Whether or not I get into a car accident depends mostly on other drivers driving too close to my car	1	2	3	4	5	6
11. Whether or not I get into a car accident depends mostly on fate	1	2	3	4	5	6
12. Whether or not I get into a car accident depends mostly on bad weather or lighting conditions	1	2	3	4	5	6
13. Whether or not I get into a car accident depends mostly on a mechanical failure in the car	1	2	3	4	5	6
14. Whether or not I get into a car accident depends mostly on other drivers driving under the influence of alcohol	1	2	3	4	5	6
15. Whether or not I get into a car accident depends mostly on other drivers' dangerous overtaking	1	2	3	4	5	6
16. Whether or not I get into a car accident depends mostly on my own dangerous overtaking	1	2	3	4	5	6

‘Efficacy appraisals’

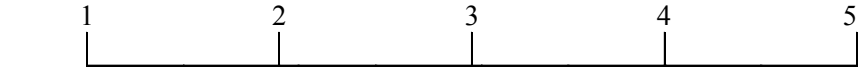
The following is a list of positive and negative events. Think about these events happening to you. ***How confident are you in your ability to control or influence these outcomes?*** *Please circle a score from 1 to 5 where 1 indicates no confidence in your ability to control/influence these outcomes and 5 indicates complete confidence.*

Getting booked for speeding



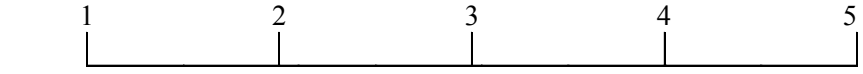
No Confidence Complete Confidence

Having a crash, as the driver at fault



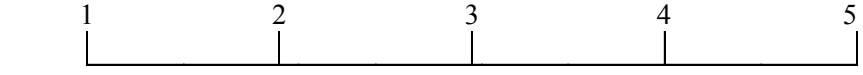
No Confidence Complete Confidence

Stopping quickly in an emergency while driving



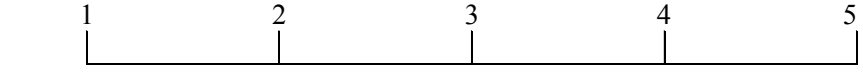
No Confidence Complete Confidence

Being killed in a crash, as the driver at fault



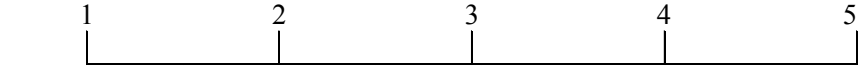
No Confidence Complete Confidence

Having 3 consecutive years of crash free driving



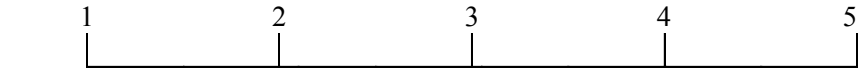
No Confidence Complete Confidence

Having 3 consecutive years without being booked



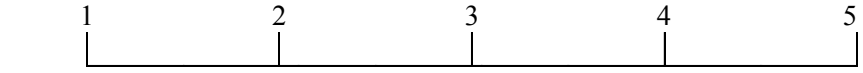
No Confidence Complete Confidence

Being booked for doing an illegal U – turn



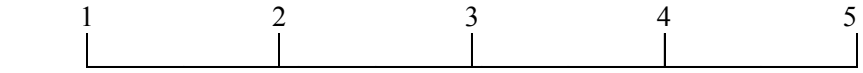
No Confidence Complete Confidence

Avoiding a crash nearly caused by another driver



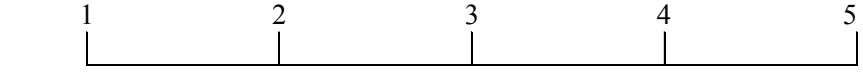
No Confidence Complete Confidence

Driving safely if driving while tired



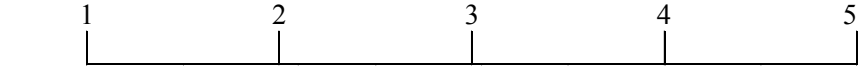
No Confidence Complete Confidence

Running a red light without being booked



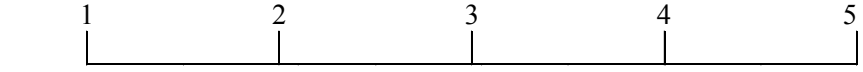
No Confidence Complete Confidence

Being killed in a crash, as the passenger



No Confidence Complete Confidence

Being booked for driving with a blood alcohol content over the legal limit



No Confidence Complete Confidence

CHD scenario condition

'Locus of control'

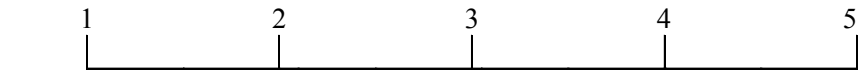
*Each item below is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, then the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item.*

	Strongly disagree	**Moderately disagree**	**Slightly disagree**	**Slightly agree**	**Moderately agree**	**Strongly agree**
1. If I get sick, it is my own behaviour which determines how soon I get well again	1	2	3	4	5	6
2. No matter what I do, if I am going to get sick, I will get sick	1	2	3	4	5	6
3. Having regular contact with my doctor is the best way for me to avoid illness	1	2	3	4	5	6
4. Most things that affect my health happen to me by accident	1	2	3	4	5	6
5. Whenever I don't feel well, I should consult a medically trained professional	1	2	3	4	5	6
6. I am in control of my health	1	2	3	4	5	6
7. My family has a lot to do with my becoming sick or staying healthy	1	2	3	4	5	6
8. When I get sick, I am to blame	1	2	3	4	5	6
9. Luck plays a big part in determining how soon I will recover from an illness	1	2	3	4	5	6
10. Health professionals control my health	1	2	3	4	5	6
11. My good health is largely a matter of good fortune	1	2	3	4	5	6
12. The main thing which affects my health is what I myself do	1	2	3	4	5	6
13. If I can take care of myself, I can avoid illness	1	2	3	4	5	6
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me	1	2	3	4	5	6
15. No matter what I do, I'm likely to get sick	1	2	3	4	5	6
16. If it's meant to be, I will stay healthy	1	2	3	4	5	6
17. If I take the right actions, I can stay healthy	1	2	3	4	5	6
18. Regarding my health, I can only do what my doctor tells me to do	1	2	3	4	5	6

‘Efficacy appraisals’

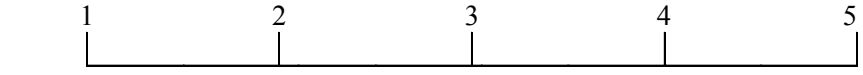
The following is a list of positive and negative events. Think about these events happening to you. ***How confident are you in your ability to control or influence these outcomes?*** *Please circle a score from 1 to 5 where 1 indicates no confidence in your ability to control / influence these outcomes and 5 indicates complete confidence.*

Developing high blood pressure



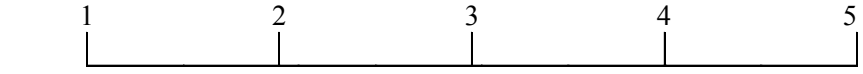
No Confidence Complete Confidence

Becoming overweight or obese



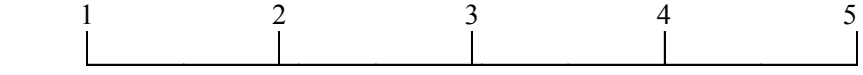
No Confidence Complete Confidence

Having a healthy heart well into old age



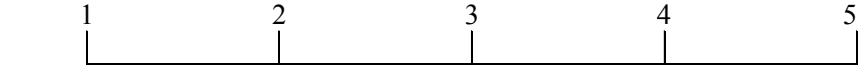
No Confidence Complete Confidence

Having normal cholesterol levels



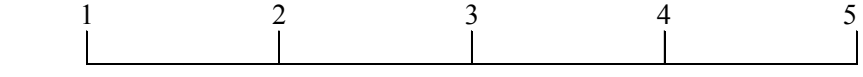
No Confidence Complete Confidence

Having a heart attack



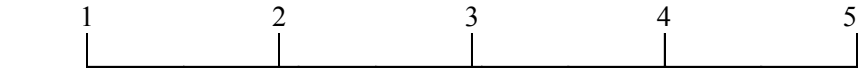
No Confidence Complete Confidence

Dying from a heart attack



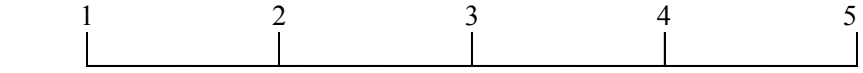
No Confidence Complete Confidence

Maintaining a healthy heart



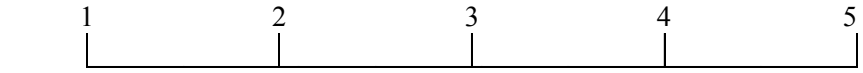
No Confidence Complete Confidence

Engaging in regular exercise



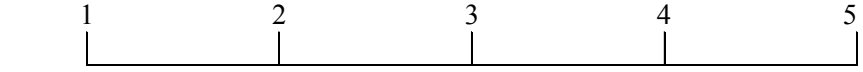
No Confidence Complete Confidence

Maintaining a good social support network



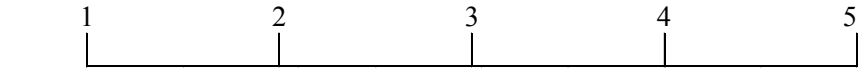
No Confidence Complete Confidence

Suffering from depression



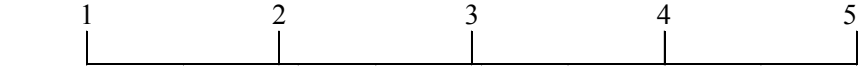
No Confidence Complete Confidence

Having an angina attack



No Confidence Complete Confidence

Refraining from smoking



No Confidence Complete Confidence

Appendix C: Essay information

Road scenario condition

'Neutral information'

The following information has been created to develop a new leaflet about Queensland (QLD) road practices. We would therefore like to know what you think of this information! Please read the following paragraphs and then answer the questions that follow:

The Queensland Department of Main Roads looks after 33, 535kms of roads. These roads carry 70% of the state's traffic. They also look after almost 3000 bridges and 4000 major culverts. The rest of QLD roads are controlled by local governments, including Aboriginal and Torres Strait Islander district councils. Our roads are worth about $35 billion. Over the next 5 years Main Roads will deliver more than $16 billion in road building projects. This road building program consists of 2500 projects. Upgrades on the Bruce and Flinders Highways are part of this program.

Patterns in the use of transport have changed in QLD. In a 3 year period from 2000 to 2003 the number of people who used private vehicles to go to work or study decreased. As a result, the number of people who used public transport to go to work or study increased by 30%. There are fairly low rates of public transport use among people living in households with two or more cars. Most people (70%) without a registered vehicle use public transport for their usual journey to work or study.

Women of all ages are more likely than men to use public transport for their usual journey. About 23% of women use public transport compared to 16% of men. Also, younger people are more likely than older people to use public transport. The bulk of people who use public transport believe it is more convenient, comfortable and cheaper. However, convenience and comfort are also reasons why people choose to use their own vehicles.

The number of registered vehicles in QLD is rising. In 2009, over 3 million vehicles had been registered across the state. Queensland registrations account for 20% of all registrations in the country. Queensland also has the strongest growth in the amount of households with 2 or more vehicles. Motor vehicle sales in QLD account for almost 20% of all those sold in the country. The northern region's part in this is relatively low compared to more urban areas.

Source: Queensland Transport website (www.tmr.qld.gov.au)

‘Risk information’

The following information has ALSO been created to develop a new leaflet about Queensland road practices. We would therefore like to know what you think of this information! Please read the following paragraphs and then answer the questions that follow.

In 2009, Queensland’s road toll was 331 deaths. This equals a rate of 7.51 fatalities per 100,000 population. This alarming figure is 9.3% greater than the overall Australian rate. In particular, rural and remote areas such as the Townsville region are significantly over represented in road related fatality and injury. The chance of being killed on these roads is 4 times greater than urban areas. The recent death of a driver in the area has brought the Northern region road toll above 30 deaths. So why are so many crashes occurring on our roads?

To begin with, drink driving is one of the major killers on Queensland roads – contributing to over 100 fatalities each year. The crash risk of a driver with a BAC of 0.10 is almost five times that of a driver with no alcohol in their system. In a 6 year period to the end of June 2009, almost 1 in 4 of all road fatalities were the result of crashes involving a drink driver. As a result 3 million random breath tests will be conducted this year. If you drink and drive, you will be caught, one way or another.

Speeding is also a major killer on QLD roads, contributing to 26% of fatalities. In a 60km/hr speed limit area, your risk of dying in a car crash doubles with each 5km/hr increase in travelling speed. Speeding is no accident – you kill, you maim, you disable, you disfigure. There are no positives, just nightmares. If you exceed the limit by any amount… expect the worst.

Fatigue is also a silent killer on our roads. All motorists need to wake up to the warning signs of fatigue. These include yawning, heavy eyes, blurred vision and reduced concentration. In 2008, fatigue contributed to 44 deaths on QLD roads. So, rest up by taking breaks every 2 hours or Rest in Peace. Lastly, not wearing a seatbelt accounts for around 30 deaths and 250 hospitalizations each year in QLD. If you choose not to wear them, you choose to wear the cost.

Source: Queensland Transport website (www.tmr.qld.gov.au)

CHD scenario condition

'Neutral information'

The following information has been created to develop a new leaflet about heart health. We would therefore like to know what you think of this information! Please read the following paragraphs and then answer the questions that follow.

The Heart Foundation of Australia has been an independent charity for fifty years. Their aim is for Australians to have the best heart health in the world. Volunteers and staff have been involved in the work of the Heart Foundation since it began in 1959. In 1961 the Heart foundation set up the first heart assessment centre. This work saw thousands of Australians live happy and healthy lives. By 1974 when the Heart Foundation began handing over their services to government health groups, it had helped 15, 000 heart patients.

The Heart Foundation helps people with, and at risk of, heart disease by giving information and guidance on how to reduce their risk. Every year, they distribute more than 1.3 million heart health brochures. Their information service and website also give heart health information to thousands of Australians each year. As a result, many health projects have been set up and established. For example, in 1968 the idea of a one week public awareness campaign was launched. Heart Week has now been running for more than four decades.

In 1983, Jump Rope for Heart was launched in Australian schools to get children to be more active. Since then, over 8 million children have learnt about exercise and heart health through this program. Another program was the launch of their information service, Heartline in 1998. They provide free information on any heart health issue. Over the years it has grown from 50 calls a day to 350 calls a day. Trained professionals will answer any of your questions.

In 1989 the foundation launched their most recognised program. The Tick program helps shoppers make healthier food choices. For example, a tick approved pizza has a third of the salt and saturated fat of other pizzas. It also gives you 80% of your daily fibre needs. This year the Heart Foundation is funding more than 150 research projects around Australia. Along with funding partners, the Heart Foundation will invest $8.1 million towards heart research to improve the lives of Australians.

Source: Heart Foundation website (www.heartfoundation.org.au)

‘Risk information’

The following information has ALSO been created to develop a new leaflet about heart health. We would therefore like to know what you think of this information! Please read the following paragraphs and then answer the questions that follow.

Coronary Heart Disease (CHD) is the leading cause of death in Australia, causing 34% of all deaths in 2008. If you have CHD the blood vessels that carry oxygen and nutrients to your heart are clogged and narrowed. When these vessels become too clogged, the blood supply to your heart is greatly reduced. If a blood clot forms in the narrowed artery you can have a heart attack. The blockage can cause severe chest pain and death of the heart muscle.

There is no single cause for CHD but there are things you do that greatly increase your chance of developing it. Unhealthy eating, not enough physical activity and smoking will cause CHD. For example, eating fast foods can lead to overweight and obesity. People who have excess body fat — especially around the waist — are more likely to develop heart disease even if they have no other risk factors. Approximately 54% of adults in Australia are overweight or obese. A waist measurement of greater than 94cm for men or 80cm for women is an indicator of the internal fat deposits, which coat the heart, kidneys, liver and pancreas. This increases your risk of CHD.

Almost 55% of Australian adults do not exercise enough. Sedentary people can not run away from CHD. If you are one of these people your risk of death from CHD is doubled. Smoking is also a major risk factor for heart disease. It reduces the amount of oxygen in your blood and damages artery walls. If you are a regular smoker or are exposed to second hand smoke your risk of developing CHD is 4 times that of non-smokers.

All of these factors cause premature death from CHD. These bad habits combined can age you by 14 years. Among Australians having a heart attack, about 25% die within an hour of their first ever symptoms. Over 40% will be dead within a year. CHD kills 1 Australian every 10 minutes and prevents 1.4 million people from living a full life because of disability caused by the disease. CHD affects 2 out of 3 Australian families.

Source: Heart Foundation website (www.heartfoundation.org.au)

Appendix D: Distractor task

Thinking about the information you have just read, please indicate your agreement with the following statements by ticking the appropriate box:

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. The information was bland					
2. I found the information concerning					
3. The information was new to me					
4. The information made me feel anxious					
5. The information was surprising to me					
6. The information was threatening to me					
7. The information was appealing					
8. The information made me feel unsafe					
9. The information made me feel uncomfortable					
10. The information made me want to know more					
11. I found the information overwhelming					
12. I found the information interesting					
13. I found the information confusing					
14. The information made me feel restless					
15. The information made me feel agitated					
16. The information was informative					
17. The information made me feel indifferent					
18. The information made me feel angry					
19. I found the information distressing					
20. The information was clear and concise					
21. The information was boring					
22. The information made me feel relaxed					

Appendix E: Recall task

Road scenario condition

Recall task for 'Neutral information'

Earlier, you were asked to read some information regarding Queensland (QLD) road practices. The following questions are about that information. Please answer the following by circling your answer.

1. Queensland Main Roads look after how many kilometres of roads?
   - (a) 20, 000 km
   - (b) 2 million km
   - (c) 33, 535 km
   - (d) 4000 km
2. The Queensland Department of Main Roads carries ____% of the state's traffic?
   - (a) 25%
   - (b) 70%
   - (c) 50%
   - (d) 90%
3. How many bridges do QLD Main Roads look after?
   - (a) 3000
   - (b) 4000
   - (c) 25
   - (d) 250
4. How much are Queensland roads worth?
   - (a) $35 billion
   - (b) $1 billion
   - (c) $16 billion
   - (d) $200 billion
5. Over the next 5 years how much will QLD Main Roads spend on road building projects?
   - (a) $35 billion
   - (b) $1 billion
   - (c) $16 billion
   - (d) $200 billion

6. How many road projects will the QLD Department of Main Roads implement over the next 5 years?

   (a) 250

   (b) 999

   (c) 2500

   (d) 4000

7. Which highways are included in the road project upgrades delivered by QLD Main Roads?

   (a) the Bruce highway

   (b) the Flinders highway

   (c) the Warrego highway

   (d) both the Bruce and Flinders highways

8. From 2000 to 2003 the number of people using private vehicles to go to work or study…

   (a) increased

   (b) decreased

   (c) stayed the same

   (d) decreased by 20%

9. From 2000 to 2003 the number of people using public transport to go to work or study…

   (a) increased by 30%

   (b) decreased by 30%

   (c) consistently stayed the same

   (d) dropped off due to safety concerns

10. How many vehicles had been registered across QLD in 2009?

    (a) 10% more than New South Wales

    (b) 1 million

    (c) the article did not specify how many

    (d) over 3 million

11. Which of the following is true?

    (a) QLD has the strongest growth in the amount of households with 2 or more vehicles

    (b) QLD has the weakest growth in the amount of households with 2 or more vehicles

    (c) Motor vehicle sales in QLD were the highest in the country

    (d) None of the above are true

12. Motor vehicle sales in QLD accounted for ____% of all vehicles sold in Australia?

(a) 50%

(b) 20%

(c) 28%

(d) 12%

Recall task for 'Risk information'

Earlier, you were asked to read some information regarding Queensland (QLD) road practices. The following questions are about that information. Please answer the following by circling your answer.

1. How many deaths were there on QLD roads in 2009?

   (a) 105

   (b) 250

   (c) 331

   (d) 1000

2. What was the fatality rate per 100, 000 people in QLD last year?

   (a) 9.3

   (b) 7.51

   (c) 4

   (d) 26

3. How much higher is the QLD rate than the overall national rate?

   (a) 9.3%

   (b) 7.51%

   (c) 26%

   (d) It is not higher than the overall national rate

4. In rural and remote areas such as the Townsville region you are ___ times more likely to be killed on the road.

   (a) 8

   (b) 16

   (c) 25

   (d) 4

5. How many deaths does drink driving cause in QLD each year?

   (a) 25%

   (b) 11%

   (c) over 100 deaths

   (d) over 50 deaths

6. How many random breath tests will be conducted this year?

   (a) 100 every week

   (b) 1.5 million

   (c) 3 million

   (d) none of the above

7. Finish this phrase: If you drink and drive_____

   (a) your friends will ditch you

   (b) you will die

   (c) you kill, you maim, you disable, you disfigure

   (d) you will be caught, one way or another

8. How much of the Queensland road toll is due to Speeding?

   (a) about 50 cases in the last year

   (b) 26%

   (c) it's hard to say because it also occurs with drink driving

   (d) 31%

9. Complete the following sentence. In a 60 km / hr speed limit area, your risk of dying in a car crash….

   (a) triples with each 5km / hr increase in travelling speed

   (b) doubles with each 5 km / hr increase in travelling speed

   (c) triples with each 10 km / hr increase in travelling speed

   (d) doubles with each 10 km / hr increase in travelling speed

10. In 2008, fatigue contributed to ____ deaths on QLD roads?

   (a) 44 deaths

   (b) 30%

   (c) There is no data available on fatigue

   (d) 18%

11. How often should you take breaks when driving?

    (a) every 2 hours

    (b) as soon as your vision becomes fuzzy

    (c) every 3 hours

    (d) at every rest stop

12. How many hospitalizations occur every year in QLD due to people not wearing a seat belt?

    (a) about 15% of all crashes

    (b) 250

    (c) about 25% of all crashes

    (d) 2500

Appendix F: Measure of optimism

Please indicate your agreement with the following statements, by marking the appropriate box on the right.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. In uncertain times, I usually expect the best.					
2. It's easy for me to relax.					
3. If something can go wrong for me, it will.					
4. I'm always optimistic about my future.					
5. I enjoy my friends a lot.					
6. It's important for me to keep busy.					
7. I hardly ever expect things to go my way.					
8. I don't get upset too easily.					
9. I rarely count on good things happening to me.					
10. Overall, I expect more good things to happen to me than bad.					

Source: LOT- R (Scheier et al., 1994)

Appendix G: Social desirability scale

Please indicate which of the following statements APPLY TO YOU by circling Yes (Y) or No (N).

1. It is sometimes hard for me to go on with my work if I am not encouraged	**Y**	**N**
2. I sometimes feel resentful when I don't get my way	**Y**	**N**
3. On a few occasions, I have given up doing something because I thought too little of my ability	**Y**	**N**
4. There have been times when I felt like rebelling against people in authority even though I knew they were right	**Y**	**N**
5. No matter who I'm talking to I am always a good listener	**Y**	**N**
6. There have been occasions when I took advantage of someone	**Y**	**N**
7. I'm always willing to admit it when I make a mistake	**Y**	**N**
8. I sometimes try to get even rather than forgive and forget	**Y**	**N**
9. I am always courteous, even to people who are disagreeable	**Y**	**N**
10. I have never been bothered when people have expressed ideas very different from mine	**Y**	**N**
11. There have been times when I was quite jealous of the good fortune of others	**Y**	**N**
12. I am sometimes irritated by people who ask favours of me	**Y**	**N**
13. I have never deliberately said something that hurt someone's feelings	**Y**	**N**

Source: Marlowe –Crowne Social Desirability Scale, Short Form C (Reynolds, 1982)

Appendix H: Coping styles measure

These questions ask you to indicate what you generally do and feel when you experience stressful events. There are lots of ways to try to deal with stress. Obviously, different events bring out somewhat different responses, but think about what YOU usually do when you are under a lot of stress. Please respond to each of the following items by choosing one number for each, using the response choices listed below.

1 = I usually don't do this at all	2 = I usually do this a little bit
3 = I usually do this a medium amount	4 = I usually do this a lot

1. I turn to work or other activities to take my mind of things	
2. I concentrate my efforts on doing something about it	
3. I say to myself "this isn't real"	
4. I get emotional support from others	
5. I give up trying to deal with it	
6. I take action to try and make the situation better	
7. I refuse to believe that it has happened	
8. I say things to let my unpleasant feelings escape	
9. I get help and advice from other people	
10. I try to see it in a different light, to make it seem more positive	
11. I get comfort and understanding from someone	
12. I give up the attempt to cope	
13. I look for something good in what is happening	
14. I make jokes about it	
15. I do something to think about it less, such as going to the movies or watching TV	
16. I accept the reality of the fact that it happened	
17. I express my negative feelings	
18. I try to get advice or help from other people about what to do	
19. I learn to live with it	
20. I make fun of the situation	

Source: (Carver, 1997)

Appendix I: Items assessing risk and protective factors

Road scenario condition

This set of questions asks you how often you do certain actions while driving. When choosing your answer, think about your driving over the past 12 months, and mark the box that best represents how often you do the following.

	Never	Hardly ever	Occasionally	Quite Often	Frequently	Nearly all the time	Always
1. Run a red light							
2. Keep driving even though you are tired							
3. Do an illegal U-turn							
4. Keep driving if you want to talk on a hand-held mobile phone							
5. Reduce your usual speed when it's raining							
6. Turn right across a busy road even when there is a small chance of collision							
7. Exceed the speed limit on the highway							
8. Exceed the speed limit in a residential area							
9. Drive faster than 40km / hr in a school zone							
10. Pull out in a way where another driver has to change their speed							
11. Stop completely at a stop sign							
12. Stay a minimum of 3 seconds behind the vehicle ahead							
13. Make regular checks in your rear vision mirror							
14. Check your blind spot by turning your head and looking over your shoulder before steering							
15. Enter a level crossing when the lights are still flashing							

Please answer the following questions about yourself:

1. How old are you? _____yrs
2. Where do you live? (post code only) _____
3. How long have you had your licence? _____yrs
4. How many hours do you spend driving as a driver in the average week? _____hrs
5. Are you male or female? _____
6. Do you have access to any of the following vehicles for your own use? If so please circle those that apply. **CAR** **MOTORBIKE** **SCOOTER**
7. How many accidents have you been in as a driver? _____
8. How many accidents have you been in as a passenger? _____
9. Have you ever had an insurance claim made against you? Yes No
10. Have you ever lost your licence? Yes No

If you have ever had an accident, think of the most severe, and answer the following questions by circling yes or no.

Was anyone killed?	**Yes**	**No**
Was anyone injured and hospitalized?	**Yes**	**No**
Was anyone injured and treated at the scene?	**Yes**	**No**
Was any vehicle towed away?	**Yes**	**No**
Were you the driver?	**Yes**	**No**
Were you at fault?	**Yes**	**No**
Was someone else at fault?	**Yes**	**No**
Were you booked?	**Yes**	**No**
Was another driver booked?	**Yes**	**No**

CHD scenario condition

Please answer the following questions about yourself by circling the appropriate response or filling in the blanks:

Age: _____ yrs

Where do you live? (post code only) _____

What is your height? _____ cm

What is your weight? _____ kg

Sex: Male Female

Is there a history of heart disease in your family?

A. Yes – relatives such as cousins or uncles

B. No, or not to my knowledge

C. Yes – one or both of my parents

Are you overweight?

A. No, I'm about the right weight for my height, give or take a few kilos.

B. Yes, I'm obese and need to lose a lot of weight.

C. Yes, I could afford to lose a bit of weight.

If you *are* overweight, where do you tend to carry those extra kilos?

A. Around my stomach.

B. Around my hips

C. All over.

How often do you eat fatty foods like full cream dairy products, cakes, chips and fried foods?

A. Every day.

B. Around once per week or less.

C. Two or three times per week, on average.

Do you smoke cigarettes?

A. Yes, I smoke every day.

B. No, I don't smoke.

C. Sometimes, perhaps on the weekends or when socialising.

How much time in HOURS do you spend in an average week engaging in moderate intensity physical activity? Moderate intensity activity will cause a slight, but noticeable, increase in your breathing and heart rate. A good example of moderate intensity activity is brisk walking, that is at a pace where you are able to comfortably talk but not sing. Other examples include mowing the lawn, digging in the garden, or medium paced swimming or cycling.

_____ hrs

Do you have diabetes?

A. Yes, but I control it well.

B. Yes, but I don't manage it very well, or else I think I may have diabetes but haven't seen my doctor about it.

C. I don't have diabetes, according to my doctor at my last medical check up.

Have you ever been told that you have high blood pressure (hypertension) or have you ever been given blood pressure medication?

A. Yes

B. No

Have you ever been told that your cholesterol level is high?

A. Yes

B. No

What is your **Total** cholesterol level? If unknown, leave blank.

_____ mmol/L

What is your **HDL** ('good') cholesterol? If unknown, leave blank.

_____ mmol/L

What is your LDL ('bad') cholesterol? If unknown, leave blank.

_____ mmol/L

Do you usually eat fish two or more times per week?

A. Yes

B. No

Do you eat **5 or more servings of vegetables** per day? **One** serve of vegetables (75g) is equivalent to ½ cup cooked vegetables or legumes, or 1 medium potato, or 1 cup salad vegetables.

A. Yes

B. No

Do you eat **2 or more servings of fruit** per day? **One** serve of fruit (150g) is equivalent to 1 medium sized apple, or 1 cup canned or chopped fruit.

A. Yes

B. No

During a typical Monday to Thursday, on how many days do you consume alcohol?

_____days

How many servings of alcohol do you typically have during the period Monday to Thursday?
One serving is equivalent to one can of mid strength beer, or 100ml of wine or 30ml nip of spirits.

_____ serves

During a typical Friday to Sunday, on how many days do you consume alcohol?

_____days

How many servings of alcohol do you typically have during the period Friday to Sunday?
One serving is equivalent to one can of mid strength beer, or 100ml of wine or 30ml nip of spirits.

_____serves

Appendix J: Study 1 Ethics approval

This administrative form has been removed

Appendix K: Study 2 questionnaire

1. The following is a list of positive and negative behaviours. Think about these things happening to you. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO CONTROL OR INFLUENCE THESE BEHAVIOURS? Please indicate a score from 1 to 7 where 1 indicates no confidence in your ability to control / influence these outcomes and 7 indicates complete confidence.

	1 (no confidence)	2	3	4	5	6	7 (complete confidence)
Engaging in regular exercise							
Eating a healthy diet							
Eating a variety of fresh fruits and vegetables							
Refraining from smoking							
Limiting your alcohol intake							
Driving safely if driving while tired							
Driving over the speed limit							
Drinking 8 glasses of water daily							
Eating a diet high in fibre							
Limiting your soft drink intake							
Getting adequate sleep							
Having a good social support network							
Driving without talking on a mobile phone							
Driving without texting							
Maintaining a healthy heart							
Driving with a blood alcohol content over the legal limit							
Living a happy life							

2. The following is a list of health outcomes and life events. Think about these outcomes and events happening to you. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO CONTROL OR INFLUENCE THESE OUTCOMES? Please indicate a score from 1 to 7 where 1 indicates no confidence in your ability to control / influence these outcomes and 7 indicates complete confidence. Please also indicate if this event HAS HAPPENED to you by ticking the box.

	1 (no confidence)	2	3	4	5	6	7 (complete confidence)	Has happened to me
Getting the measles								
Getting the common cold								
Getting chicken pox								
Contracting influenza								
Getting tonsillitis								
Becoming overweight or obese								
Having unhealthy levels of cholesterol								
Developing high blood pressure								
Having raised blood sugar levels								
Being booked for speeding								
Being booked for drink driving								
Suffering from anxiety								
Suffering from depression								
Being diagnosed with Type 1 diabetes								
Developing Type 2 diabetes								
Developing coronary heart disease								
Having an angina attack								
Having a heart attack								
Having a stroke								
Having an aneurysm								
Winning the lottery								

	1(no confidence)	2	3	4	5	6	7 (complete confidence)	Has happened to me
Being booked for talking on a mobile phone while driving								
Being booked for texting while driving								
Having dengue fever								
Having Ross River virus								
Developing asthma								
Developing pneumonia								
Developing emphysema								
Developing lung cancer								
Getting a promotion at work								
Developing bowel cancer								
Developing kidney disease								
Getting kidney stones								
Getting gall stones								
Developing pancreatic cancer								
Being diagnosed with leukaemia								
Being involved in a car accident / crash								
Developing dementia								
Developing Huntington's disease								
Developing multiple sclerosis								
Developing arthritis								
Having a family								
Developing appendicitis								
Contracting chlamydia								

3. The following is a list of health outcomes and life events. Think about these outcomes and events happening to you. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO CONTROL OR INFLUENCE THESE OUTCOMES? Please indicate a score from 1 to 7 where 1 indicates no confidence in your ability to control / influence these outcomes and 7 indicates complete confidence.

	1 (no confidence)	2	3	4	5	6	7 (complete confidence)
Dying from a heart attack							
Dying from a stroke							
Dying from an aneurysm							
Going on an overseas holiday							
Dying from lung cancer							
Dying from pneumonia							
Dying from influenza							
Dying from emphysema							
Dying from bowel cancer							
Dying from kidney failure							
Dying from pancreatic cancer							
Dying in a car accident / crash							
Buying a home							
Dying from Huntington's disease							
Dying from multiple sclerosis							
Dying from leukaemia							
Dying from appendicitis							
Getting a raise in your salary							

4. Please list the following 10 illnesses or events from least controllable (1) to most controllable (10).

_____High cholesterol

_____High blood pressure

_____Type II diabetes

_____Gall stones

_____Car accident

_____Arthritis

_____Dementia

_____Bowel cancer

_____Coronary heart disease

_____Stroke

5. How old are you in years?

6. Please indicate your gender

7. Please enter your postcode below

8. Please indicate your highest level of education attained:

(a) Not completed year 10

(b) Completed year 10

(c) Completed year 12

(d) Completed trade qualification

(e) Completed undergraduate degree

(f) Other - please specify: _____

Appendix L: Study 2 Ethics approval

This administrative form has been removed

Appendix M: Study 3 questionnaire

1. The following statements reflect how you might FEEL about getting booked for a traffic offence. Please indicate the response that best reflects your FEELINGS.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel quite vulnerable to getting booked for a traffic offence.							
I am worried about getting booked for a traffic offence.							

2. The following questions ask you about your RISK of getting booked for a traffic offence. Please indicate the response that best represents your THOUGHTS.

	Extremely unlikely	Very unlikely	Unlikely	Neither likely or unlikely	Likely	Very likely	Extremely likely
How likely is it that you will get booked for a traffic offence in the next 3 years?							
How likely is it that you will get booked for a traffic offence in your lifetime?							

3. Please mark the box that represents the extent to which you disagree or agree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I am confident that I can protect myself against getting booked for a traffic offence.							
There are many things I can do to ensure I am not booked for a traffic offence.							

4. The following statements reflect how you FEEL about being involved in a car crash. Please indicate the response that best reflects your FEELINGS.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I feel quite vulnerable to being involved in a serious car crash.							
I am worried about being involved in a serious car crash.							
I am worried about dying in a serious car crash.							

5. The following questions ask you about your RISK of being involved in a car crash. Please indicate the response that best represents your THOUGHTS.

	Extremely unlikely	Very unlikely	Unlikely	Neither likely or unlikely	Likely	Very likely	Extremely likely
How likely is it that you will be involved in a serious car crash in your lifetime?							
How likely is it that you will die in a serious car crash?							

6. Please mark the box that represents the extent to which you disagree or agree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
I am confident that I can protect myself against being involved in a car crash.							
There are many things I can do to ensure I am not involved in a car crash.							
Dangerous driving has serious outcomes and can kill.							
Dangerous driving is more deadly than people realise.							

7. Each item below is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree to strongly agree. For each item we would like you to mark the box that represents the extent to which you disagree or agree with the statement. Please make sure that you answer every item.

	Strongly disagree	**Moderately disagree**	**Slightly disagree**	**Slightly agree**	**Moderately agree**	**Strongly agree**
Whether or not I get into a car accident depends mostly on shortcomings in my driving skills						
Whether or not I get into a car accident depends mostly on my own risk taking while driving						
Whether or not I get into a car accident depends mostly on shortcomings in other drivers' driving skills						
Whether or not I get into a car accident depends mostly on other drivers' risk taking while driving						
Whether or not I get into a car accident depends mostly on bad luck						
Whether or not I get into a car accident depends mostly on dangerous roads						
Whether or not I get into a car accident depends mostly on my speeding behaviour						
Whether or not I get into a car accident depends mostly on other drivers' speeding behaviour						
Whether or not I get into a car accident depends mostly on if I drive too close to the car in front						
Whether or not I get into a car accident depends mostly on other drivers driving too close to my car						
Whether or not I get into a car accident depends mostly on fate						
Whether or not I get into a car accident depends mostly on bad weather or lighting conditions						
Whether or not I get into a car accident depends mostly on a mechanical failure in the car						
Whether or not I get into a car accident depends mostly on other drivers driving under the influence of alcohol						
Whether or not I get into a car accident depends mostly on other drivers' dangerous overtaking						
Whether or not I get into a car accident depends mostly on my own dangerous overtaking						

8. The following is a list of positive and negative behaviours. Think about these things happening to you. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO CONTROL OR INFLUENCE THESE BEHAVIOURS? Please indicate a score from 1 to 7 where 1 indicates no confidence in your ability to control / influence these outcomes and 7 indicates complete confidence.

	1 (no confidence)	**2**	**3**	**4**	**5**	**6**	**7 (complete confidence)**
Driving to the speed limit							
Driving without using a mobile phone							
Ensuring you are not tired when driving							
Refraining from drinking and driving							
Driving over the speed limit							
Being distracted by a mobile phone whilst driving							
Driving safely if driving while tired							
Driving with a blood alcohol content over the legal limit							

9. The following is a list of positive and negative events. Think about these events happening to you. HOW CONFIDENT ARE YOU IN YOUR ABILITY TO CONTROL OR INFLUENCE THESE OUTCOMES? Please indicate a score from 1 to 7 where 1 indicates no confidence in your ability to control / influence these outcomes and 7 indicates complete confidence.

	1 (no confidence)	**2**	**3**	**4**	**5**	**6**	**7 (complete confidence)**
Being booked for a traffic offence							
Being booked for speeding							
Being booked for drink driving							
Being booked for using a mobile phone while driving							
Being involved in a car crash							
Dying in a car crash							
Having a crash as the driver at fault							

The following information has been taken from Australian road safety advertising. We are interested in knowing your thoughts about this information. Please read the following paragraphs before moving on to the next page.

Almost everyone has been fined for a traffic offence at some stage. Recently, over 50,000 fines were issued for speeding during a two week period in QLD. Over the next few months police will be heavily patrolling metropolitan, rural and regional roads targeting those who drive dangerously. Penalties include fines, licence sanctions and driving disqualifications. In some cases you can have your vehicle impounded or face imprisonment.

Your behaviour on the road is responsible for these outcomes. High profile policing will ensure you get caught. Police will be conducting highly visible operations, along with mobile unmarked tactics. If you break the road rules you could be booked at any time. You won't know where or when. Even if you think you can avoid a police patrol, there are many fixed cameras in new locations that will spot you. For example, there are over 4000 fixed speed cameras operating in QLD.

Speeding offences will be the main target. Police have lowered their tolerance margins but will not be revealing what they are. Therefore, if you are even 1km/hr over the speed limit you are speeding. Penalties will be issued on the spot. The minimum fine for speeding is $146 and 1 demerit point. Higher speeds will mean greater fines and more demerit points. If you are driving between 13km/hr to 20km/hr more than the speed limit you will be fined $220 and 3 demerit points.

Dangerous driving and inattention will also be targeted. It is illegal to use a hand held mobile phone while driving. The fine for this is $330 and 3 demerit points. Plain clothes spotters will be on the lookout for mobile phone offences. Police will also be stepping up RBT operations to catch drink drivers. Over 3 million RBTs will be conducted in QLD over the next year. Even if you are a little bit over, you will face penalties. If you are caught drink driving, you will go to court.

10. *Thinking about the information you have just read, please indicate your agreement with the following statements by ticking the appropriate box:*

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
The information was new to me					
The information made me feel anxious					
The information was threatening to me					
The information made me feel unsafe					
The information made me feel uncomfortable					
I found the information overwhelming					
I found the information interesting					
I found the information confusing					
The information made me feel restless					
The information was informative					
The information made me feel indifferent					
I found the information distressing					
The information was clear and concise					
The information was boring					
The information made me feel relaxed					

11. Earlier in this survey you were asked to read some information about road safety. The following questions are about that information. Please answer the following by marking your answer.

According to the article, how many fines were issued in a 2 week period in QLD recently?

a) Around 5000
b) Around 4000
c) Over 40, 000
d) Over 50, 000

For what offence/s were these fines issued?

a) Dangerous driving
b) Drink driving
c) Parking penalties
d) Speeding

What kinds of areas will police be patrolling in the coming months?

a) Metropolitan, rural and regional roads
b) Highways
c) Highways and intersections
d) Heavily populated urban areas

How many fixed speed cameras are there operating in QLD?

a) Over 5000
b) Over 50, 000
c) Over 4000
d) Over 40, 000

Finish this phrase: "Police have lowered tolerance margins…."

a) By more than ever before
b) By an extra 1km / hr
c) But will not be revealing what they are
d) None of the above

What is the minimum fine for speeding stated in the article?

a) $146 and 1 demerit point
b) $186 and 1 demerit point
c) $120 and 2 demerit points
d) $160 and 2 demerit points

If you are driving 15km / hr more than the speed limit, how many demerit points will you be issued?

a) 2 demerit points
b) 0 demerit points
c) 3 demerit points
d) 1 demerit point

If you are driving between 13 – 20 km / hr over the speed limit, what will your fine be?

a) $180
b) $146
c) $220
d) $250

What kinds of police operations will be specifically targeting mobile phone offences?

a) Plain clothes spotters
b) Mobile marked operations
c) Members of the public calling offender hotlines
d) The article did not specify

What is the fine for using a hand held mobile while driving?

a) $220 and 3 demerit points
b) $330 and 3 demerit points
c) $180 and 2 demerit points
d) $195 and 2 demerit points

How many RBTs will be conducted in QLD over the next 12 months?

a) Over 2 million
b) Over 3 million
c) Over 200, 000
d) Over 300, 000

If you are caught drink driving, what will happen to you?

a) You will injure another person
b) You will go to jail
c) You will go to court
d) You will be issued a minimum fine of $800

The following information has been taken from Australian road safety advertising. We are interested in knowing your thoughts about this information. Please read the following paragraphs before moving on to the next page.

Almost everyone has, at some stage, been affected by a road crash. On average, 4 people are killed and 90 are seriously injured every day on Australia's roads. Road crashes destroy lives, families and communities yet the carnage continues. In particular, rural and remote areas are significantly over represented in road related fatality and injury. The chance of being killed on these roads is 4 times greater than urban areas. So why are there so many crashes occurring on our roads?

There are things you do that greatly increase your chances of having a road crash. Speeding is one of the biggest contributors. In a 60km/hr speed limit area, your risk of dying in a car crash doubles with each 5km/hr increase in travelling speed. The faster you drive, the harder you hit. Driver distraction and inattention are also major contributors responsible for 33% of fatal crashes. Distracted drivers are dangerous drivers. If you eat while you drive you could end up taking your meals through a straw. If you are on the phone, get off the road. You don't want your life destroyed by a text message.

Fatigue is also a silent killer on our roads as drivers refuse to take recommended breaks. All motorists need to wake up to the warning signs of fatigue. These include yawning, heavy eyes, blurred vision and reduced concentration. Remember, the risk of a fatal fatigue crash is highest between 10pm and 6am.

Lastly, drink driving is one of the major killers on our roads – responsible for around 25% of all road deaths. If you are just over, you are just as guilty. The crash risk of a driver with a Blood Alcohol Level of 0.08 is 7 times that of a driver with no alcohol in their system. Drunk drivers who are involved in fatal crashes are 3 times more likely to have been speeding or not wearing a seatbelt than sober drivers.

12. Thinking about the information you have just read, please indicate your agreement with the following statements by ticking the appropriate box:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
The information was new to me					
The information made me feel anxious					
The information was threatening to me					
The information made me feel unsafe					
The information made me feel uncomfortable					
I found the information overwhelming					
I found the information interesting					
I found the information confusing					
The information made me feel restless					
The information was informative					
The information made me feel indifferent					
I found the information distressing					
The information was clear and concise					
The information was boring					
The information made me feel relaxed					

13. Once again, you were asked to read some information about road safety. The following questions are about that information. Please answer the following by marking your answer.

According to the article, how many people are killed daily on Australian roads?

a) 4
b) 5
c) 90
d) 120

How many people are injured daily on Australian roads?

a) 5
b) 4
c) 120
d) 90

In rural and remote areas you are ___ times more likely to be killed on the road compared to urban areas?

a) 16
b) 8
c) 4
d) 2

Complete the following sentence: "In a 60km / hr speed limit area, your risk of dying in a car crash..."

a) Triples with each 5km/ hr increase in travelling speed
b) Doubles with each 5 km / hr increase in travelling speed
c) Triples with each 10 km / hr increase in travelling speed
d) Doubles with each 10 km / hr increase in travelling speed

Driver distraction and inattention are responsible for how many deaths on our roads?

a) 33%
b) More than half
c) There is no data available on this
d) 26%

Finish the following sentence: "You don't want your life destroyed by…"

a) Speed
b) A text message
c) A drunk driver
d) Distraction

What are the warning signs of fatigue?

a) Blurred vision
b) Reduced concentration
c) Yawning and heavy eyes
d) All of the above

At what time is crash risk highest for fatigued drivers?

a) Between 6pm and 10am
b) Between 7pm and 1am
c) Between 10pm and 6am
d) Between 1am and 7am

Finish this sentence: "All motorists need to…"

a) Wake up to the warning signs of fatigue
b) Understand that drink driving is never ok
c) Wake up to the dangers of distraction
d) Understand that speeding kills your driving skills

According to the article, drink driving is responsible for how many road deaths?

a) 25% of all road deaths
b) 30% of all road deaths
c) Over 500 deaths per year
d) The article did not specify

Finish the following sentence: "If you are just over…"

a) You can risk your life
b) You will be caught one way or another
c) You can kill, maim and disable
d) You are just as guilty

What is the crash risk of a driver with a blood alcohol level of 0.08?

a) Twice that of a driver with no alcohol in their system
b) 3 times greater than a driver with no alcohol in their system
c) 7 times greater than a driver with no alcohol in their system
d) 10 times that of a driver with no alcohol in their system

14. Please indicate your agreement with the following statements, by marking the appropriate box on the right.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
In uncertain times, I usually expect the best.					
It's easy for me to relax.					
If something can go wrong for me, it will.					
I'm always optimistic about my future.					
I enjoy my friends a lot.					
It's important for me to keep busy.					
I hardly ever expect things to go my way.					
I don't get upset too easily.					
I rarely count on good things happening to me.					
Overall, I expect more good things to happen to me than bad.					

15. These questions ask you to indicate what you generally do and feel when you experience stressful events. There are lots of ways to try to deal with stress. Obviously, different events bring out somewhat different responses, but think about what YOU usually do when you are under a lot of stress. Please respond to each of the following items by choosing one number for each, using the response choices listed below.

1 = I usually don't do this at all	2 = I usually do this a little bit
3 = I usually do this a medium amount	4 = I usually do this a lot

I concentrate my efforts on doing something about it	
I say to myself "this isn't real"	
I give up trying to deal with it	
I take action to try and make the situation better	
I refuse to believe that it has happened	
I give up the attempt to cope	
I try to come up with a strategy about what to do	
I think hard about what steps to take	

16. This set of questions asks you how often you do certain actions while driving. When choosing your answer, think about your driving over the past 12 months, and mark the box that best represents how often you do the following.

	Never	Hardly ever	Occasionally	Quite Often	Frequently	Nearly all the time	Always
Run a red or yellow light							
Keep driving even though you are tired							
Do an illegal U-turn							
Keep driving if you want to use a hand-held mobile phone							
Exceed the speed limit on the highway							
Exceed the speed limit in a residential area							
Drive faster than 40km / hr in a school zone							
Stop completely at a stop sign							
Stay a minimum of 3 seconds behind the vehicle ahead							
Drive after drinking alcohol							

17. Please answer the following questions about yourself:

How old are you? _____yrs

Where do you live? (postcode only) _____

How long have you had your licence? _____yrs

How many hours do you spend driving as a driver in the average week? _____hrs

Please indicate your gender _____

What is your highest level of education attained?

(a) Not completed year 10

(b) Completed year 10

(c) Completed year 12

(d) Completed trade qualification

(e) Completed undergraduate degree

(f) Other - please specify: _____

Do you have access to any of the following vehicles for your own use? If so please circle those that apply. **CAR** **MOTORBIKE** **SCOOTER**

Have you ever been booked for a traffic offence? Yes No

If you have been booked for a traffic offence: Please specify the offence / s by ticking those that apply

(a) Speeding

(b) Using a mobile phone

(c) Running a red or yellow light

(d) Performing an illegal turn

(e) Failing to Stop or Give Way

(f) Drink driving

(g) Fatigued driving

(h) Other please specify _____

How long ago did the MOST RECENT offence occur?

(a) Less than 6 months

(b) 6 to 12 months ago

(c) 1 to 3 years ago

(d) 3 to 5 years ago

(e) More than 5 years ago

(f) I've never been booked for a traffic offence

How many accidents have you been in as a driver? _____

How many accidents have you been in as a passenger? _____

Have you ever had an insurance claim made against you? Yes No

Have you ever lost your licence? Yes No

If you have ever had an accident, think of the most severe, and answer the following questions by circling yes or no.

Was anyone killed?	**Yes**	**No**
Was anyone injured and hospitalised?	**Yes**	**No**
Was anyone injured and treated at the scene?	**Yes**	**No**
Was any vehicle towed away?	**Yes**	**No**
Were you the driver?	**Yes**	**No**
Were you at fault?	**Yes**	**No**
Was someone else at fault?	**Yes**	**No**
Were you booked?	**Yes**	**No**
Was another driver booked?	**Yes**	**No**

Appendix N: Study 3 Ethics approval

This administrative form has been removed