

CONTRACT REPORT

Development of Messages to Address
Young Drivers' Risk Taking Behaviours

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for NRMA-ACT Road Safety Trust

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SUMMARY

Introduction

Previous work by ARRB Group (ARRB) has found that the frequency of engaging in risky driving behaviours had increased for young male drivers since obtaining a provisional licence. The main reason for this was that no negative consequences had been experienced in relation to the risky behaviours, so they were perceived as less risky, especially as experience in engaging in the behaviour without negative consequences increased. Research has shown that risk taking behaviour in young drivers contributes to crash risk. If young drivers can be convinced that particular risky driving behaviours are in fact risky, they could be expected to engage in such behaviours less often, leading to a decrease in young driver crashes.

The aim of the current project was to investigate factors that influence risk taking by young drivers and develop prototype road safety messages to address risky driving behaviours. The main behaviours examined were speeding, mobile phone use and tailgating. This included an investigation of situational, emotional, peer group, confidence and other factors, as well as risk taking models and relevant behaviour change theories. Prototype road safety messages were developed for speeding, mobile phone use and tailgating.

Method

A literature review on models and theories of risk taking and behaviour change, factors influencing young driver risk taking while driving, and communication/message development theories and principles was undertaken. The information was consolidated to provide guiding principles for message development. These guiding principles were used during a workshop to develop prototype messages. The overall aim was to develop prototype messages that were either slogans, content for an advertisement or resource, or for use in face-to-face educational sessions for speeding, mobile phone use and tailgating.

Models and Theories of Risk Taking and Behaviour Change

Eighteen risk taking and behaviour-change models/theories were reviewed. Some of the principles to achieve maximum effectiveness in reducing the frequency of risky driving behaviour derived from the review include:

- Explain that if risky driving leads to adverse consequences, the consequences will be severe.
- Offer incentives for safe behaviour as well as punishments for risky behaviour.
- Illustrate societal, familial and peer disapproval of risky driving behaviour.
- Recommend alternative, non-risky behaviours.
- Show respected or influential others (e.g. parents, peers) modelling non-risky alternative behaviours.
- Demonstrate the feasibility of the non-risky alternative behaviours.
- Provide messages tailored to various stages of change (contemplating, planning, acting, etc.).
- Consider for high-sensation seekers that risk taking behaviours without negative outcomes, lowers risk appraisal.
- Use a high-fear message, where severe consequences and a high probability of occurrence are to produce stronger intentions to remain 'abstinent' (in relation to the behaviour being targeted) than a low-fear message.
- Remove barriers to non-risky behaviours.

- Provide information on how the advantages of performing the behaviour outweigh the disadvantages (costs, anticipated negative outcomes).
- Address the motives underlying risk taking behaviours.
- Teach skills to enable non-risky behaviours.

Factors Influencing Risk Taking While Driving

The factors affecting risk taking behaviours among young drivers were reviewed. The research indicated that risk taking behaviours do not occur in isolation and a large number of factors are responsible. Factors that may influence risk taking include:

- Psychosocial maturation and gender. Young males take more risks than young females and lower psychosocial maturation is linked to higher risk taking, e.g. not being married, less financial independence, being less capable in adult roles etc.
- Lifestyle factors such as high levels of antisocial behaviour, lower level of education and using the car itself as a venue in which to socialise.
- Cigarette use, alcohol misuse/binge drinking, substance availability, marijuana use and parental modelling of and permissive attitudes toward substance use.
- Peer influences associated with an increased proneness to problem behaviours as is negative role modelling from parents (i.e. showing unsafe behaviours) and broad socialisation (i.e. few restrictions on adolescent behaviour).
- Personality factors, general attitudes, behaviours and anti-social behaviours such as thrill or sensation seeking, impulsivity, hostility/aggressive tendencies, emotional instability, depression, anti-social behaviour and belief that external factors influence behaviour (rather than oneself).
- Self-assessment and optimism bias whereby younger drivers generally overrate their skills and safety compared to older drivers.

Message Development

A selection of important principles for consideration during message development are listed below. Not all of these principles can be satisfied by a single message, but all should be considered in the design of the overall campaign, which may use a number of messages.

Source:

- The source should be credible, knowledgeable, trustworthy and unbiased.
- The source should be similar to the audience, hold similar opinions, be likeable and physically attractive.

Delivery:

- Repeat the message.
- Use more than one delivery channel (TV, radio, newspapers, billboards, pamphlets, newsletters, websites, email, instant messaging, text messaging etc.).
- Messages should reach the recipient at a time when they are able to respond.
- Deliver the message when the audience is not distracted.
- Accompany the communication campaign with other actions to encourage behaviour change (e.g. enforcement).

Style:

- Avoid lecturing.

- Educational messages must be made entertaining.
- The message must obtain and hold the interest of the audience.
- The message must be easy to understand and not too complicated.
- Sensation-style messages should use drama, surprise, novelty and strong emotional appeal.
- Non-sensation-style messages should stress peer resistance and low sensation value.

Customisation:

- The message must be personally relevant to and understandable by the recipient. (If not, use emotional appeals.)
- Build on the audience's pre-existing knowledge, beliefs, motivations and values.
- Segment the audience by beliefs and attitudes before developing messages and create different messages suited to different sub-populations.
- Avoid exaggeration that would reduce personal relevance.
- Use sensational messages promoting alternative behaviours when targeting sensation seekers.
- Use low-sensation messages promoting avoidance skills when targeting non-sensation seekers.

Mode of action:

- Aim for persuasion rather than education.
- Use a two-sided message, i.e. acknowledge the person's positive perceptions of the negative behaviour, so the message is less likely to be refuted. For example, 'although smoking is enjoyable it causes cancer'.
- State the specific behaviour change required. Avoid generalities.
- Strong fear messages may be rejected by the audience unless they:
 - can be shown to be relevant to the audience (it must believe the threat is severe and they are susceptible to the risk)
 - include an action the audience can take to avoid the negative behaviour.
- Change beliefs that impede adoption of desired behaviours.
- Demonstrate the immediate, high-probability benefits of the desired behaviour.
- Focus on immediate rewards rather than distant costs.
- The message should focus on a single behaviour to change.
- Establish disapproval of the risky behaviour.
- Encourage the audience to question the benefits of the risky behaviour.
- Stimulate self-assessment by the audience.
- Explain the enforcement and legal consequences of the risky behaviour.
- Use mnemonics (formula or rhymes to assist remembering) when presenting information.
- Incorporate evidence, examples and reasoning.
- Alleged costs and benefits must be credible.
- When messages are simple and familiar, use graphics to attract attention, but when messages are new or complex, simplify the presentation.
- For audio messages, use multiple voices, concrete language and chronological presentation of information.

- Use positively-framed messages:
 - when promoting cautious or preventative behaviours (ensure information on how to perform a task correctly is provided)
 - when audience attention is limited
 - when there is low relevance or the issue is unfamiliar
 - targeting low or high-risk situations
 - when focusing on consequences for others
 - targeting males.
- Use negative messages:
 - when ‘grabbing attention’ and providing a ‘top-up’ of fear
 - when there is high relevance and high risk to the audience
 - when focusing on consequences for self
 - targeting females.
- Use indirect appeals such as humour once the issue is familiar.
- Avoid positive emotion if an issue is strongly associated with negative emotion.

Prototype Messages to Address Speeding, Mobile Phone Use and Tailgating

The guiding principles for message development were applied in a workshop. The workshop team aimed to develop different types of prototype messages e.g. slogans, advertisements, resource content and information for face-to-face educational sessions. However, the main ideas that resulted from the workshop, once the message content ideas were discussed for each behaviour, were narrative or story-based with some slogans. Five prototype messages were developed for low-level speeding, six for extreme speeding, three for hand-held mobile phone use and two for tailgating. A message example for low-level speeding appears below.

Message example: Avoiding a fine

A speeding young driver named ‘Pete’ could feature in a range of scenarios (similar to the naming concepts of ‘Lucky Phil’ and ‘Don’t be a Wally with Water’ in other advertising material). Pete could appear in a number of different advertisements showing the different consequences of speeding – damaging his car, being fined, being delayed by being pulled over by police, having his friends refuse to get in the car when he is driving, losing his licence, losing his job etc. One scenario is:

- A good driver is driving on the freeway with his girlfriend in the front passenger seat. A P-plater speeds past in a distinctive car. Good driver says to girlfriend ‘Isn’t that Pete? He must be in a hell of a hurry to get somewhere.’ Further down the freeway they round a corner and there is Pete at the side of the road having been pulled up by police in an unmarked car (with lights flashing). Girlfriend says to good driver ‘Looks like Pete’s going to be late today.’

Potential Slogan

‘Stick to the speed limit. Let Pete get the fine’.

Rationale

This message shows the positive consequences of the correct behaviour as well as the negative consequences, including time delay, of the speeding behaviour.

Conclusions and Recommendations

Influencing young driver risk taking behaviours is not an easy task. The research in risk taking theories and other relevant behaviour-change models indicated it is important to illustrate in messages to young drivers the costs of risky behaviours, benefits of desired behaviours, a minimisation of any costs of desired behaviours, the feasibility of desired behaviours and strategies to perform the desired behaviours.

The factors that affect young drivers' perceptions of risk and reasons for engaging in risk taking behaviours ranged from gender, beliefs, attitudes, lifestyle factors, personality factors to self-assessment and optimism bias. Message development models and general factors to consider during message development illustrated there are a large number of principles to consider during this process. This provides quite a challenge for the message developer.

It is recommended that a second stage of research is commissioned to review the prototype messages, select the most promising and undertake further refinement. Once this process has occurred, the final messages would be focus tested with suitably identified subgroups of young drivers. A further round of refinement may be required following focus testing.

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1 INTRODUCTION

1.1 Background

The NRMA-ACT Road Safety Trust commissioned two research projects on young drivers and risk taking, which were published by ARRB in 2005:

- *Understanding risk taking by young male drivers* (Styles et al. 2005).
- *Young drivers: Who takes risks and why?* (Catchpole & Styles 2005).

The first project explored, via focus group research, the frequency of engaging in risky driving behaviours during the first year after a young male acquires a provisional licence; and identified the influences that contribute to the early occurrences of risk taking behaviours. The factors that also contribute to any increase in risk taking with increasing experience were explored. The study found that the frequency of engaging in risky behaviours had increased for young male drivers since obtaining a provisional licence. The main reasons for this was that no negative consequences had been experienced in relation to the risky behaviours, so they were perceived as less risky, especially as experience in engaging in the behaviour without negative consequences increased. In addition, many young male drivers engaged in the risky behaviours because they did not expect to experience negative consequences.

The second project involved a telephone survey and an analysis of traffic offence data for recently-licensed ACT drivers to identify the groups of young drivers most likely to engage in risky driving behaviour. The importance of age, experience, over-confidence, aversive consequences and parental risky driving were examined as influences on risk taking by young drivers. The study found that being male influenced participation in risky driving behaviours. Speeding was statistically significantly influenced by driving experience, with those who had held a solo licence for longer more likely to speed. The same applied for aggressive driving, with the behaviour also being more likely for those that had held a solo licence for longer. Respondents also indicated that parents had an influence on their driving behaviour. Finally, it was found that the impact of prior offences on future offence rates was greater than the effect of either gender or age.

Research has shown that risk taking behaviour in young drivers contributes to crash risk, thus clearly this is an important area to be addressed. If young drivers can be convinced that particular risky driving behaviours are in fact risky, they could be expected to engage in such behaviours less often, leading to a decrease in young driver crashes. Research also shows that speeding and mobile phone use contribute to crash risk; hence, these behaviours will be covered in this project. There is some evidence that aggressive driving is associated with increased crash risk and tailgating is an aggressive driving behaviour. Tailgating may also cause young drivers to have rear-end crashes, a common crash type for this driver group.

In 2007, about 43% of all ACT casualties were people younger than 30 years of age and those aged between 20 and 24 accounted for nearly 17% of all casualties (Department of Territory and Municipal Services 2006). To reduce these casualty figures and address issues the NRMA-ACT Road Safety Trust is particularly interested in:

- preventing rear-end crashes
- better understanding and influencing the speeding behaviour of motorists
- development of effective educational strategies on driver distraction
- innovative strategies to minimise the potential for drivers to drink and drive.

This project attempted to address the above by focusing on risk taking by novice drivers. It addressed the first three points above, through tailgating (rear-end crashes), speeding and mobile phone use (driver distraction). Drink and drug driving were not covered in this project, as they are considered to fall into the realm of impaired driving rather than deliberate risk taking. In addition, it should be noted there are now commercially available, technological countermeasures to reduce the incidence of speeding (e.g. maximum speed limiters and Intelligent Speed Assist) and tailgating (e.g. adaptive cruise control and following distance warning devices). Similarly, it would be possible to develop devices which would interfere with mobile telephone reception when the car ignition is on. These technological issues are beyond the scope of this report.

1.2 Project Objectives

The project's objectives were to investigate the thoughts that underlie some young drivers' perceptions that selected objectively risky driving behaviours are safe or less risky. Where information was available, this focused on speeding, mobile phone use and tailgating. This included an investigation of situational, emotional, peer group, confidence and other factors that may influence these specific risky driving behaviours. Prototype road safety messages were developed to counteract the perception that speeding, mobile phone use and tailgating are safe.

1.3 Project Tasks

This project consisted of a literature review and development of prototype messages to ensure risk taking behaviours are seen as unsafe. If approved by the NRMA-ACT Road Safety Trust, a second stage of the project will be undertaken to refine the prototype messages to produce ready-to-use final messages, most likely with the aid of focus groups with young drivers.

2 METHOD

2.1 Literature Review

The MG Lay Library, Australia's pre-eminent transport library, located at ARRB's Melbourne office, was utilised to obtain the relevant literature for review. The ARRB library provided the project team with access to a variety of Australian and overseas bibliographic databases that were searched for information:

- Australian Transport Index (ATRI)
- Transport which includes:
 - USA Transportation Research Information Service 'TRIS'
 - European International Transport Research Documentation 'ITRD'
- PsycINFO, which provides abstracts and citations to the scholarly literature in the behavioural sciences and mental health
- PubMed, which provides abstracts and citations to the scholarly literature in the fields of medicine, nursing, the health care system and the preclinical sciences
- SafetyLit, the online source for current and past scholarly research about all aspects of injury prevention
- ERIC, Education Resources Information Center, which provides abstracts and citations to the scholarly literature fields of education and teaching.

For reasons of cost efficiency, the literature review was limited to English language documents. Upon sourcing available literature, the review was written with an emphasis on:

- young drivers and their perceptions of, and attitudes toward, all risky driving behaviours, and in particular the chosen three risky driving behaviours, and reasons for these, e.g. situational, emotional, peer group, confidence and other factors. The review investigated the reasons young drivers perceive these risk taking behaviours as safe, rather than the reasons they engage in the behaviours (which they may or may not do, or may or may not relate to their perceptions of the level of safety associated with the risk taking behaviours)
- how to target young drivers' risky driving behaviour cognitions in terms of curbing risk taking and any associated appropriate road safety messages.

In addition, various risk taking models of behaviour and behaviour change were reviewed to provide an understanding of what areas could be targeted for prototype message development. Different communication/message development theories and principles of message development were also reviewed.

It should be noted that much of the literature was on general risk taking rather than the chosen three risky driving behaviours, of speeding, mobile phone use and tailgating, as there was not a great deal of literature in these three areas, particularly on tailgating. With respect to how to target young drivers' cognitions, this was addressed through the review of risk taking and behaviour-change models primarily, with any information on this issue from the factors influencing young driver risk taking review included.

The nature of this literature review was to bring the findings together in an easy-to-read format to allow progression to, and guidance for, the second component of the current project, the development of prototype road safety messages. It was not intended to be a rigorous scientific review where information on the study methods and results is provided in

detail (e.g. providing information on all statistical tests used and the scientific results achieved (such as chi-square, logistic regression etc. results and statistical significance levels)). Neither was it a critique of the study being reviewed. Where studies did not appear to be credible, due to poor sample sizes, and/or method and statistics employed, they were not included in the review, or were indicated to be of poor quality.

2.2 Development of Prototype Road Safety Messages

2.2.1 Background

Using the information found in the literature review, prototype road safety messages were developed that target the incorrect cognitions of young drivers regarding the risks associated with speeding, mobile phone use and tailgating. The types of messages considered for development were:

- slogan e.g. for use in advertisements (e.g. 'Wipe off five', 'Drink drive bloody idiot', 'Click clack front and back', etc.)
- content of an advertisement (e.g. showing how the target behaviour can lead to a crash)
- content for a resource such as a driver handbook, pamphlet, web site etc.
- information to be used in face-to-face educational sessions (e.g. Road Ready [for pre-learners], Road Ready Plus [for P-platers], etc.).

The development of the messages was based on the important components of communication theories and other relevant message development principles, also covered in the literature review.

2.2.2 Workshop

To develop the messages a workshop was held with ARRB's Behavioural Scientists, Mr John Catchpole, Ms Kelly Imberger and Ms Victoria Pyta, and the ARRB Marketing Manager, Mr Damien Hense. Ms Imberger prepared a PowerPoint presentation with the main findings of the literature review (i.e. principles to be considered during the task) to guide the workshop and prototype message development. Message examples found during the literature review were also provided in the PowerPoint presentation (Appendix A). A further summary document was also prepared for use during the workshop (Appendix B). Ms Imberger and Mr John Catchpole then refined the messages as required after the workshop.

2.3 Arrangement of Report

The literature review considered a large amount of detailed and sometimes complicated research. Therefore, the detailed analyses of the literature are in Appendix C through to Appendix F. In the chapters that follow this section, summaries of the literature review are presented, as these provide the considerations and guidelines for the message development component, the focus and creative part, of this project.

3 DEFINITION OF RISK TAKING

It is well known that young drivers have a far higher crash rate than experienced middle-aged drivers, and that this is due in part to a high level of risk taking (Williamson, cited in Styles et al. 2005). Risk taking has been defined in various ways:

- 'the ratio between some measure of adverse consequences of events and some measure of exposure to conditions under which those consequences are possible' which distinguishes risk from probability of seriousness and/or harmfulness of the consequences (Brown & Groeger 1988, p. 586)
- 'any behaviour involving a lifestyle choice that increases the potential for physical and/or psychological harm to the individual that makes that choice' (Tonkin, Cox, Blackman & Sheps, cited in Hewitt et al. 1995, p. 48)
- the result of a variety of motivational factors and skill deficiencies (such as difficulty in perceiving or predicting hazards) resulting from lack of driving experience (Williamson, cited in Styles et al. 2005).

Igra and Irwin (1996) outlined that risk is defined by the chance of loss, and that risky behaviours are characterised by those behaviours that may result in subjective loss or negative outcomes. Therefore, risk taking is engaging in risky behaviour and these behaviours are under a person's control and involve some conscious weighing of alternative courses of action.

Types of risky driving behaviours include, but are not limited to (Styles et al. 2005):

- speeding
- mobile phone use
- tailgating
- hoon type behaviour such as drag racing, burnouts, drifting (intentional loss of rear wheel traction) and road games
- driving whilst fatigued
- cutting across lanes
- changing the CD or radio, other distraction activities such as eating, day-dreaming or looking at people on the street rather than watching the road
- drink driving
- not indicating
- crossing double lines
- aggressive driving.

Aggressive driving focuses on deliberate and wilful driving behaviours that show disregard for other road users' safety, but not with the intention of physically harming road users. Aggressive driving can be motivated by annoyance, impatience, hostility and/or an attempt to save time, and it includes the following behaviours (Tasca 2000):

- tailgating
- improper passing (e.g. cutting in too close to the vehicle being overtaken)
- passing on the road shoulder
- weaving in and out of traffic

- preventing other drivers from passing
- running red lights and stop signs
- failure to extend cooperation to motorists unable to merge or change lanes due to traffic conditions.

Risk taking behaviours are characterised by their potentially long-term, serious and negative consequences. Those who engage in such behaviours feel invulnerable to their consequences. Risk taking behaviours include particular eating behaviours, substance use, delinquency, sexual activity and injury-related behaviours. The negative consequences of such behaviours include obesity, physical and psychological disability, sexually transmitted diseases, unplanned pregnancies and death. Such behaviours are raised, as risky driving behaviours are often associated with these other risk taking behaviours, as will be discussed in the report.

4 MODELS AND THEORIES OF RISK TAKING

Eighteen risk taking and behaviour-change models/theories were reviewed to allow important points in relation to influencing risk taking to be drawn out and assist in the main objective of this project. These are discussed in Appendix C. To achieve maximum effectiveness in reducing the frequency of risky driving behaviour the following principles were found to be important:

- Explain that if risky driving leads to adverse consequences, the consequences will be severe.
- Offer incentives for safe behaviour as well as punishments for risky behaviour.
- Illustrate societal, familial and peer disapproval of risky driving behaviour.
- Recommend alternative, non-risky behaviours.
- Show respected or influential others (e.g. parents, peers) modelling non-risky alternative behaviours.
- Demonstrate the feasibility of the non-risky alternative behaviours.
- Provide messages tailored to various stages of change (contemplating, planning, acting, etc.).
- Consider for high-sensation seekers that risk taking behaviours without negative outcomes, lowers risk appraisal.
- Use a high-fear message, where severe consequences and a high probability of occurrence are to produce stronger intentions to remain 'abstinent' (in relation to the behaviour being targeted) than a low-fear message.
- Remove barriers to non-risky behaviours.
- Provide information on how the advantages of performing the behaviour outweigh the disadvantages (costs, anticipated negative outcomes).
- Address the motives underlying risk taking behaviours.
- Teach skills to enable non-risky behaviours.

5 FACTORS INFLUENCING RISK TAKING WHILE DRIVING

The factors affecting risk taking behaviours among young drivers were reviewed. The research indicated that risk taking behaviours do not occur in isolation and a large number of factors are responsible. The main factors that influence risk taking are summarised below under the topics covered in the literature review (Appendix D):

- Psychosocial maturation and gender:
 - young drivers engage in greater amounts of risk taking than drivers aged 25 and over, with higher crash and offence rates
 - age and experience separately affect crash risk, with one study finding the length of licensure being more important in controlling crash risk than age, and another study indicating risk taking increased with experience
 - the age effect on crash risk may be influenced by poverty levels, providing support for the Biopsychosocial Model of Risk taking where poverty influences risk taking
 - young males take more risks than young females
 - some risk taking behaviours may decrease with increased age, particularly for males such as drink driving and 'driving for thrills', indicating psychosocial maturation
 - lower psychosocial maturation is linked to higher risk taking, e.g. not being married, less financial independence, being less capable in adult roles and feeling like an adult a smaller part of the time (an overall construct of less belonging to mainstream society).
- Beliefs and attitudes:
 - one study found that teenagers believed driving inexperience was defined in terms of having a driver licence rather than by distance driven or by exposure to a wide variety of driving situations, and lack of driving experience was not seen as a crash causation factor
 - the same study found that teenagers believed carrying teen passengers was safe
 - beliefs and attitudes can be formed before driving is learnt; one study found links between speed and sensation seeking, and between finding driving violations somewhat acceptable and sensation seeking in pre-drivers.
- Lifestyle:
 - one study found high levels of antisocial behaviour, cigarette smoking, comfort eating and time spent with their friends in activities that were not part of organised events related to risky driving
 - the following lifestyle factors were found to be associated with risky driving:
 - ◆ a lower level of education
 - ◆ when the car itself is considered a venue in which to socialise, used as entertainment, and showing off and competing
 - ◆ an increased interest in cars, being 'out and about' and driving for extra motives other than transport.
- Substance use:

- cigarette use, alcohol misuse/binge drinking, substance availability, propensity to use marijuana and marijuana use
- lived in a situation other than both parents e.g. single-parent families
- parental modelling of and permissive attitudes toward substance use have been implicated in the initiation of substance use in early adolescence. Adolescents who have emotional support and acceptance from, and a close relationship with, their parents, are less likely to abuse substances.
- Parental influences and socialisation:
 - peer influences have been found to be a factor in adolescent substance use and a greater influence of peers than parents is associated with an increased proneness to problem behaviours. It is not clear whether risk taking behaviours are initiated in order to conform to a peer group or those inclined to engage in such behaviours are drawn to similar peers
 - negative role modelling from parents (i.e. showing unsafe behaviours)
 - narrow socialisation (e.g. restrictions on behaviour by parents), as opposed to broad socialisation (e.g. few restrictions on adolescent behaviour), reduces the opportunity for sensation seeking or development of an egocentric predisposition and hence risk taking.
- Personality factors, general attitudes, behaviours and anti-social behaviours:
 - thrill or sensation seeking, impulsivity (to act without thinking about the future consequences of behaviour), hostility/aggressive tendencies, emotional instability, depression and locus of control (extent to which one is in control of their own actions, internal locus of control, or controlled by other factors, external locus of control, where high external locus of control is related to higher risky driving)
 - the following factors were found to be related to risk taking driving behaviours:
 - ◆ low self-esteem
 - ◆ anti-social behaviour
 - ◆ perceived risk
 - ◆ general risk taking propensity and risk acceptance
 - ◆ physical/verbal hostility, general aggression and tolerance of deviance
 - ◆ beliefs such as drink driving is acceptable, the risk of crashing is not high and if a crash occurs the consequences would not be serious
 - ◆ use of driving as a means to reduce tension
 - ◆ negative emotionality and constraint
 - ◆ low traditionalism, harm avoidance and social closeness
 - ◆ high alienation and aggression
 - ◆ aggressive driving, competitive speeding and not being an inhibited driver
 - ◆ motives for risk taking e.g. experience seeking, excitement, sensation seeking, prestige seeking (doing things that will result in others admiring the person), social influence, confidence and familiarity, underestimation of risk, irrelevance of risk, 'let off steam' and 'get there quicker'
 - ◆ low altruism (concern for others)

- ◆ sensation seeking and normlessness (low barriers towards socially unapproved behaviour).
- Self assessment and optimism bias:
 - younger drivers generally overrate their skills and safety compared to older drivers, although one study found this not to be the case where optimism and pessimism about specific-behaviour risks may be based on drivers' realistic assessments
 - young male drivers believe they are at less risk of crashing compared to older male drivers when tailgating, driving at night, speeding, driving on snowy roads and after drinking six beers in one hour.

The specific factors influencing speeding, mobile phone use and tailgating were also explored, as the project's focus is to develop prototype messages for these risk taking behaviours. It should be noted that very little research was found on mobile phone use and tailgating. The factors that influence these risk taking behaviours are summarised below:

- Speeding:
 - sensation seeking
 - impulsivity
 - aggression
 - confident/adventurous driving style
 - low levels of positive health behaviours
 - authority rebellion
 - illusory invulnerability (non-road related)
 - peer influence
 - risk propensity
 - low constraint
 - age (younger)
 - Type A personality
 - situational/positive consequences e.g. 'you need to overtake', 'you are in a hurry to get to an appointment', 'to avoid a crash', 'keep up with the general flow of traffic', 'where you feel speed limit is inappropriate', 'in light traffic conditions', 'if you feel the risk of crashing is low', 'impress others', 'race others', 'gain recognition as a respected adult' and 'if you feel the risk of being caught by police is low'
 - less perceived risk e.g. 'you know the road very well', 'you need to overtake'
 - perceived pressure from other drivers e.g. from tailgating and flashing their headlights
 - as there are no negative consequences for particular situations e.g. cannot be booked for speeding when it is for overtaking, going down a hill or being no more than 10% over the speed limit
 - to avoid negative consequences e.g. being fined, licence loss, crashing

- socially acceptable (to some people usually those who speed regularly and at substantial amounts over the speed limit; others do not wish to be caught speeding as they wish to be viewed as responsible and trustworthy, and do not wish to be embarrassed)
- lack of passengers (presence of passengers makes drivers drive slower), except young males (more likely to speed with friends in the car)
- by modelling parents speeding behaviour.
- Mobile phone use:
 - grown up with the technology and have the belief that one is naturally able to use a mobile phone while driving successfully
 - peers in the vehicle
 - situational e.g. 'making plans for the evening', 'boredom of driving alone in a vehicle'
 - positive consequences such as 'using time more effectively', 'receiving information e.g. directions, important news'
 - social approval
 - perceived less risk
 - negative consequences resulted in potentially less mobile phone use e.g. due to the risk of fines, lack of hands-free kit, demanding driving conditions (e.g. weather, changing lanes), risk of a crash, police presence and heavy traffic.
- Tailgating:
 - low constraint
 - age (younger)
 - Type A personality.

The above findings show the diversity of factors influencing risk taking. Unfortunately, some of these factors are not easily influenced, especially where messages to curb such behaviour is concerned, e.g. age, poverty and personality factors such as sensation seeking. Suggestions by authors to influence the general risk taking factors described above included:

- use peer-based appeals for females, and family-based interventions that involve parents for males
- highlight the disapproval of peers and partners in educational messages
- the negative consequences of risky driving behaviour should be made more salient to younger drivers whilst reminding them that perceived positive consequences are either much less likely than they believe them to be or are insignificant by comparison to the potential negative outcomes
- place an emphasis on the potential costs and benefits of committing driving violations
- include parents in education efforts well before teens learn to drive
- find ways to create and/or strengthen the perceived belonging to mainstream society
- as peers are often the most influential role models encouraging adolescents to engage in safe road use behaviour, in peer situations, may be effective

- personality factors could be used to match interventions to individuals, providing a 'closer link between intervention message and purpose, and the characteristics of the person receiving the intervention'
- interventions that are computer-based to address personality characteristics that influence risk taking may be feasible
- use group discussion exercises that focus upon strategies to recognise and manage aggression while driving
- interventions that target antisocial behaviour and/or substance use in adolescence may assist in impeding the development of risky driving
- as young adults who engage in risky driving behaviours tend to experience other problem behaviours no single approach is likely to reduce risky driving and that a mixture of targeted approaches is required
- test new drivers to determine their levels of excitement seeking and altruism and provide an education program to increase their understanding of how their personality affects their decision making. The focus of the education would be on the issue that society depends on everyone co-operating and that all people contribute toward the safety goal. Altruistic norms need to be positively reinforced and the potential risky driver needs to gain an understanding of the way in which their behaviour will impact negatively on others
- use messages with high sensation value to target high-sensation seekers
- reduce the driver's sense of perceived control over the driving environment by using education to demonstrate the limits of one's driving skill in crash avoidance. Provide drivers with more realistic appraisals of perceived vulnerability, as drivers do not believe that the risks apply to them personally. As such 'standard educational efforts, warning and statistics are not likely to be effective'.

Suggestions by authors to influence the speeding risk taking factors included:

- messages outlining mortality risks were unlikely to be successful with high-sensation seekers
- identify speeding as a factor in road crashes, but do not publicise actual figures
- make the message that 5 km/h above the speed limit doubles the chance of casualty crash the basis of social disapproval of drivers who exceed the limit by greater amounts
- address the perception that speeding is safe under some circumstances and that skill is not a reason for speeding
- increase the social disapproval of speeding
- driving practice and education needs to cover the effect of driver demeanour on the likelihood of crashing. Focus should be turned to the effects of risk taking and characterising oneself as a confident/adventurous driver
- campaigns should concentrate on portraying driving at safe speeds as a positive health behaviour
- develop less gender neutral campaigns as males are the group requiring targeting about speeding
- target speed campaigns at the appropriate age group using familiar scenarios and depictions of peers with whom they can identify

- portray how impressionable people may copy what they observe (e.g. as shown in the 'Kids absorb your drinking' Australian public health campaign).

Suggestions by authors to influence the mobile phone risk taking factors included:

- strategies to increase awareness of the risks of hands-free mobile phone use (i.e. as it is as risky as hand-held mobile phone use)
- strategies highlighting unexpected driving challenges in most driving situations and associated hands-free mobile phone use risks
- demonstrating favourable and unfavourable outcomes of hands-free mobile phone use alone in campaigns is likely to be ineffective
- design messages that emphasise disapproval from significant others, i.e. friends and family, e.g. 'Your friends don't want you to be dying to talk to them' to decrease hands-free mobile phone use whilst driving
- disapproval strategies could also be applied to hand-held mobile phone use, such as referring to the driver as irresponsible (e.g. 'bloody idiot' Transport Accident Commission drink driving campaign), or if adopting a positive approach, reinforcing approval for the decision not to use a hand-held mobile phone while driving
- as drivers are aware of the risk of hand-held mobile phone use, but they engage in the behaviour as they see the call as important, strategies to reduce the perceived advantages of the behaviour and the need for improved time management and trip preparation may be helpful
- an analysis challenging drivers to weigh up the favourable outcomes (e.g. time effectiveness) against unfavourable outcomes (e.g. distraction) may also be effective for those who use a hand-held mobile phone whilst driving
- publicise the dangers of hand-held mobile phone use – the number of crashes and fines to make the dangers more salient to infrequent users.

There were no suggestions on how to influence tailgating in the literature reviewed.

The principles, which will assist with message development for all three behaviours, are:

- Explain and emphasise the potential negative outcomes of risky driving such as:
 - getting caught by police
 - cost of fines
 - losing your licence
 - hurting your friends
 - hurting road users outside the vehicle
 - the embarrassment of receiving a ticket, especially if the person must tell their parents, employer, work colleagues or even friends.
- Explain the positive and negative aspects of behaviours, for example:
 - that drivers have control over whether or not they take risks
 - that the supposed positive outcomes of risky driving (such as saving time) are unlikely to occur or will be minimal
 - that particular situations to commit risky driving behaviours are not actually safe (e.g. speeding in light traffic conditions)
 - that using a hands-free mobile phone is just as risky as using a hand-held mobile phone

- that crashes are usually caused by driver decisions rather than by defects of the road or vehicle
- the contribution of speeding to crashes
- that speeding by 5 km/h doubles the risk of being involved in a crash
- that being skilful at using mobile phones etc. does not mean it can be done safely while driving
- that distracting tasks are dangerous
- that drivers are not in control when speeding or distracted (e.g. by mobile phone) and how little they will be able to respond to avoid a crash if there is an unexpected hazard.
- Address commonly held beliefs and motives such as:
 - speeding is safe under some circumstances
 - young drivers are better skilled than other drivers (optimism bias)
 - speeding is acceptable if the driver is skilful
 - using vehicles for socialising and having fun is acceptable.
- Persuade young drivers:
 - that family, friends and work colleagues do not approve of risky driving (such as using a mobile phone while driving)
 - to model safe driving to their peers
 - to disapprove when their friends take risks while driving.
- Focus on groups who are over involved:
 - males
 - drivers who see themselves as confident and adventurous.
- Develop different messages for different personality types and driver sub-populations e.g. high-sensation value for sensation seekers (but do not highlight mortality risks to high-sensation seekers).
- Persuade parents to:
 - reduce risky driving
 - model safe driving to their pre-driver and novice driver children
 - retro fit the vehicles they and their children drive with Intelligent Speed Adaptation and following distance warning devices
 - tell their children that they disapprove of risky driving.
- Use scenarios and characters that are relevant to the target group e.g. peer-based education.
- Portray driving at safe speeds as a positive health behaviour.
- Provide strategies to counteract risk taking behaviours e.g. encourage drivers to prepare before trips so they will not need to speed or use mobile phones while driving (i.e. provide strategies to counteract risk taking behaviour).

6 ADDRESSING THE PERCEPTION THAT RISK TAKING BEHAVIOURS ARE SAFE

A review of school-based education, fear and shock tactics, and incentives in addressing risk taking behaviours is presented in Appendix E. The following issues are pertinent to the current investigation:

- A school-based campaign that aimed to enhance traffic safety attitudes, generate increased awareness of crash risks and promote safe driving using class-based projects, movies, web information and specific role models, appealed most to low-risk takers. There is a need to make sure that campaigns are highly salient to specific risk taking groups in order to sufficiently engage their attention. General high-school campaigns, involving class-based assignments such as the one in this study appear to have little effect on high-risk taking young drivers.
- Using a peer intervention program, which provides strategies to address the risk taking behaviour with role playing scenarios with school students, may help to change behaviour (the study that found this promising outcome had focussed on drink driving intervention behaviours, so may not necessarily be relevant for other risk taking behaviours).
- Further research is required to determine if a learner/driving instructor education package which highlights the importance of teaching learner drivers strategies to help them avoid risky situations, made the learner driver imagine the consequences of being involved in crashes (including getting them to imagine how their friends and family would react) and asked the learner driver to think about the positive and negative aspects of risk taking, is worthwhile.
- Young drivers who have a high risk taking propensity and are most in need of being convinced about their vulnerability, are least likely to be persuaded by fear and shock messages and will be the most resistant to change. This is because young people, particularly males, do not see the message as personally relevant and do not identify with the message.
- If fear appeals are to be used the following actions are essential:
 - inform the audience of the harmful nature of the problem
 - explain the high likelihood of suffering the negative consequences of the behaviour if this behaviour is not changed
 - outline the steps to reverse the negative consequences
 - explain the ability of target audience members to personally carry out the required behaviours to reduce the negative consequences.
- The use of incentives to encourage drivers to behave safely may be worth consideration. Incentives need to:
 - increase the perceived benefit of cautious behaviour
 - decrease the perceived cost of cautious behaviour
 - increase the perceived cost of risky behaviour
 - decrease the perceived benefit of risky behaviour.

Information pertaining to the topics in this section is also addressed in the next section, in the context of message development.

7 MESSAGE DEVELOPMENT

Nine message development models/theories were reviewed in the literature in addition to general guiding principles (Appendix F). The overall important principles to consider during message development are outlined below.

Source:

- should be credible, knowledgeable, trustworthy and unbiased
- should be similar to audience, hold similar opinions, be likeable and physically attractive
- use more than one source.

Delivery:

- repeat the message
- use more than one delivery channel (TV, radio, newspapers, billboards, pamphlets, newsletters, websites, email, instant messaging, text messaging etc.). messages should reach the recipient at a time when they are able to respond
- place TV ads at the time the target audience is watching
- deliver the message when the audience is not distracted
- accompany the communication campaign with other actions to encourage behaviour change (e.g. enforcement)
- place messages in sensational contexts (e.g. TV programs) when targeting sensation seekers.

Style:

- avoid lecturing
- non-judgemental
- educational messages must be made entertaining
- message must obtain and hold the interest of the audience
- message must be easy to understand and not too complicated
- message should be concrete, clear and realistic
- sensation-style messages should use drama, surprise, novelty and strong emotional appeal
- non-sensation-style messages should stress peer resistance and low sensation value.

Customisation:

- message must be personally relevant to and understandable by the recipient (if not use emotional appeals)
- use settings and situations relevant to the audience
- build on the audience's pre-existing knowledge, beliefs, motivations and values
- use existing motives of young people, such as freedom, independence and peer group acceptance
- segment the audience by beliefs and attitudes before developing messages
- create different messages suited to different sub-populations

- consider the language and culture of sub-populations
- avoid exaggeration that would reduce personal relevance
- use sensational messages promoting alternative behaviours when targeting sensation seekers
- use low-sensation messages promoting avoidance skills when targeting non-sensation seekers

Mode of action:

- aim for persuasion rather than education
- use a two-sided message i.e. acknowledge the person's positive perceptions of the negative behaviour, so the message cannot be refuted e.g. although smoking is enjoyable it causes cancer
- state the specific behaviour change required, avoid generalities
- strong fear messages may be rejected by the audience unless they:
 - can be shown to be relevant to the audience (it must believe the threat is severe and they are susceptible to the risk)
 - include an action the audience can take to avoid the negative behaviour
- change beliefs that impede adoption of desired behaviours
- demonstrate the immediate, high-probability benefits of the desired behaviour
- demonstrate the personal as well as social benefits of the desired behaviour
- focus on immediate rewards rather than distant costs
- the message should focus on a single behaviour to change
- allow audience to participate by drawing a conclusion rather than presenting a ready-made conclusion
- draw a firm conclusion or present a firm recommendation
- establish disapproval of the risky behaviour
- encourage the audience to question the benefits of the risky behaviour
- stimulate self-assessment by the audience
- explain enforcement and legal consequences of risky behaviour
- arouse a strong positive or negative emotional response
- use mnemonics, such as verses, when presenting information
- incorporate evidence, examples and reasoning
- present counterarguments and refute them
- if counterarguments cannot be refuted, do not mention them
- alleged costs and benefits must be credible
- when messages are simple and familiar, use graphics to attract attention
- when messages are new or complex, simplify the presentation
- begin a message with an emotional appeal before presenting information
- for audio messages, use structural complexity or emotional appeal, but not both

- for audio messages, use multiple voices, concrete language and chronological presentation of information
- use positively-framed messages when:
 - promoting cautious or preventative behaviours (ensure information on how to perform a task correctly is provided)
 - audience attention is limited
 - there is low relevance or the issue is unfamiliar
 - targeting low or high-risk situations
 - focusing on consequences for others
 - targeting males
- use negative messages when:
 - 'grabbing attention' and providing a 'top-up' of fear
 - there is high relevance and high risk to the audience
 - focusing on consequences for self
 - targeting females
- use indirect appeals such as humour once the issue is familiar
- avoid positive affect (emotion) if an issue is strongly associated with negative affect (emotion)
- emphasise controllability of behaviour
- transport the audience into a narrative world (when appropriate) that has engaging characters (possibly similar to the audience) and incorporates the desired values, beliefs or behaviours.

Other:

- pre-test messages to verify they are understood and do not generate counterarguments
- develop new messages for booster campaigns
- include messages for parents.

8 SPECIFIC MESSAGE EXAMPLES

8.1 Introduction

Specific message examples in the three areas of interest, speeding, mobile phone use and tailgating, were reviewed to assist in the creative message development process.

8.2 Speeding

8.2.1 Example One

Kirby et al. (2003) reported on focus group work with young (17 to 24 years) and older (30 to 50 years) repeat speed offenders and manipulators (those who slow down for speed cameras and accelerate afterwards) who viewed eight television advertisements from various jurisdictions in relation to speeding. The aim of the research was to determine the effective and ineffective elements of the advertisements. The effective elements included:

- a strong storyline which is based on an individual
- clearly showing the reason for speeding, the cause of the crash and the outcomes
- a range of social consequences (there was greater impact when they showed consequences on family, friends, passengers, police, etc., rather than just the driver)
- high dramatic impact (e.g., woman facing court for culpable driving). However, advertisements that were too graphic and showing too much gore were not effective
- a serious rather than light-hearted tone – humour was seen to detract from the message
- everyday situations such as running late for an appointment or children running out on local roads
- drivers speeding at 10 km/h or 20 km/h over the limit – higher speeds (even if they admitted to using them) were considered unrealistic and not personally relevant;
- explanations from credible and authoritative figures were more acceptable
- attribute as much as possible the cause of the crash solely to speeding – where alternative explanations were possible, the speeding message was not as powerful
- target a range of ages, not just young drivers (an alternative is to segment the market by age and develop specific communications for each segment).

Based on the focus groups, a campaign known as 'Every k over is a killer' was developed with two key messages 'there is no such thing as safe speeding' and 'police and speed cameras/radars are everywhere'. There were five final television advertisements developed as part of the campaign and various billboards. Messages in these included:

- 'The faster you go, the longer it takes to stop. Slow down. Stick to the limit'.
- 'Every k over is a killer'.
- 'There's been enough blood spilled on our streets'.
- 'The negatives of speeding....you kill, you maim, you disable, you disfigure.....no positives....just nightmares.....forever'.
- 'Exceed the speed limit by any amount.....expect the worst'.
- 'How many times do we have to tell you – 60 – every k over is a killer'.
- 'High speed. Low IQ'.

- 'Has your car got a nut loose at the wheel'.

8.2.2 Example Two

In June 2007, the RTA NSW launched the 'Speeding. No one thinks big of you' campaign. The television campaign shows people wiggling their pinkies at young men who are speeding and is aimed at young drivers. The wiggling pinkie is intended to suggest that a young man who speeds is attempting to compensate for a 'lack of manhood'. The RTA NSW indicates 'A wiggling pinkie now has another meaning – slow down and stop acting recklessly on our roads because stupid driving behaviour can cost your life in the blink of an eye.'

According to the RTA NSW, the campaign has been effective with 76% of people surveyed believing the campaign increased community awareness about speeding and understood the campaign's clear anti-speeding message. In addition (Roads and Traffic Authority 2009):

- 53% of the general population and 53% of young males (17-25 years) indicated they would be more likely to comment 'on someone's driving as a result of seeing the 'Pinkie' campaign'
- 64% of the general population, and 63% of young male drivers, thought the campaign would have some effect in encouraging young male drivers to obey speed limits
- 74% of the general population and 75% of young males demonstrated a strong recognition of the anti-speeding message
- 60% of the general population and 59% of young males recognised the meaning behind the message that 'speeding is not cool, does not impress or is stupid'.

8.2.3 Example Three

On 16 December 2009, the RTA NSW launched its 'Speedblitz' which involved the Minister for Transport and Roads, and Australian cricketers to urge young drivers to take the pledge during the holiday season and slow down and refuse to get into a vehicle with someone who may speed. The campaign was driven from a Facebook page, which allows people to read other personal experiences in relation to speeding (NSW Transport and Infrastructure 2009).

The Facebook pledge reads:

Take the slow down pledge

Driving gives you the freedom to be with friends, see new places and do things in your own time, but speeding and reckless driving can put you in situations that take that freedom away. Even worse, every time you speed, you are at risk of causing harm to yourself, your mates and others.

You can control your own destiny and take responsibility for your actions. Take the slow down pledge – a pledge to slow down on the road and take a stand to make speeding unacceptable; taking the slow down pledge means you have agreed to drive yourself and your mates to your location safely.

Join other young people and click here to take the slow down pledge today!
(http://www.facebook.com/slowdownpledge?v=app_229273185420)

8.2.4 Example Four

The Transport Accident Commission in Victoria has had ongoing speeding campaigns (Transport Accident Commission n.d.). Some of the key messages used in its television advertisements are:

- 'This is why you're photographed when you speed' from the 'Pictures of you' campaign showing the photographs of people killed from speeding
- 'Wipe off 5' which emphasises that small reductions in speed can make the difference between life and death
- 'There's no excuse for speeding', which explores the excuses for speeding and tries to shame speeding behaviour.

8.2.5 Example Five

The NSW Government has had ongoing speeding campaigns (Roads and Traffic Authority 2009). Some of the key messages used in its television advertisements are:

- '73 people were killed in P plate crashes last year. Please slow down'
- 'Police now targeting P plate speeding. Please slow down'.

8.2.6 Example Six

The Government of Western Australia also has had ongoing speeding campaigns (Government of Western Australia n.d.). A key message used in its advertisements is:

- 'Speed and you could lose your licence in a flash. Stick to the speed limit'.

8.3 Mobile Phones

The Transport Accident Commission in Victoria has had ongoing distraction campaigns that consider mobile phone use (Transport Accident Commission n.d.). Some of the key messages used in its television advertisements are:

- 'Distracted drivers are dangerous'
- 'Mobile phones can be deadly if you're driving. If you're on the phone, get off the road'.

The Road Safety Task Force in Tasmania has a radio and television campaign with the following messages (Road Safety Task Force 2009):

- 'You make a call, we'll make a call' (i.e. a policeman watching by the roadside for mobile phone use, radios a police car up ahead to apprehend the driver)... 'You break the law, we'll catch you' (television)
- 'A lot can happen in a second, so concentrate' (radio).

8.4 Other

Messages on other road safety topics include:

- 'We'll catch you before someone gets hurt' (Transport Accident Commission n.d.)
- 'Safer lives save lives' (Government of Western Australia n.d.)
- 'Shift workers are six times more likely to hit the wall (Government of Western Australia n.d.)
- 'With a partner, why not swap? One of the best ways to fight fatigue is to stop and swap drivers' (Government of Western Australia n.d.)

- 'Some things are worth waiting for' (in relation to stopping at a railway level crossing) (Government of Western Australia n.d.)
- 'You don't have to be drunk to be a drink driver' (Transport Accident Commission n.d.)
- 'If you drink and drive you're a bloody idiot' (Transport Accident Commission n.d.)
- 'Drive on drugs and you're out of your mind' (Transport Accident Commission n.d.)
- 'Choose a car that could save your life' (Transport Accident Commission n.d.).

9 PROTOTYPE MESSAGES TO ADDRESS SPEEDING, MOBILE PHONE USE AND TAILGATING

9.1 Introduction

To develop the prototype messages, the workshop participants first considered speeding, mobile phone use and tailgating in the following areas:

1. Message content:
 - (a) perceived benefits of risky behaviours
 - (b) costs/negative outcomes of risky behaviours
 - (c) identification of safe alternative behaviours
 - (d) benefits of safe behaviours
 - (e) costs of safe behaviours
 - (f) feasibility and enabling strategies of safe behaviours.
2. Customising messages for population segments e.g. high and low-sensation seekers, deep thinkers, personally relevant versus not personally relevant etc.
3. Message delivery, style, mode of action/context, including when to use fear, positively versus negatively-framed messages etc.

The messages developed are considered to be prototypes, as they may need further development, possibly with input from an advertising agency, as well as testing with the appropriate target group. In addition, it is likely that some of the prototype messages may be considered unsuitable during the next stage of research and may need to be dropped, and/or the idea behind the prototype message may need further development or refinement.

9.2 Prototype Messages

9.2.1 Background

The workshop team aimed to develop different types of prototype messages e.g. slogans, advertisements, resource content and information for face-to-face educational sessions. However, the ideas that resulted from the workshop, once the message content ideas were discussed for each behaviour, were mostly narrative or story-based, with some slogans. The narratives could be used in television or radio advertisements or as examples in printed and web-based educational materials or face-to-face sessions. This material will be able to be adapted in the next stage of the project, if commissioned by the Trust. Each risk taking behaviour is presented in a table (message content issues) followed by different narrative examples, with an associated slogan. A rationale for each example is also provided.

9.2.2 Speeding

Speeding was divided into low-level speeding, e.g. everyday speeding approximately 5 to 15 km/h over the speed limit and high-level speeding, e.g. excessive speeding 40 km/h or more over the limit.

Low-Level Speeding Messages

Message Content

Message content for low-level speeding appears in Table 9.1.

Table 9.1: Low-level speeding – message content

Message component	Description
Risky behaviour (to be discouraged)	Everyday speeding (5–15 km/h over limit)
Cost of risky behaviour – severity and probability of consequences (maximise)	<ul style="list-style-type: none"> Damage to own vehicle Harm to self Harm to friends Kill pedestrians or cyclists Fines Demerit points Eventual loss of licence (e.g. from repeat offences) Disapproval of parents Disapproval of friends and/or girlfriend (won't get in the car) Disapproval of employer, potential job loss Embarrassment Increased cost of insurance Increased fuel costs Environmental impact e.g. exhaust emissions
Benefit of risky behaviour (minimise)	<ul style="list-style-type: none"> Get to destination quicker Beat other drivers Need to overtake Want to keep up with traffic
Reasons for risky behaviour (minimise)	<ul style="list-style-type: none"> Consider speed limit to be inappropriate Alleviates boredom Know where cameras are, so can speed in non-camera areas without getting caught
Lower risk alternative behaviour	Stick to the speed limit
Cost of alternative behaviour (minimise)	<ul style="list-style-type: none"> Trip takes longer (but this is a fallacy for short trips)¹ Boredom and frustration with traffic
Benefit of alternative behaviour (maximise)	<ul style="list-style-type: none"> Don't have to look out for police and speed cameras No fines Driver feels more relaxed Passengers feel more relaxed More spare capacity to talk to passengers Save the environment Save money on fuel Feel relaxed and in control on arrival
Feasibility of alternative behaviour/strategies to perform desired behaviour (maximise)	<ul style="list-style-type: none"> Can use cruise control (but probably not relevant to young drivers as they drive older cars) Can set over-speed warning (but probably not relevant to young drivers as they drive older cars) Trip planning Call ahead if running late

¹ On short journeys, the perceived time saving is much longer than the actual time saving. For a 10 km journey when speed is increased by 5 km/h, the time saving when travelling at 70 km/h is only 0.7 minutes (European Road Safety Observatory 2007).

Message Examples

Message example one: Time savings

Show how on short journeys the perceived time saving from speeding is much longer than the actual time saving.

Potential Slogan

'Speeding to save time can cost more than you'd think'.

Rationale

'Being in a hurry' is a common reason for speeding which relates to poor time management. This message is about removing the perceived need for speeding.

Message example two: Journey planning

Show how internet resources (e.g. whereis.com or Google maps) do not always give accurate estimates of journey length, as they do not take into account peak hour or the traffic on weekend days. Depict the need for adequate journey planning to arrive on time for work or school/university. The young driver should be shown arriving with time to feel relaxed, in control, buy a coffee and ready to listen in class/lecture (or start work). Then show the alternative negative consequence to not planning the journey or not leaving enough time for the trip. The concepts to show these alternative scenarios could be similar to those used in the 1998 movie *Sliding Doors*, which is about how a woman's love life and career both hinge, unknown to her, on whether or not she catches a train; her life is seen both ways, in parallel. The driver who does not leave sufficient time for the trip would be shown arriving dishevelled/stressed and being told off by the boss/cannot listen to the lecture etc.

Another potential scenario could depict a good driver arriving at a BBQ. Everyone says 'G'day. Where's Pete?' Good driver says 'He should be here by now. He left before me. I didn't know the way so I had to look up the street map before I started.' Just then, someone receives a phone call from Pete, who has taken a wrong turn and is therefore running late. The person receiving the phone call tells Pete he is holding everyone up, as they cannot start until he brings the gas bottle. Someone else says 'Looks like Pete didn't know the way either. Maybe he should have taken a minute to check the map too'.

Potential Slogans

'Plan ahead; reward yourself – no stress, no cops – a clear head instead'.

'Leave a few minutes earlier and you won't have to speed'.

Rationale

There is a need to provide young drivers with a realistic understanding of the length of time journeys actually take and how to plan trips, as well as the benefits of allowing extra travel time as opposed to the disbenefits.

Message example three: Avoiding a fine

Following on from the speeding driver named 'Pete' above, the speeding young driver could continue to be named Pete in these scenarios (similar to the naming concepts of 'Lucky Phil' and 'Don't be a Wally with Water' in other advertising material). Pete could appear in a number of different advertisements showing the different consequences of speeding – damaging his car, being fined, being delayed by being pulled over by police, having his

friends refuse to get in the car when he is driving, losing his licence, losing his job etc. The following scenarios were put forward during the workshop:

- Depict Pete being delayed as he is pulled over by the police and receives a fine. Pete could be shown looking at his watch while receiving the fine, while another young driver obeying the speed limit is shown looking and driving past Pete. The 'good' driver then arrives on time.
- A good driver is driving on the freeway with his girlfriend in the front passenger seat. A P-plater speeds past in a distinctive car. Good driver says to girlfriend 'Isn't that Pete? He must be in a hell of a hurry to get somewhere.' Further down the freeway they round a corner and there is Pete at the side of the road having been pulled up by police in an unmarked car (with lights flashing). Girlfriend says to good driver 'Looks like Pete's going to be late today.'
- The above scenarios could also focus on social engagements e.g. concert/BBQ/drinks etc. Friends could ask 'Where is Pete?' with the response being 'He's not coming out this weekend, saving money to pay his speeding fine'.

Potential Slogan

'Stick to the speed limit. Let Pete get the fine'.

Rationale

This message shows the positive consequences of the correct behaviour as well as the negative consequences, including time delay, of the speeding behaviour.

Message example four: Negative consequences for life

This idea is for a fear-based campaign using a series of television advertisements, whereby the life consequences are shown for a young driver who speeds and kills someone. The driver could be female or male (e.g. separate advertisements for each gender). Note that the concept of Pete illustrated above would not be used, as his comparatively minor difficulties may make him a figure of ridicule, whereas any form of humour needs to be avoided in this message. The following would be depicted:

- the driver in court, then in jail and then as a 'no-hoper' out of jail (e.g. no job, lonely etc.)
- embarrassment and depression of the driver (e.g. in court, jail and as a no-hoper)
- impact on family and friends (embarrassment, disapproval, sadness)
- the loss of friends and girlfriend/boyfriend
- the lack of visits from friends, whilst friends have a good time in a social setting.

The alternative to not having sped can be shown in a type of unison manner, similar to the 1998 movie *Sliding Doors* described above. Thus the non-speeding driver could be shown as being successful at school, travelling, working and getting married etc.

After some of the advertisements described above, a later advertisement shows the convicted driver in jail receiving a visit from his mum. He says 'I couldn't survive here without you Mum. After that first week, you're the only one who ever comes to see me.' Mum replies 'Jason, I know it's hard for you, but your friends have all got busy lives. Chris and Tina are doing the final year of their university courses, Phil and Rob have both got great new jobs that they're loving, and Jeff and his girlfriend are travelling around Europe this year. None of them can get here easily.' Convicted driver says, 'But Mum, even Alicia left me.' Mum

pauses, shows the agony on her face and eventually says 'Jason...Alicia is 21 years old. You're going to be in here for 3 years. What did you expect her to do?'

Potential Slogans

'Bet you never thought it would come to this'.

'Bet you never thought speeding would lead to this'.

'Crashes happen fast enough, do you really need to speed?'

Rationale

The message is of high relevance to the young driver audience. There is a need to illustrate the negative outcomes of speeding. The narrative shows both the short and long term consequences of speeding, as well as what happens when the desired behaviour of not speeding is followed.

Message example five: Low-level speeding kills

Depict a driver going 50-60 km/h and losing control of the vehicle due to distraction/unexpected situation (pedestrian on the road) etc. in wet weather. The vehicle has a side-impact with a tree and the driver is killed.

Potential Slogan

'Slow down when the road is wet'.

Other information

Time management was considered in the workshop, but has been rejected here as it cannot be taught successfully in a public education campaign as the skills and strategies are complex, requiring rehearsal and feedback.

Extreme Speeding Messages

Message Content

Message content for extreme speeding appears in Table 9.2. Note that 'Message example four: Negative consequences for life' (above) also applies to extreme speeding.

Table 9.2: Extreme speeding – message content

Message component	Description
Risky behaviour (to be discouraged)	Extreme speeding (40 km/h or more over limit)
Cost of risky behaviour – severity and probability of consequences (maximise)	Crash and write off vehicle Kill self Kill friends Kill other road users Appear in court to answer charges Reported in newspaper/radio/TV Big fines Vehicle impoundment Loss of licence Loss of job following loss of licence Imprisonment Loss of girlfriend following imprisonment Disapproval of parents Disapproval of friends and/or girlfriend (won't get in the car) Disapproval of employer Embarrassment Increased cost of insurance or insurance refused Environmental e.g. exhaust emissions, increased fuel costs
Benefit of (reason for) risky behaviour (minimise)	Thrill of speed Demonstrate skill level Impress passengers Impress other road users Compete with other drivers Test own capabilities Demonstrate status among peers
Reasons for risky behaviour (minimise)	No police in area
Lower risk alternative behaviour	Get thrills from non-driving activities (rock climbing, water skiing, skydiving, paintball, bungee jumping, mountain biking...)
Cost of alternative behaviour (minimise)	Financial cost of equipment and participation Time required to attend and participate in activities
Benefit of alternative behaviour (maximise)	Don't have to look out for police and speed cameras Thrill and enjoyment Admiration of peers
Feasibility of alternative behaviour/strategies to perform desired behaviour (maximise)	Find a club or centre on the web Phone up and ask for information Lessons available
Population	Usually high-sensation seekers

Message Examples

Message example one: Reward high-sensation seekers

Licensing authorities or insurance agencies could reward good driving behaviour for probationary drivers, by offering them a free bungee jump or similar sensation seeking behaviour once they reach their full licence. Note that this is not a message as such, but a program, and is considered out of the project scope. However, slogans that could be used with such a program are outlined below.

Potential Slogans

'Get your thrills from speeding? Why not try bungee jumping instead. The thrill beats hurting other people on the road'.

'Get your rush off the road ...' (e.g. in relation to the adrenalin rush from speeding).

'Risking other people's lives on the road – how brave is that?'

Rationale

This would only be suitable for high-sensation seekers. Most drivers who speed at 40 km/h over the speed limit would fall into this category. The aim of this message is to get high-sensation seekers to get their 'thrills' from activities that are not driving based.

Message example two: Reward good driving behaviour for all probationary drivers

A reward could be offered for good driving behaviour such as not having to display P plates after two years. A condition of the reward would be that as soon as the probationary driver is caught doing something illegal they will have to display the P plates again. Note that this is not a message as such, but a program, and is considered out of the project scope. However, slogans that could be used with such a program are outlined below.

Potential Slogans

'We'll reward your two-year good behaviour on the road, no P plates!'

'No points, no P Plates, no problems!'

Rationale

Rewards can work, as shown in the literature. This positively-framed idea has been put forward, as developing positively-framed messages in relation to high-level speeding has proved difficult.

Message example three: Disapproval by peers

A group of girls discuss how their boyfriends speed (all young drivers), how bad they perceive the behaviour and how they see the boyfriends as 'idiots/tools'. The girls indicate they will either 'withhold sex' (note appropriate language would need to be used for the target audience) or break-up with the boyfriends if they continue with the behaviour. They also talk about not getting into the car with the boyfriends.

Potential Slogan

'Hoping to get lucky tonight? You won't impress your girlfriend by speeding'.

Rationale

The main target audience is young males. This message may help to diffuse the perception that speeding provides males with status among their peers or that they might impress their girlfriends by speeding. The message illustrates strong disapproval of the speeding behaviour.

Message example four: Nuisance to peers and loss of friends

Depict a young driver who loses their licence for high-level speeding having to rely on friends and/or parents to provide them with transport and the overall nuisance value of this. Eventually friends get tired of the situation, refuse to provide lifts and do not want to spend time with the driver. Other similar situations that could be depicted:

- Show images of bad driver on public transport and demonstrate the travel time differences.
- Phone calls between friends ... 'I'm leaving now, see you at Eddie's place. I should be there in around 20 minutes' (good driver). 'See you in an hour' (bad driver). Show bad driver walking to the station/tram or bus stop and unhappy to decrease their fun activity time with friends.

Potential Slogans

'Reckon driving at the limit is a nuisance? Think about the nuisance you become if you get caught speeding'.

'Lose you licence, and you'll miss more than you think'.

Rationale

This idea shows the negative consequences for the main target audience.

Message example five: 'Thrills and spills'

Show four males in the school footy team together. When they finished school, they had plenty of spare time over summer. How did they use their time? Marat took up rock climbing. He's nearly ready to tackle Mt Arapiles. Chris goes water skiing every time he gets the chance. He'll never be in the Moomba Masters, but he and his friends have a lot of thrills and spills. Jason tried skydiving. He says there is nothing else like it in the world. Tony thought he would get his thrills on the road. He was speeding and killed a six-year-old girl.

Potential Slogan

'Risking other people's lives on the road – how brave is that?'

Rationale

This idea shows the negative consequences for the main target audience and other strategies for high-sensation seekers to engage in rather than speeding.

Message example six: Consequences for the hoon

Hoon driving results in a crash and a child pedestrian is killed. The hoon driver is unharmed – not even a scratch. This narrative could then use the concepts and potential slogans introduced in 'Message example four: Negative consequences for life' under Low-Level Speeding Messages (page 23).

9.2.3 Mobile Phone Use

Message Content

Mobile phone use was considered for hand-held (illegal) mobile phone use, as hands-free, being legal, was considered too difficult to dissuade. Message content for hand-held mobile phone use appears in Table 9.3.

Table 9.3: Hand-held mobile phone use – message content

Message component	Description
Risky behaviour (to be discouraged)	Using hand-held mobile phone while driving
Cost of risky behaviour – severity and probability of consequences (maximise)	Damage to own vehicle Kill pedestrians or cyclists Stopped by police Fines Demerit points Disapproval of friends and/or girlfriend (won't get in the car)
Benefit of (reason for) risky behaviour (minimise)	Keep in touch with friends, customers or colleagues Get driving directions en route
Lower risk alternative behaviour	Get a voicemail service Switch the phone off (or to silent) before starting to drive Plan to make calls before departure Plan route from a map or get directions before starting to drive Concentrate on driving
Cost of alternative behaviour (minimise)	Financial cost of voicemail (Note: the service is free from some providers) Financial cost of returning missed calls Preparation time before starting to drive Boredom during driving
Benefit of alternative behaviour (maximise)	Don't have to look out for police Less stress, more relaxed Easier to look for hazards, i.e. can concentrate on driving Drive better, make fewer mistakes Safer
Feasibility of alternative behaviour/strategies to perform desired behaviour (maximise)	Voicemail greeting message to say missed calls will be returned Get a street directory or GPS system

Message Examples

Message example one: Texting

A young driver is texting while driving and in the one second their eyes are off the road, they hit a young child. The story then follows the life of the young driver that shows the consequences outlined in 'Message example four: Negative consequences for life' under Low-Level Speeding Messages (page 23).

Potential Slogans

'Bet you never thought a second of texting would come to this'.

'Bet you never thought texting could lead to this'.

'Bet you never thought a distraction would lead to this'.

Rationale

There is a need to illustrate the negative outcomes of texting. The narrative shows both the short and long-term consequences of texting.

Message example two: Tunnel vision

Depict a young driver's tunnel vision (lack of peripheral vision) when using a mobile to dial a number while driving. Show the driver's vehicle veering slightly off the road on a freeway and how a person changing a car tyre in the emergency lane (or another situation e.g. pedestrian darts out from between parked cars) is not in the young driver's 'tunnel' of vision. A near miss could be shown as the driver looks up or a crash. Provide alternative strategies such as phoning before leaving if running late. The narrative could also indicate how research shows 'you can end up all over the road when you use your mobile while driving'.

Potential Slogan

'Think you can drive and dial, you're a fool. Phone before you leave, don't risk a crash'.

Rationale

Young drivers do not understand the risk of mobile phone use or its consequences. The narrative shows what actually happens when using a mobile, the consequences and alternative strategies.

Message example three: Hand-held mobile phone use and a narrow bridge

Show a young driver driving along a very narrow bridge without barriers (single lane each way) along a cliff and how much concentration it is taking (e.g. by showing the driver turning off the radio or abstaining from talking to the passenger; the young driver must be able to relate to the need to concentrate) to stay in their lane and not go over the cliff. Then show the driver using a mobile phone on a normal road with parked cars and pedestrians, bicyclists and motorcyclists. Depict the driver almost running into one of the vulnerable road users or fearful reaction by a motorcyclist the driver just missed crashing into. The strategy for the driver is to focus on the task at hand, i.e. pay attention and concentrate at all times and not use the mobile.

Potential Slogan

'Don't drive and dial, it could cost someone's life'.

Rationale

Young drivers do not understand the risk of mobile phone use or its consequences. The narrative shows how much a driver needs to concentrate and how this concentration is affected when using a mobile, the consequences and alternative strategies.

9.2.4 Tailgating

Message Content

The tailgating message content appears in Table 9.4.

Table 9.4: Tailgating – message content

Message component	Description
Risky behaviour (to be discouraged)	Tailgating
Cost of risky behaviour – severity and probability of consequences (maximise)	Damage to own vehicle Fines Demerit points (one point in the ACT) Disapproval of friends and/or girlfriend (won't get in the car) Embarrassment Pay insurance excess following crash Pay increased insurance premiums following crash
Benefit of (reason for) risky behaviour (minimise)	Ready to overtake or change lanes Driver in front gets out of the way Get to destination faster
Lower risk alternative behaviour	Leave a two second gap (more if the road is wet) Reduce speed/travel at a speed suitable for conditions
Cost of alternative behaviour (minimise)	Other drivers cut in
Benefit of alternative behaviour (maximise)	Driver feels more relaxed Passengers feel more relaxed More spare capacity to talk to passengers Ability to brake and react to unexpected situations
Feasibility of alternative behaviour/strategies to perform desired behaviour (maximise)	Drive to the road rules easy to do

*Message Examples***Message example one: Tailgating a van**

One driver in a van, another driver (friend of first driver) follows in sedan, tailgating on a four-lane dual carriageway road (i.e. two lanes in each direction). The vehicles are travelling in the left lane and suddenly the van moves to the right lane due to a parked car. The sedan cannot stop in time and crashes into the parked car, which was not seen beforehand due to the height of the van. The police are called and the sedan driver goes to court. Depiction of embarrassed sedan driver (in front of parents and partner) who receives a fine, but is threatened with licence loss by the magistrate. The alternative strategy to avoid court could be depicted (the two second rule).

An alternate scenario: Road is one lane in each direction. A dog runs out in front of the van, which brakes suddenly and the car runs into it. Conversation reveals that the car driver was unable to see the dog in front of the van. Van driver is very annoyed with car driver for damaging van. Car has fairly minor damage but still needs to be towed because the radiator is cracked and the water runs out on the road. Both drivers might also be annoyed because they will now be late to wherever they were going.

Potential Slogan

'Think you're being smart keeping up with your mate? Think again, tailgating has consequences, leave a two second gap'.

Rationale

The negative consequences of tailgating and an alternative strategy are depicted.

Message example two: Annoyance of the tailgater

Show a young person (wearing headlights and horns or similar for humour) following different people around an office very closely (i.e. tailgating 'in person'). Show how the people tailgated react e.g. they either get out of the way quickly, race the tailgater, slow down so the tailgater cannot get past, elbow the tailgater into the filing cabinet etc. The tailgater should look like a 'tossler/idiot'. The two second rule should be communicated.

Potential Slogans

'Tailgating, you wouldn't do it here, so why do it on the road?'

'Tailgaters – what tossers'.

Rationale

The narrative shows humour and how the person being tailgated may react (potential negative consequences). Humour may make this potential advertisement memorable, as anecdotally most people probably do not consider tailgating to be a safety issue.

10 CONCLUSIONS AND RECOMMENDATIONS

Influencing young driver risk taking behaviours is not an easy task. This project aimed to explore the possibility of influencing this risk taking through the development of prototype messages in the areas of speeding, hand-held mobile phone use and tailgating. Consideration was given to risk taking theories and other relevant behaviour-change models to determine what factors should be considered when influencing young driver risk taking behaviour. The research in this area indicated it is important to illustrate in messages to young drivers the costs of risky behaviours, benefits of desired behaviours, a minimisation of any costs of desired behaviours, the feasibility of desired behaviours and strategies to perform the desired behaviours.

The factors that affect young drivers' perceptions of risk and reasons for engaging in risk taking behaviours were then explored. These factors ranged from gender, beliefs, attitudes, lifestyle factors, personality factors to self-assessment and optimism bias. Specific factors influencing speeding, mobile phone use and tailgating behaviours were also reviewed. Issues such as young drivers being a non-homogenous group, optimism bias, general social background and upbringing, and peer group pressure make young drivers difficult to influence. Role modelling of desired behaviours by parents is an important factor in influencing the young drivers of the future.

Message development models and general factors to consider during message development illustrated there are a large number of principles to consider during this process. Issues surrounding message sources, mode of delivery, message style, customisation (e.g. to pre-existing knowledge and motivations, etc.), consideration of the specific target group, content-related principles, and the type of message used and in what context (e.g. fear, positive and negatively-framed messages and narratives) must be considered. This provides quite a challenge for the message developer.

Due to the challenge involved in the message development process, the development of a range of prototype road safety messages in the form of general narrative ideas and accompanying slogans was workshopped. The risk taking behaviours targeted were high and low-level speeding, hand-held mobile phone use and tailgating. The message content delivered should prove a good starting point for further refinement in Stage 2 of the project, followed by testing with the relevant target audiences.

It is recommended that a second stage of this project be commissioned to review the prototype messages, select the most promising and undertake further refinement. It is anticipated that an advertising agency will assist ARRB with this process. Once this process has occurred, the final messages would be focus tested with suitably identified subgroups of young drivers. A further round of refinement may be required following focus testing.

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APPENDIX A WORKSHOP PRESENTATION




Development of messages to address young drivers' risk-taking behaviours

Collaborating with the road industry to turn knowledge into practice





research consulting technology




Project objectives

- Investigate young drivers' perceptions/attitudes that objectively risky driving behaviours are safe or less risky. Specific interest in:
 - speeding, mobile phone use and tailgating
- Develop prototype road safety messages to counteract young driver perceptions that speeding, mobile phone use and tailgating are safe

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Project components

Information on young drivers perceptions and attitudes toward all risky-driving behaviours:
e.g. personality, situational, emotional, peer group, confidence and other factors
AND specifically toward speeding, mobile phone use and tailgating

Information from risk-taking and behavioural change models

Message development principles/rules

This Workshop to develop messages

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Information from risk-taking and behaviour-change models

- Explain that if risky driving leads to adverse consequences, they will be severe
- Offer incentives for safe behaviour and punishments for risky behaviour
- Illustrate societal, familial and peer disapproval of risky driving behaviour



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Information from risk-taking and behaviour-change models (cont.)

- Recommend alternative, non-risky behaviours (e.g. stick to the speed limit)
- Show respected or influential others (e.g. parents, peers) modelling non-risky alternative behaviours
- Demonstrate the feasibility of the non-risky alternative behaviours
- Provide messages tailored to various stages of change (contemplating, planning, acting, etc).

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Factors associated with risk taking

- Being young
- Lower education, poverty
- Lifestyle factors e.g. antisocial, using cars for fun
- Substance use e.g. cigarettes, marijuana
- Negative role modelling from parents
- Influence of peers
- Personality factors e.g. sensation seeking, impulsivity, hostility/aggressive tendencies, emotional instability, depression, low traditionalism, harm avoidance, social closeness, altruism
- Optimism bias



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How to influence risk-taking factors (1)

- Explain and emphasise the potential negative outcomes of risky driving, e.g.:
 - getting caught by police
 - losing your licence
 - hurting your friends
 - hurting road users outside the vehicle
 - the embarrassment of receiving a ticket, especially if driver must tell parents, employer, work colleagues or friends



How to influence risk-taking factors (2)

- Explain the positive & negative aspects of behaviours, e.g.:
 - drivers have control over whether they take risks
 - the supposed positive outcomes of risky driving (such as saving time) are unlikely to occur or will be minimal
 - using a hands-free mobile is just as risky as using a hand-held mobile
 - crashes are usually caused by driver decisions rather than road/vehicle defects



How to influence risk-taking factors (2, cont.)

- Explain the positive & negative aspects of behaviours, e.g.:
 - contribution of speeding to crashes
 - speeding by 5 km/h doubles risk of being involved in a crash
 - being skilful at using mobile phones etc. doesn't mean it can be done safely while driving
 - distracting tasks are dangerous
 - drivers are not in control when speeding or distracted (e.g. by mobile phone) and how little they will be able to respond to avoid a crash if there is an unexpected hazard
 - portray driving at safe speeds





How to influence risk-taking factors (3)

- Address commonly held beliefs, e.g.:
 - speeding is safe under some circumstances
 - speeding is acceptable if the driver is skilful



How to influence risk-taking factors (4)

- Persuade young driver:
 - family, friends and work colleagues don't approve of risky driving
 - to model safe driving to their peers
 - to disapprove when their friends take risks while driving
 - to use strategies to counteract risk-taking behaviour (e.g. prepare before trips, so they will not need to speed or use mobile phones while driving)
- Focus on:
 - males
 - drivers who see themselves as confident and adventurous



How to influence risk-taking factors (5)

- Develop different messages for different personality types and driver sub-populations (do not highlight mortality risks to high sensation seekers)
- Use scenarios and characters that are relevant to the target group
- Persuade parents to:
 - reduce risky driving
 - model safe driving to their pre-driver and novice driver children
 - tell their children that they disapprove of risky driving





Message style

- Avoid lecturing
- Non-judgemental
- Educational messages must be made entertaining
- Message must obtain and hold the interest of the audience
- Message must be easy to understand and not too complicated
- Message should be concrete, clear and realistic



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Message customisation

- Relevant and understandable
- Settings and situations relevant to the audience
- Build on the audience's pre-existing knowledge, beliefs, motivations and values
- Use existing motives of young people, such as freedom, independence and peer group acceptance
- Segment the audience by beliefs and attitudes and develop messages suited to different sub-populations
- Avoid exaggeration that would reduce personal relevance
- Use sensational messages promoting alternative behaviours when targeting sensation-seekers
- Use low-sensation messages promoting avoidance skills when targeting non-sensation seekers



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Message mode of action (1)

- Persuasion rather than education
- State the specific behaviour change required (single behaviour focus)
- Fear messages must:
 - be relevant to audience
 - include an action/steps the audience can take to avoid the negative behaviour
 - inform the audience of the harmful nature of the problem
 - explain the high likelihood of suffering the negative consequences of the behaviour if this behaviour is not changed
 - explain the ability of target audience members to personally carry out the required behaviours to reduce the negative consequences
- Change beliefs that impede adoption of desired behaviours
- Show immediate, high-probability benefits of the desired behaviour
- Show the personal as well as social benefits of the desired behaviour
- Immediate rewards rather than distant costs

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Message mode of action (2)

- Firm conclusion/recommendation
- Establish disapproval of the risky behaviour
- Stimulate self-assessment by the audience
- Enforcement and legal consequences of risky behaviour
- Arouse a strong positive or negative emotional response
- Use mnemonics, such as verses
- Incorporate evidence, examples and reasoning - alleged costs and benefits must be credible
- Present counterarguments and refute them
- If counterarguments cannot be refuted, do not mention them
- Begin with an emotional appeal before presenting information



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Message mode of action (3)

- Use positively-framed messages when:
 - promoting cautious or preventative behaviours
 - audience attention is limited
 - low relevance or the issue is unfamiliar
 - for males
 - focusing on consequences for others
- Use negative messages when:
 - there is high relevance and high risk to the audience
 - for females
 - focussing on consequences for self
- Use indirect appeals such as humour once the issue is familiar
- Avoid positive emotion if an issue is strongly associated with negative emotion
- Emphasise controllability of behaviour
- Use narrative that has engaging characters (possibly similar to the audience) and incorporates the desired values, beliefs or behaviours

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Speed messages

- Two areas of focus:
 - low-level speeding e.g. 5-10 km/h over the limit
 - Extreme speeding e.g. 40 km/h+ over the limit, hooning
- Message examples:
 - 'The faster you go, the longer it takes to stop. Slow down. Stick to the limit'
 - 'Every k over is a killer'
 - 'There's been enough blood spilled on our streets'
 - 'The negatives of speeding....you kill, you maim, you disable, you disfigure.....no positives....just nightmares.....forever'
 - 'Exceed the speed limit by any amount.....expect the worst'
 - 'How many times do we have to tell you – 60 – every k over is a killer'
 - 'High speed. Low IQ'
 - 'Limit your speed. Limit the damage'

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Speed messages (cont.)

- 'Has your car got a nut loose at the wheel'
- 'This is why you're photographed when you speed' from the 'Pictures of you' campaign showing photos of people killed from speeding
- 'Wipe off 5' which emphasises that small reductions in speed can make the difference between life and death
- 'There's no excuse for speeding' which explores the excuses for speeding and tries to shame speeding behaviour
- '73 people were killed in P plate crashes last year. Please slow down'
- 'Police now targeting P plate speeding. Please slow down'
- 'Speed and you could lose your licence in a flash. Stick to the speed limit'



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Mobile phone messages

- 'Distracted drivers are dangerous'
- 'Mobile phones can be deadly if you're driving. If you're on the phone, get off the road'
- 'A lot can happen in a second, so concentrate'
- 'You make a call, we'll make a call' (i.e. policeman watching by the roadside, radio police car up ahead to apprehend driver)... 'You break the law, we'll catch you'



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Other messages (no tailgating ones found)!

- 'We'll catch you before someone gets hurt'
- 'Safer lives save lives'
- 'Shift workers are six times more likely to hit the wall'
- 'With a partner, why not swap? One of the best ways to fight fatigue is to stop and swap drivers'
- 'Some things are worth waiting for' (in relation to stopping at a railway level crossing)
- 'You don't have to be drunk to be a drink driver'
- 'If you drink and drive you're a bloody idiot'
- 'Drive on drugs and you're out of your mind'
- 'Choose a car that could save your life'

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Target population - speeders

- Personality factors:
 - sensation seeking, impulsivity, aggression, authority rebellion, Type A personality
 - confident/adventurous driving style
 - low levels of positive health behaviours
 - illusory invulnerability (non-road related)
 - peer influence, risk-propensity, low constraint
- Situational/positive consequences e.g. 'you need to overtake', 'you are in a hurry to get to an appointment', 'to avoid a crash', 'keep up with the general flow of traffic', 'where you feel speed limit is inappropriate', 'in light traffic conditions', 'if you feel the risk of crashing is low', 'impress others', 'race others', 'gain recognition as a respected adult' and 'if you feel the risk of being caught by police is low'

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Target population – speeders (cont.)

- Less perceived risk e.g. 'you know the road very well', 'you need to overtake'
- Perceived pressure from other drivers e.g. from tailgating and flashing their headlights
- Believe no negative consequences for particular situations e.g. cannot be booked for speeding when it is for overtaking, going down a hill or being no more than 10% over the speed limit
- To avoid negative consequences e.g. being fined, licence loss, crashing
- Socially acceptable (to some people usually those who speed regularly and at substantial amounts over the speed limit; others do not wish to be caught speeding as they wish to be viewed as responsible and trustworthy, and do not wish to be embarrassed)
- Lack of passengers (presence of passengers makes drivers drive slower), except young males (more likely to speed with friends in the car)

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Target population – mobile phone users

- Naturally able to multi-task (i.e. carry out tasks using a mobile phone while driving) as teenagers have grown up with the technology
- Peers in the vehicle
- Situational e.g. 'making plans for the evening', 'boredom of driving alone in a vehicle'
- Positive consequences such as 'using time more effectively', 'receiving information e.g. directions, important news'
- Social approval
- Perceived less risk
- Negative consequences resulted in potentially less mobile phone use e.g. due to the risk of fines, lack of hands-free kit, demanding driving conditions (e.g. weather, changing lanes), risk of a crash, police presence and heavy traffic

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Target population - tailgaters

- Low constraint
- Age (younger)
- Type A personality

- Note – very little literature in this area!

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LET'S DEVELOP MESSAGES FOR: Speeding, mobile phones and tailgating!!

Messages can be:
slogans, advertisements, resource content,
info for face-to-face sessions



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APPENDIX B WORKSHOP SUMMARY DOCUMENT

MESSAGE CONTENT PRINCIPLES

Illustrate the negative outcomes/costs of risky driving behaviours

- Explain and emphasise the potential negative outcomes of risky driving (and that they will be severe) e.g. enforcement and legal consequences. Examples of negative outcomes:
 - getting caught by police
 - cost of fines
 - losing your licence
 - hurting your friends and other road users outside the vehicle
 - the embarrassment of receiving a ticket, especially if the person must tell their parents, employer, work colleagues or even friends.

Counteract perceived positive beliefs (benefits) and motives for risky driving behaviours

- Explain the positive and negative aspects of behaviours, including how the advantages of performing the positive behaviour outweigh the disadvantages (costs, anticipated negative outcomes) for example:
 - that drivers have control over whether or not they take risks
 - that the supposed positive outcomes of risky driving (such as saving time, speeding is safe under certain circumstances) are unlikely to occur or will be minimal
 - that particular situations to commit risky driving behaviours are not actually safe (e.g. speeding in light traffic conditions)
 - that using a hands-free mobile is just as risky as using a hand-held mobile
 - that being skilful at using mobile phones etc. does not mean it can be done safely while driving
 - that distracting tasks are dangerous
 - that crashes are usually caused by driver decisions rather than by defects of the road or vehicle
 - the contribution of speeding to crashes
 - that speeding by 5 km/h doubles the risk of being involved in a crash
 - speeding is acceptable if the driver is skilful (i.e. counteract this belief)
 - young drivers are better skilled than other drivers (optimism bias) (i.e. counteract this belief)
 - the risk of using vehicles for socialising and having fun
 - that drivers are not in control when speeding or distracted (e.g. by mobile phone) and how little they will be able to respond to avoid a crash if there is an unexpected hazard.

Provide strategies to counteract risk taking behaviours

- Provide strategies (non-risky behaviours) to counteract risk taking behaviours:

- e.g. encourage drivers to prepare before trips so they will not need to speed or use mobile phones while driving (i.e. provide strategies to counteract risk taking behaviour)
- remove any barriers to facilitate strategies (if possible)
- ensure the strategies are feasible and the audience will believe they can perform them (self-efficacy).
- Illustrate any costs associated with positive alternative behaviour and try to counteract it.

Use persuasion

- Persuade young drivers:
 - that family, friends and work colleagues do not approve of risky driving (such as using a mobile phone while driving)
 - to model safe driving to their peers
 - to disapprove when their friends take risks while driving.

MESSAGE DEVELOPMENT PRINCIPLES

Source

- should be credible, knowledgeable, trustworthy and unbiased
- should be similar to audience, hold similar opinions, be likeable and physically attractive
- use more than one.

Delivery

- repeat the message if appropriate
- use more than one delivery channel (TV, radio, newspapers, billboards, pamphlets, newsletters, websites, email, instant messaging, text messaging etc.)
- messages should reach the recipient at a time when they are able to respond (not distracted) e.g. place TV ads at the time the target audience is watching
- accompany the communication campaign with other actions to encourage behaviour change (e.g. enforcement).

Style

- avoid lecturing
- non-judgemental
- educational messages must be made entertaining
- obtain and hold the interest of the audience
- easy to understand (if not, use emotional appeals) and not too complicated
- concrete, clear and realistic
- sensation-style messages should:
 - use drama, surprise, novelty and strong emotional appeal

- not highlight mortality risks
- show negative outcomes to increase risk appraisal
- promote alternative behaviours
- non-sensation-style messages should stress peer resistance and low-sensation value, and promote avoidance skills
- the message should focus on a single behaviour to change – state the specific behaviour change required and avoid generalities
- draw a firm conclusion or present a firm recommendation
- use mnemonics, such as verses, when presenting information
- arouse a strong positive or negative emotional response
- when messages are simple and familiar, use graphics to attract attention
- when messages are new or complex, simplify the presentation.

Customisation

- message must be personally relevant (e.g. settings and situations)
- provide messages tailored to various stages of change (contemplating, planning, acting, etc.) if possible
- build on the audience's pre-existing knowledge, beliefs, motivations and values
- use existing motives of young people, such as freedom, independence and peer-group acceptance
- avoid exaggeration that would reduce personal relevance.

Consider the target group

- segment the audience by beliefs and attitudes
- create different messages suited to different sub-populations
- consider the language and culture of sub-populations
- focus on:
 - males
 - drivers who see themselves as confident and adventurous
- develop different messages for different personality types and driver sub-populations, e.g. for high-sensation seekers use high-sensation value messages
- use scenarios and characters that are relevant to the target group e.g. peer-based education.

Mode of action/context

General actions

- aim for persuasion rather than education

- use a two-sided message i.e. acknowledge the person's positive perceptions of the negative behaviour, so the message cannot be refuted e.g. although smoking is enjoyable it causes cancer.

General content-related principles

- incorporate evidence, examples and reasoning
- use indirect appeals such as humour once the issue is familiar
- avoid positive affect (emotion) if an issue is strongly associated with negative affect (emotion)
- if counterarguments cannot be refuted, do not mention them
- alleged costs and benefits must be credible
- begin a message with an emotional appeal before presenting information
- demonstrate the immediate, high-probability benefits of the desired behaviour, including any social benefits, rather than distant costs
- establish disapproval of the risky behaviour and show positive behaviours by parents, peers and society
- emphasise controllability of behaviour.

Fear appeals

- if fear appeals are to be used (e.g. used where severe consequences and a high probability of occurrence are to produce stronger intentions to remain 'abstinent') the following actions are essential:
 - inform the audience of the harmful nature of the problem
 - explain the high likelihood of suffering the negative consequences of the behaviour if this behaviour is not changed
 - outline the steps to reverse the negative consequences
 - explain the ability of target audience members to personally carry out the required behaviours to reduce the negative consequences.

Positively-framed messages

- use positively-framed messages when:
 - promoting cautious or preventative behaviours (ensure information on how to perform a task correctly is provided)
 - audience attention is limited
 - there is low relevance or the issue is unfamiliar
 - targeting either low or high risk situations
 - focusing on consequences for others
 - targeting males.

Negatively-framed messages

- use negatively-framed messages when:

- 'grabbing attention' and providing a 'top-up' of fear
- there is high relevance and high risk to the audience
- focusing on consequences for self
- targeting females.

Incentives

- the use of incentives to encourage drivers to behave safely needs to:
 - increase the perceived benefit of cautious behaviour
 - decrease the perceived cost of cautious behaviour
 - increase the perceived cost of risky behaviour
 - decrease the perceived benefit of risky behaviour.

Audio messages

- for audio messages, use structural complexity or emotional appeal, but not both
- for audio messages, use multiple voices, concrete language and chronological presentation of information.

Narratives

- transport the audience into a narrative world (when appropriate) that has engaging characters (possibly similar to the audience) and incorporates the desired values, beliefs or behaviours.

Audience participation (as applicable)

- allow audience to participate by drawing a conclusion rather than presenting a ready-made conclusion
- encourage the audience to question the benefits of the risky behaviour
- stimulate self-assessment by the audience.

Other

- pre-test messages to verify they are understood and do not generate counterarguments
- develop new messages for booster campaigns
- include messages for parents and persuade them to:
 - reduce risky driving
 - model safe driving to their pre-driver and novice driver children
 - tell their children that they disapprove of risky driving.

APPENDIX C MODELS AND THEORIES OF RISK TAKING

C.1 Introduction

There are various models or theories relating to risk taking. These are briefly discussed to allow important points in relation to influencing risk taking to be drawn out and assist in the main objective of this project. The models discussed are those most widely cited in the literature.

C.2 Theory of Sensation Seeking

In 1979 Zuckerman developed the theory of sensation seeking with the definition: the need for varied, novel and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences. He went on to develop a sensation seeking scale to measure this personality trait which consists of four subscales (Hewitt et al. 1995):

1. thrill and adventure seeking – adoption of intense, novel recreational experiences e.g. paraflying, waterskiing
2. disinhibition – refers to social drinking, liberal sexual attitudes and enjoyment of lively parties
3. boredom susceptibility – one's loathing for monotonous and repetitive tasks, and unexciting people
4. experience seeking – desire for travel, nonconforming way of life and unusual experiences.

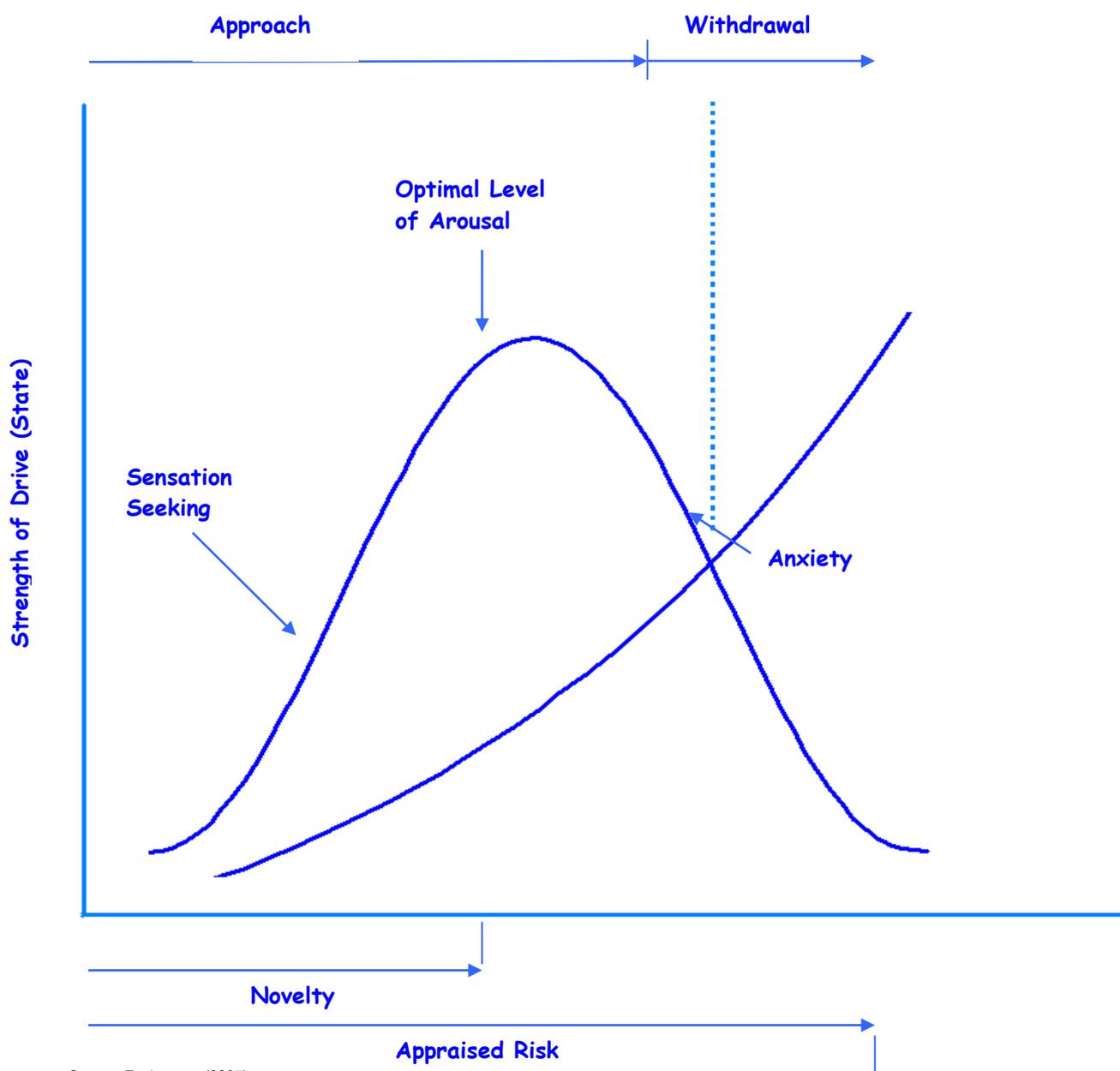
Sensation seeking has been linked to risky driving, alcohol and drug use. Sensation seekers perceive themselves as skilled drivers and this probably reduces their perception of risk in the way that they drive. There is some evidence that sensation seeking has a biological basis, e.g. link to monoamine oxidase (MAO) and sex hormone levels. Overall, it is considered to provide the best account of risk taking as a personality trait, supported by biological data (Hewitt et al. 1995).

Zuckerman (2007) expanded the theory of sensation seeking into a general theory of risk taking. The theory postulates that avoidance reactions are a function of the anticipated and actual states of anxiety and positive affect² (considered sensation seeking here) in particular situations (Figure C 1). Anxiety will tend to increase linearly with perceived riskiness, as does sensation seeking up to a point, which then decreases with increasing riskiness. In addition:

- Sensation seeking increases with novelty and appraised risk up to a maximum level, then decreases with further increases in appraised risk and anxiety levels.
- High and low-sensation seekers differ in the height of the anxiety and positive affect gradients in relation to perceived risk and the point where positive affect begins to decrease as a function of riskiness. For high-sensation seekers the anxiety increase is more pronounced for risky situations. For low-sensation seekers the decrease in sensation seeking is greater than high-sensation seekers.

² Positive emotion such as happiness. Negative affect is negative emotion e.g. sadness (Colman 2003).

The model further proposes that the novelty and intensity of stimuli produced by risky driving behaviours, such as speeding, results in a release of dopamine (reinforces the current behaviour) in reward areas of the brain in high-sensation seekers, but low-sensation seekers show a weak dopamine response and stronger noradrenergic (related to anxiety) and serotonergic (inhibition) reactions. The high-sensation seeker, in addition, has a lower perception of risk than the low-sensation seeker and is therefore not deterred by a dopamine response, except in extreme situations. Thus, experiences such as speeding without negative outcomes further lower risk appraisal in the high-sensation seeker, whereas the low-sensation seeker is sensitised to stimuli and conditioned by experiences that reinforce their fears of danger of the road (Zuckerman 2007).



Source: Zuckerman (2007).

Figure C 1: Zuckerman's general theory of risk taking

C.3 Risk Behaviour Syndrome Theory

The Risk Behaviour Syndrome Theory of crash risk posits that aggressive and reckless driving is a manifestation of a tendency toward deviance and risk taking. This theory has received robust empirical support. For example, research has shown that individual risky driving behaviours covary with each other, and reckless driving is correlated with behaviours such as delinquency, drug and alcohol use, and drink driving. Research has also consistently shown links between alcohol and substance abuse, and crash risk and aggressive driving (Galovski et al. 2006).

C.4 Problem Behaviour Theory

In 1977, Jessor and Jessor devised Problem Behaviour Theory (PBT), a theory initially used to explain deviance. PBT postulates that all behaviour is the result of the person-environment interaction, and that behaviours are a balance between enhancing and compromising activities in which one engages. Problem behaviours are those that depart from legal and social norms that usually result in some type of control response by others such as mild disapproval or social rejection, or in more extreme circumstances lead to incarceration. PBT uses three systems: the personality, behaviour and perceived environment. Within each of these systems is the motivation to constrain or commit certain behaviours, known as proneness or the likelihood of engaging in risky behaviours (Hewitt et al. 1995).

The variables contained in each of the systems related to values, beliefs, expectations etc. and result in proneness to problem behaviour are:

- Personality system: more external control, lower self-esteem, greater social criticism, lower academic achievement, higher value on independence, greater deviance tolerance, less religiosity and greater alienation.
- Perceived environment system: lower parental support and controls, greater friends' than parents' influence, lower parental disapproval of problem behaviour, greater friends' approval for problem behaviour, lower friends' controls and lower parent-friend compatibility.
- Behaviour system: relates to higher involvement in specific problem behaviours such as problem drinking, cigarette use, promiscuity etc. (Hewitt et al. 1995).

PBT indicates that problem behaviours are not separate behaviours but interrelated to one another, thus the personal and situational factors influencing one behaviour also influence another. Hewitt et al. (1995) outlined two studies that supported PBT.

C.5 Risk Homeostasis Theory

In 1982, Wilde developed Risk Homeostasis Theory (RHT) (also known as risk compensation) to account for the relative stability of crash rates. The theory indicates that (Hewitt et al. 1995):

- For any activity, people have an accepted level or target of risk.
- The aggregate level (not individual level) of risk is kept constant through a self-regulating homeostatic process. Thus, the person compares the amount of risk they perceived with their target level of risk and adjusts behaviour to eliminate the discrepancy between the two.

- The level of risk can be reduced by motivating people to want to behave in a less risky fashion.

Overall, people take risks based on four utility factors, namely the:

1. expected benefits of risky behaviours (e.g. gaining time by speeding, alleviating boredom)
2. costs of risky behaviours (e.g. speeding tickets, car repairs)
3. expected benefits of safe behaviours (e.g. insurance discounts for crash-free periods)
4. expected costs of safety behaviours (e.g. time loss, using an uncomfortable seat belt).

Thus, cautious driving results in less chance of a crash, but when crashes do not happen, driving becomes less cautious. Therefore engineering infrastructure that makes roads safer increases risky driving as the perceived probability of injury is reduced. A similar situation can arise with airbags, where one study found that airbags encouraged driver carelessness. The same applies for various other countermeasures, such as driver training whereby a driver's skills improve, but confidence increases more so, hence increasing the chance of crashing. Therefore, there is a need to make people willing to take less risk, rather than optimise risk (Hewitt et al. 1995; Wilde 1998).

It appears prudent to offer incentive systems to decrease risky driving (see utility factor 3 above). There have been many studies indicating their effectiveness, from 10% to 90% injury reductions. The prospect of future gratification appears to make people look to the future with a positive expectation. There is evidence that suggests people who have a high valuation of the future take fewer risks and display less unhealthy lifestyles.

Despite support for the theory, it has received substantial criticism, one of the major criticisms being that it is untestable as it is impossible to measure an individual's target level of risk. Another criticism is there are many empirical studies to refute the claims of the theory, for example in relation to airbags, there are many studies that show a decrease in death and injury from the countermeasure (O'Neill & Williams 1998).

C.6 Risk Motivation Theory

Hewitt et al. (1995) indicated that Risk Motivation Theory (RMT) was derived in 1994 by Trimpop from Risk Homeostasis Theory. Trimpop's RMT outlines that two motives drive risk taking, extrinsic benefits (e.g. saving time) and intrinsic pleasures (e.g. emotional pleasure). It differs from RHT as it accounts for risk taking being a desirable, pleasant activity, which offers extrinsic and intrinsic rewards. The theory argues that incentives are a powerful motivator in reducing risk taking, and that positive and rewarding incentives are more effective than negative and punishing incentives.

Thus, the theory indicates that individuals should be 'motivated to perform safe behaviours rather than rewarding them for avoiding unsafe behaviours by not administering a penalty' (p. 59). Overall, the theory postulates that risk taking is genetically determined, intrinsically supported and extrinsically rewarded on a physiological, emotional and cognitive level. Thus, it is illogical to attempt to prevent crashes by preventing drivers from taking risks, due to the rewards associated with such behaviours. Thus changing risk taking should be based on:

- an individual assessment of risk taking tendencies
- the specific way risk taking is individually expressed

- understanding the variables in different situations that trigger, encourage or discourage certain types of behaviour
- the need to design alternatives to risk taking behaviours, 'whilst fulfilling evolutionally controlled needs without compromising social values' (p. 59).

C.7 Zero Risk Model

In 1976, Näätänen and Summala introduced the Zero Risk Model. The model outlines that drivers control safety margins rather than some specific risk measures, and only when the risk or fear threshold is exceeded or expected to be so, does it influence behaviour. Thus, a 'fear monitor' will influence driver decisions when safety margins are violated. With repeated confrontations to situations, drivers will adapt to these situations, which at first elicited a fear/risk response, so that such situations pose no risk (an overlearned habitual response), hence the term 'zero risk'. The model has a motivational element, used to explain the approach to zero risk, which includes both motives which are outside the traffic context (e.g. trip-centred motives such as time to arrive at one's destination) and motives during the trip (e.g. desire to maintain a steady speed) (Summala 1996).

C.8 Threat Avoidance Model

In 1984 Fuller developed the threat avoidance model in response to the zero risk model and risk homeostasis theory outlined earlier. The model focuses on the response of a driver who perceives a potential aversive stimulus – that is, a stimulus that warns that an aversive stimulus (such as a vehicle on a conflicting path) may be imminent. The driver may make an anticipatory avoidance response (e.g. changing speed or path) or do nothing until the aversive stimulus occurs and then make a delayed avoidance response. If the aversive stimulus does not occur, no response is required. These avoidance responses depend upon a number of factors which are rewards and punishments associated with the response, the accuracy of stimuli recognition (e.g. perception of speed, road environment, own driving ability, presence of police etc.), the subjective likelihood of a crash, the driver's level of arousal and the effectiveness of avoidance responses (Panou et al. 2007).

There is no motivation variable, rather the driving task is considered to involve learned avoidance responses to potential aversive situations. Drivers consider the likelihood of a crash and the discriminative stimulus for a potential aversive stimulus is based on the integration of the drivers' perceptions of their speed, the road environment, intended driving path and their ongoing driving ability. Thus, the expectation of a threat posed by the factors listed above combine, leading to a discriminative stimulus or non-discriminative stimulus. When a discriminative stimulus is detected, the avoidance response is not only determined by the subjective probability of the expected threat, but also by the rewards and punishments associated with the various response alternatives (Panou et al. 2007).

Catchpole (2005) used Fuller's Threat Avoidance Model to help explain the findings of a study of crash and offence involvement among New South Wales drivers. The study found that relative involvement in certain types of crash and the rate of traffic offences both increase with increasing driving experience (over the first few years of driving) among drivers of the same age. Using the concepts of Fuller's model, Catchpole argued that during the early years of driving, repeated exposure to discriminative stimuli without reinforcement (experience of a potentially aversive stimulus) will lead to the gradual extinction of anticipatory avoidance responses (such as reducing speed) to the potentially aversive stimulus.

This theory pays little attention to the types of reward that motivate voluntary exposure to risky situations (Zuckerman 2007).

C.9 Biopsychosocial Model of Risk Taking

The timing of biological maturation influences adolescents' cognitive scope, self-perceptions, perceptions of the social environment and personal values. The Biopsychosocial Model of Risk Taking outlines that these factors predict adolescent risk taking behaviour through the mediating effects of peer group characteristics and risk perception. Research supports this model. For example, early maturational timing is associated with a more negative self-image, and with earlier sexual activity in female adolescents. Early maturation is a risk factor for the initiation of drug use amongst adolescents (Igra & Irwin 1996).

The biological factors believed to result in increased risk taking tendencies include (Igra & Irwin 1996):

- cognitive immaturity
- sensation seeking
- value on independence
- asynchronous development
- being male
- genetic predispositions
- hormonal depression
- low self-esteem.

Social environmental factors include:

- maladaptive parenting styles
- parental modelling of risk behaviours
- peer behaviours and approval of risk behaviours
- socioeconomic status (poverty).

Situational factors include:

- school transitions and school failure
- substance use or initiation of sexual activity
- vulnerability
- family disruption and lack of parental supervision
- peer initiation of risk taking behaviours
- social pressure.

C.10 Other Behaviour-change models

C.10.1 Introduction

Behaviour-change models, in addition to risk taking models, have been applied in the design and implementation of interventions to change risky behaviours. Ten models are described

below that seek to explain how people make decisions about health-related behaviours and may assist in message development for this project.

C.10.2 Deterrence Theory

One way of controlling driving behaviours is via deterrence theory. There is general and specific deterrence. The former applies strategies that focus on preventing illegal behaviours (such as driving while in excess of the speed limit) by producing and maintaining the perception that such behaviours will be noticed and punished (via enforcement e.g. the presence of fixed speed cameras and ensuing fine). The latter applies strategies that directly punish those who are caught breaking the law in order to prevent them from doing so again, e.g. fines, court penalties (Global Road Safety Partnership 2007).

Despite the apparent success of deterrence theory in the form of driver penalties, Wilde (2001) indicated that even if laws are made stricter, greater deterrence might not be applied. He outlines that 'the evidence from many sources shows overwhelmingly that the beneficial effects of punitive measures continue to be weak, marginal or transient' (p. 196-7). However, others argue for the evidence of deterrence theory, particularly in the area of immediate licence suspensions for drink driving offences. Voas et al. (cited in Soole et al. 2008) argued that the reduction in fatalities and injuries associated with immediate licence suspension was evidence of a general deterrent impact of the laws, while the reduction in alcohol-involved fatalities and injuries, as well as recidivism, was evidence for a specific deterrent effect. This argument came from a review of local and international literature, with most research from North American studies.

In 1993, Stafford and Warr (cited in Piquero & Paternoster 1998) reconceptualised deterrence theory so that both general and specific deterrence can operate in the one individual at any given time. The following ideas surround this reconceptualisation:

- There are different types of experiences a person can have of the sanctioning system, either direct/personal experiences or indirect/vicarious experiences. In the former, the person has the direct experience of being stopped by police, being arrested/convicted or 'getting away' with a crime committed. In the latter experience, the person learns about enforcement and punishment from the experiences of others and the media.
- When one commits a criminal act, it may go unpunished and the individual learns that enforcement is not as proficient as once believed. However, punishment avoidance is not less likely to affect one's perception of risk and therefore one's motivation to commit criminal acts in the future, compared to if the person was punished. Both punishment avoidance and punishment can be experienced directly or indirectly, as discussed above.
- Overall, specific deterrence operates through an individual's personal experiences with punishment and punishment avoidance, whereas general deterrence operates through indirect experiences. As people are likely to have a mixture of direct and indirect experiences with punishment and punishment avoidance, they will be affected by both general and specific deterrence.

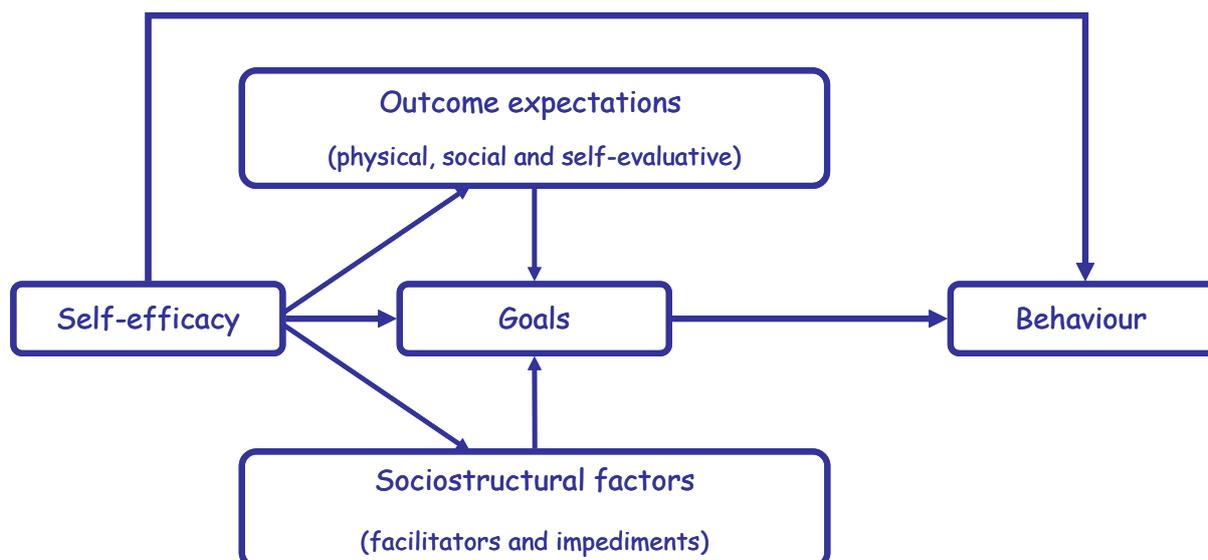
Piquero and Paternoster (1998) found evidence for Stafford and Warr's reconceptualisation from a survey study of licensed drivers in the area of drink driving. The reader is referred to their study for further information. Finally, deterrence theory works in conjunction with laws that define behaviours very specifically, fixed penalties set at an appropriate level of severity (not too high or low as discussed earlier), a high level of enforcement and mass media publicity. Enforcement needs to be ongoing and specific for deterrence of unwanted traffic behaviours to remain. Research shows the effects of increased stationary enforcement appear to last for a limited time after the police presence has been removed. The largest time 'halo' appears to be eight weeks, although sustained police presence is required to produce such large effects (Elliott & Broughton 2004).

C.10.3 Social Cognitive Theory

Bandura (1977) expanded on social learning models of earlier years (e.g. Miller & Dollard 1941) to develop Social Cognitive Theory (SCT). SCT explains how people acquire and maintain behavioural patterns while also providing the basis for intervention strategies. Earlier social learning models outlined that human behaviour was reactive, the result of interplay between internal drives and the environmental factors. Such reactive behaviours can be positively or negatively reinforced³ or punished (thus applying deterrence theory). Both social (e.g. including family members, friends and colleagues) and physical environmental (e.g. traffic conditions, weather conditions and road type) factors are considered important. Imitation, attitudes, beliefs and orientations also play a role.

Bandura (1977) added the concepts of vicarious learning and self-efficacy to supplement this notion. Vicarious learning is that from observing the outcomes of other people's behaviour. Self-efficacy is the judgement about one's own ability to perform the behaviours required to achieve specific goals in a specific situation. Self-efficacy beliefs determine how people think, feel and motivate themselves and behave. These beliefs produce diverse effects through four major processes, which include cognitive, motivational, affective and selection processes. Bandura (1977) also indicated that outcome expectations about the effects of different lifestyle habits contribute to health behaviours, with anticipated positive outcomes serving as incentives, the negative as disincentives. People also control their behaviour via their own self-sanctions, giving them self-satisfaction and self-worth, rather than behaving in ways that provide self-dissatisfaction. Behaviours are evaluated in relation to these self-sanctions and this can be one of the more influential regulators of behaviour. Figure C 2 highlights the links between the various factors described above and behaviour.

³ By definition, reinforcement (both positive and negative) increases the target behaviour. Potential 'reinforcers' can only be called such by demonstrating increases in behavior after their administration.



Source: Bandura (1998).

Figure C 2: Social Cognitive Theory

A study by Kirby and Barth (cited in Noar 2005) which involved the evaluation of a sexual educational curriculum with high school students using a treatment/control design used a number of Social Cognitive Theory constructs, including skills and the confidence to utilize self-efficacy, modelling, reinforcement and knowledge. It was found that the program increased student's knowledge, increased communication with parents about abstinence and contraception, and delayed intercourse. The curriculum has been widely used with replication of the results, giving some support to SCT.

C.10.4 Social Learning Theory

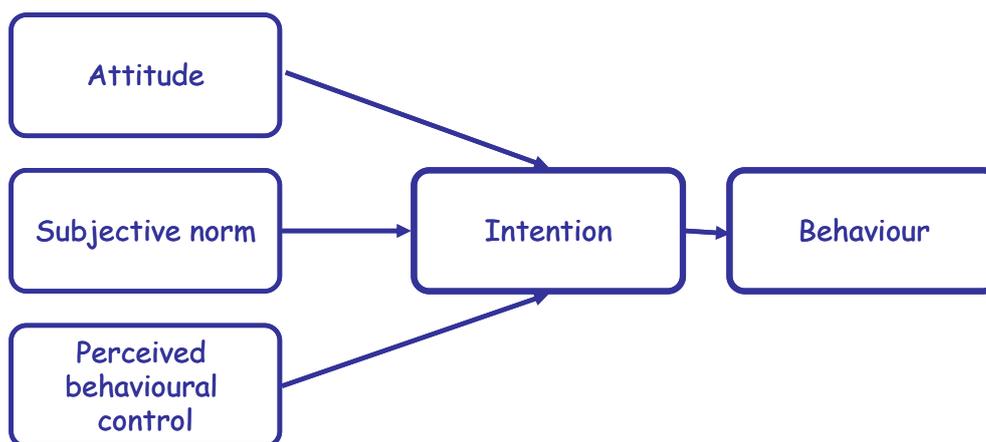
Social Learning Theory developed by Akers in 1998 emphasises the importance of people and groups with whom one associates, outlines that deviance and conformity are learned in the same way, with further influence from the method in which behaviour is rewarded and punished. The role of other people is central to the four components of the theory (Fleiter et al. 2010):

- Imitation: the role modelling of other people's behaviours.
- Definitions: personal attitudes and moral beliefs about behaviour can be influenced by significant others.
- Differential association: direct exposure to others' behaviours via associations and interactions with them (behavioural dimension) and exposure to the values and norms of others (normative dimension).
- Differential reinforcement: the balance of anticipated or actual reinforcements (i.e. punishments and rewards) associated with a given behaviour with reinforcements being social (e.g. praise, embarrassment) and non-social (e.g. anxiety, excitement).

C.10.5 Theory of Planned Behaviour

In 1985, Ajzen developed the Theory of Planned Behaviour (TPB)⁴ (Figure C 3). In the TPB, the main determinant of behaviour is a person's intention to engage in it. The TPB consists of three areas that control intentions:

- attitude – positive and negative evaluations about performing the behaviour
- subjective norm – perceived social pressure concerning the behaviour
- perceived behavioural control – perceived ease or difficulty of performing the behaviour.



Source: Ajzen (1985).

Figure C 3: The Theory of Planned Behaviour

The TPB outlines:

- Attitudes are the product of beliefs about the likelihood of various outcomes (for example, being caught by police) occurring as a result of performing the behaviour, and beliefs about how positive or negative each outcome is.
- Subjective norms are a product of the perceived amount of pressure from others to perform the behaviour and motivation to conform to this pressure.
- Perceived behavioural control is the perceived likelihood of factors that inhibit or enhance behaviour performance and corresponding beliefs about the perceived power of these factors.

A frequent criticism of the TPB is the inaccurate link between intentions and behaviour, for example, people often do not always act as they intend to. A concept that appears important to the translation of intentions into behaviour is implementation intentions as opposed to goal intentions. A goal intention is an overall intention to perform a particular behaviour, whereas the implementation intention concerns the overall plan as to when, where and how the behaviour will be committed (e.g. 'I will just do burnouts when I am with my friends and there are no police present'). Thus, the environment dictates the final behaviour, such that certain conditions are present to allow the intended behaviour to automatically occur (Gollwitzer 1993; Fylan et al. 2006).

⁴ The Theory of Planned Behavior is an extension of the Theory of Reasoned Action that was developed by Fishbein and Ajzen in 1975.

The TPB has been used in a 10th grade Queensland high school drink driving 12 lesson curriculum which aimed to change students' attitudes, norms and perceived behavioural control with regard to drinking and driving, and alternative planning strategies. Role play was used extensively in the program. An evaluation found that there was a change in attitudes and perceived behavioural control to plan ahead and avoid drink driving or being a passenger of a drink driver (Sheehan et al. in Noar 2005).

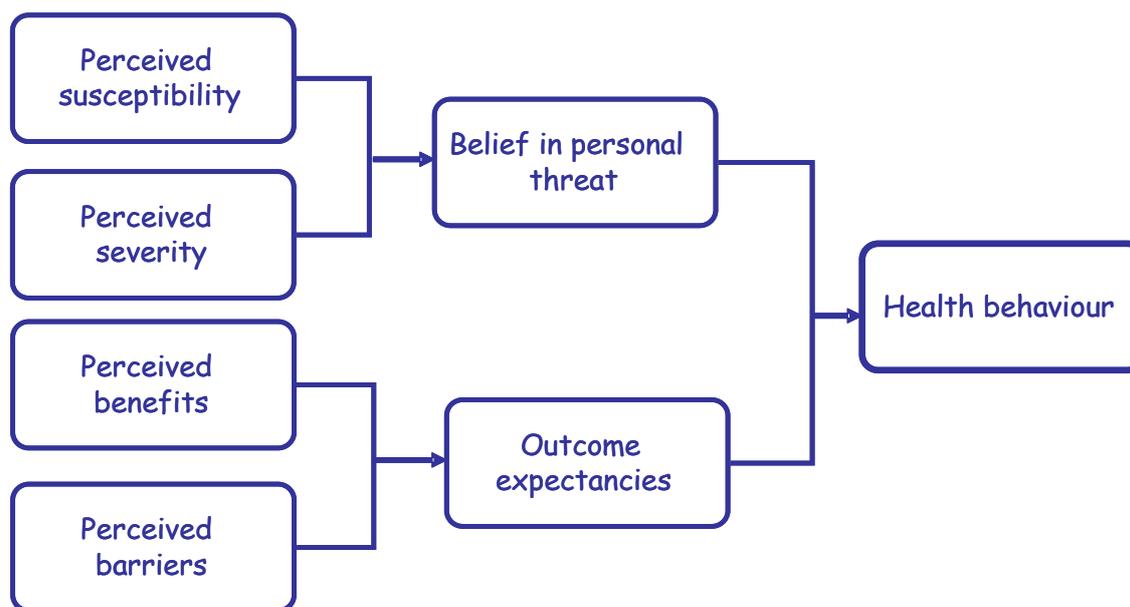
C.10.6 Health Belief Model

Rosenstock (1966) developed the Health Belief Model (HBM) (Figure C 4) to account for the uptake of health behaviours which are influenced by an individual's assessment of the:

- perceived susceptibility – risk of contracting the condition
- perceived severity – seriousness of the condition and its potential consequences
- perceived barriers – influences that discourage uptake of the promoted behaviour
- perceived benefits – positive consequences of adopting the behaviour.

Two key factors influence the likelihood that a person will adopt a recommended preventive health action (for example, refraining from speeding). First, the individual must feel personally threatened by the disease (unsafe behaviour), i.e. they feel personally susceptible and believe that it has serious consequences. Second, the person must believe that the benefits of taking the preventative action outweigh the perceived barriers to, or costs of, preventive action (Fishbein 1995).

Witte et al. (cited in Noar 2005) undertook a community program engaging parents with messages to use bicycle helmets with their children. Treatment and control groups were employed with over 1000 participants. The results indicated that perceived threat messages were most likely to change intentions, attitudes and behaviours surrounding parents buying and using bicycle helmets with their children. The authors concluded that the community-based nature of the program provided 'cues to action' that were considered instrumental in increasing 'perceived threat', but not directly related to behavioural change.



Source: Rosenstock (1966).

Figure C 4: The Health Belief Model

C.10.7 *Transtheoretical Model*

The Transtheoretical Model, also referred to as the Stages of Change Model, follows a 'stage paradigm' or a person's readiness to change a behaviour. There are five stages of change a person passes through on their way to changing a behaviour (Noar 2005):

- precontemplation – no intention to change
- contemplation – intending to change in the 'foreseeable' future
- preparation – planning to change very soon
- action – having recently changed behaviour (in the last six months)
- maintenance – having changed and sustained the behaviour for at least six months.

This model is cyclical, as a person may continue cycling through various stages of change (forward and back). Relapsing to unhealthy behaviours is seen as a natural part of the change process. Finally, the model outlines that decision-making, self-efficacy, and various cognitive and behavioural change processes all affect movement through the various stages of change. There has been empirical support for the model, although it has been criticised that it is not a true stage model and that more data is needed to fully support it (Noar 2005).

C.10.8 *Precaution Adoption Process Model*

The Precaution Adoption Process Model (PAPM) is another stages of change model that posits the process of adopting or quitting a behaviour as a logical sequence of qualitatively different cognitive stages. In each stage the types of information and interventions needed to move people closer to action vary. The greatest advantage of such a stage theory is that messages can be tailored to different sections of the population in different stages of change. There are seven distinct stages in PAPM ranging from complete ignorance to regular performance of the behaviour (Sharma 2007):

- being unaware of the issue

- being aware of the issue but not personally engaged
- being engaged and deciding what to do
- having decided not to act
- having decided to act
- acting
- maintenance.

C.10.9 Protection Motivation Theory

The Protection Motivation Theory (PMT) is a process of threat and coping appraisals where behavioural options to diminish the threat are evaluated. The appraisal of the health threat and the appraisal of the coping responses result in the intention to perform adaptive responses (protection motivation) or may lead to maladaptive (health risk) responses. The Protection Motivation Theory outlines that the intention to protect oneself depends upon four factors (Boer & Seydel, cited in University of Twente 2004):

1. the perceived severity of a threatened event
2. the perceived probability of the occurrence, or vulnerability
3. the efficacy of the recommended preventive behaviour (the perceived response efficacy)
4. the perceived self-efficacy.

Protection motivation is the result of the threat appraisal and the coping appraisal. Threat appraisal is the estimation of the chance of being injured (vulnerability) and estimates of the seriousness of an injury (severity). Coping appraisal consists of response efficacy and self-efficacy. Response efficacy is the person's expectancy that carrying out recommendations can remove the threat. Self-efficacy is the belief in one's ability to execute the recommended courses of action successfully. Protection motivation is a mediating variable whose function is to arouse, sustain and direct protective health behaviour. In relation to developing effective messages, using a high-fear message, where severe consequences and a high probability of occurrence are indicated, are considered more effective than a low-fear message with respect to producing stronger intentions to remain 'abstinent' (in relation to the behaviour being targeted) than the lower-fear message (Boer & Seydel, cited in University of Twente 2004).

C.10.10 Extended Parallel Process Model

The Extended Parallel Process Model (EPPM) focuses on the link between threat and efficacy and their combined influence on behaviours. When a person feels at risk of a particular threat, they become scared and thus motivated to take action. This is linked to a person's self-efficacy. Thus, if the person believes they can avert the negative consequences of the threat, they are motivated to control the 'danger' and protect themselves (using a campaign's recommended actions, for example). However, if a person lacks self-efficacy or believes their overall response to the threat will be ineffective, they control their fear by engaging in maladaptive behaviours such as denial, reactance or defensive avoidance (Ray 2005).

There have been many studies showing the model's four constructs (perceived susceptibility, severity, response efficacy and self-efficacy) work together to predict health-

related behaviours. A campaign's effectiveness will depend on the person, for example (Ray 2005):

- If a person has low threat perceptions they will have no reaction to a fear-based campaign (the campaign is not important to them or irrelevant).
- If a person has strong threat perceptions and high self-efficacy, they will try to control the danger, by changing their behaviour.
- If a person has strong threat perceptions and low self-efficacy, they will use maladaptive behaviours such as denial, reactance or defensive avoidance.

Thus, campaigns should promote strong perceptions of severity, susceptibility, response efficacy and self-efficacy to promote the greatest degree of 'danger control actions'. Perceptions of efficacy need to be strong enough to counterbalance the perceptions of threat to prevent fear control responses (Ray 2005).

C.10.11 Information-Motivation-Behavioural Skills Model

In 1992, Fisher and Fisher designed the Information-Motivation-Behavioural Skills Model (IMB) to predict AIDS preventive behaviour. The IMB model proposes that HIV preventive behaviour is a function of HIV prevention motivation, HIV prevention information and AIDS prevention behavioural skills. The model states that HIV prevention information and motivation work through prevention behavioural skills to influence risk reduction behaviours. Information and motivation are independent constructs, e.g. some people are well informed about AIDS but not motivated to practise preventive behaviours, and other individuals are motivated to practise preventive behaviours but not well informed. Information and motivation, however, may relate to the practice of behavioural skills relevant to risk behaviour change. Thus in the model, preventive behavioural skills represent a final common pathway for predicting complex preventive behaviours, such as condom use. The constructs of the IMB model can be applied to different behaviours as long as the constructs have content that is specific to the target population (Kalichman et al. 2002).

C.11 Applying a Behavioural-Change Model

Noar (2005) illustrated that the elements of behavioural-change models will influence which are chosen when developing promotional health interventions. For example, the following should be considered in relation to the behaviour to be changed:

- if the target audience responds to a fear of negative consequences, then a theory that contains the constructs of perceived susceptibility and severity could be chosen
- if the target audience shows a basic lack of knowledge, then the Social Cognitive Theory may be most appropriate
- if the behaviour to be changed requires consideration of environmental influences, then the Transtheoretical Model may be appropriate.

Noar (2005) outlined that more than one theory may be applicable and outlined the characteristics of nine different behavioural-change theories (Table C 1). It is worth noting that Cappella (2006) pointed out that 'behaviour change theories do not direct message design but direct what messages should be about' (p. S271). Message design issues are discussed in Appendix F.

Table C 1: Elements for consideration in different health behaviour theories

Element	HBM	TRA	TPB	SCT	TTM	PAPM	PMT	EPPM	IMB
Knowledge				✓					
Attitudes (or decision-making, response efficacy)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Perceived threat (susceptibility, severity)	✓					✓	✓	✓	✓
Social norms		✓	✓	✓		✓			
Self-efficacy (or perceived behavioural control)	✓		✓	✓	✓	✓	✓	✓	✓
Behavioural intentions		✓	✓						✓
Stages of change					✓	✓			
Reinforcements, rewards, reminders, cues to action	✓			✓	✓	✓	✓		
Environmental influences/conditions	✓			✓	✓	✓			
Behavioural-change theory (how people change their behaviour)				✓	✓	✓	✓	✓	
Fear appraisal theory (how people react to fear-based messages)							✓	✓	
Message-based theory (focuses on message processing, how people react to messages)							✓	✓	
Belief-based theory (theory contains only attitudes, beliefs)	a	✓	✓				✓	✓	

Element	HBM	TRA	TPB	SCT	TTM	PAPM	PMT	EPPM	IMB
Intervention-based theory (theory contains direct suggestions for intervention)				✓	✓	✓			

Notes:

HBM (Health Belief Model), TRA (Theory of Reasoned Action), TPB (Theory of Planned Behaviour), SCT (Social Cognitive Theory), TTM (Transtheoretical Model), PAPM (Precaution Adoption Process Model), PMT (Protection Motivation Theory), EPPM (Extended Parallel Process Model), IMB (Information-Motivation-Behavioural Skills Model).

^a Cues to action is the only variable in the HBM that is not a belief (the other four variables are beliefs). However, cues to action has not been widely applied in HBM studies, hence HBM is a belief-based theory.

Source: Noar (2005).

Noar (2005) described four stages of applying appropriate theories to the situation to be addressed:

1. planning stage – consider the ‘whys’ e.g. ‘why do young drivers engage in speeding’
2. needs assessment – to understand the specific attitudes, norms and perceptions of control of the target group, and which factors are the largest barriers in relation to behaviour change
3. implementation stage – consider the ‘hows’ e.g. ‘how can a safety education program decrease speeding’. If perceived control and behavioural skills need to be addressed, then the most successful intervention may be a one that focuses on interpersonal skills e.g. role plays
4. evaluation – a need to evaluate the health promotion program to understand why it succeeded or failed.

C.12 Information from a Meeting of Behaviour Change Theorists

A number of authors have commented on the theoretical overlap between constructs contained in the main behaviour-change models. Indeed, Fishbein (1995, pp. 249-250) described the outcomes of a meeting between principal proponents of several of the most prominent behaviour change theories which found consensus was reached on eight variables that account for variation in a behaviour: skills, environmental constraints, intentions, outcome expectations/attitudes, norms, self-standards, self-efficacy and emotional reactions. One or more of the following must be true for a behaviour to be performed:

1. The person forms a strong positive intention, or makes a commitment, to perform the behaviour.
2. There are no environmental constraints that make it impossible for the behaviour to occur.
3. The person possesses the skills necessary to perform the behaviour.
4. The person believes that the advantages (benefits, anticipated positive outcomes) of performing the behaviour outweigh the disadvantages (costs, anticipated negative outcomes) – in other words, the person has a positive attitude toward performing the behaviour.
5. The person perceives more normative pressure to perform the behaviour than to not perform the behaviour.
6. The person perceives that performance of the behaviour is more consistent than inconsistent with his or her self-image or that it does not violate personal standards.

7. The person's emotional reaction to performing the behaviour is more positive than negative.
8. The person perceives that he or she has the capabilities to perform the behaviour under a number of different circumstances – in other words, the person has self-efficacy with respect to executing the behaviour in question.

The authors concluded by indicating that behavioural interventions that are not directed at increasing skills or removing environmental constraints should attempt to reinforce and strengthen intentions to engage in desirable behaviours and weaken intentions to engage in negative/unsafe behaviours. Further, by assessing the eight determinants of behaviour (listed above), variables that most strongly influence intentions to perform a behaviour, should be the primary focus of interventions.

C.13 Summary

Table C 2 outlines each of the 18 risk taking and behaviour-change models/theories that have been discussed, provides a brief description and the important considerations for message development to address risk taking.

Table C 2: Risk taking and behaviour-change models/theories and important considerations for message development

Risk taking /behaviour-change model/theory	Key feature	Important considerations for message development
Theory of Sensation Seeking (and general theory of risk taking)	Need for varied, novel and complex sensations and experiences.	High-sensation seekers have a lower perception of risk than the low-sensation seeker. Risk taking behaviours without negative outcomes, lower risk appraisal in the high-sensation seeker, whereas the low-sensation seeker is sensitised to stimuli and conditioned by experiences that reinforce their fears of danger of the road.
Risk Behaviour Syndrome Theory	Individual risky driving behaviours covary with each other, and reckless driving is correlated with behaviours such as delinquency, drug and alcohol use, and drink driving.	Such behaviour will develop at a young age, thus parents will require targeting to ensure positive role modelling for their young children.
Problem Behaviour Theory (PBT)	Behaviour is the result of the person-environment interaction and a balance between enhancing and compromising activities in which one engages. Problem behaviours are those that depart from legal and social norms that usually result in some type of control response by others such as mild disapproval or social rejection, or in more extreme circumstances lead to incarceration. Problem behaviours are not separate behaviours but interrelated to one another, thus the personal and situational factors influencing one behaviour also influence another.	Such behaviour will develop at a young age, thus parents will require targeting to ensure positive role modelling for their young children.

Risk taking /behaviour-change model/theory	Key feature	Important considerations for message development
Risk Homeostasis Theory (RHT)	For any activity, people have an accepted level or target of risk and the aggregate level (not individual level) of risk is kept constant through a self-regulating homeostatic process. People compare the level of risk they perceive with their target level of risk and adjust behaviour to eliminate the discrepancy between the two.	The level of risk can be reduced by motivating people to want to behave in a less risky fashion. Consider benefits (e.g. gaining time by speeding, alleviating boredom), costs (e.g. speeding tickets, car repairs), expected benefits (e.g. insurance discounts for crash-free periods) and expected costs (e.g. time loss, using an uncomfortable seat belt) of behaviours. Highlight risks and ensure they are well understood, while minimising the perceived risk reduction due to non-behavioural measures, such as vehicle safety features.
Risk Motivation Theory (RMT)	Risk taking is a desirable, pleasant activity with extrinsic and intrinsic rewards. Incentives are a powerful motivator in reducing risk taking, and positive and rewarding incentives are more effective than negative and punishing incentives.	Understand the variables in different situations that trigger, encourage or discourage certain types of behaviour. Design alternative risk taking behaviours, whilst fulfilling evolutionally controlled needs without compromising social values.
Zero Risk Model	Drivers control safety margins rather than some specific risk measures, and only when the risk or fear threshold is exceeded or expected to be so, does it influence behaviour.	Address the motives underlying risk taking behaviours.
Threat Avoidance Model	A driver perceiving a discriminative stimulus can make an anticipatory avoidance response or can do nothing until the aversive stimulus occurs and then make a delayed avoidance response.	Reinforce the link between the discriminative stimulus (threat) and the aversive stimulus.
Biopsychosocial Model of Risk taking	Timing of biological maturation influences adolescents' cognitive scope, self-perceptions, perceptions of the social environment and personal values. A number of biological, social environmental and situational factors influence this maturation.	Parents will require targeting to ensure positive role modelling for their young children to assist to prevent maladaptive maturation. Depict disapproval of risk taking by peers.
Deterrence Theory	Consists of general deterrence – strategies that focus on preventing illegal behaviours by producing and maintaining the perception that such behaviours will be noticed and punished. Specific deterrence strategies directly punish those who are caught breaking law in order to prevent them from doing do again, e.g. fines, court penalties.	Communicate the consequences of breaking the law and that a high level of enforcement is being maintained.
Social Cognitive Theory	Explains how people acquire and maintain behavioural patterns. Outcome expectations, self-efficacy, sociostructural factors and goals are components of the model.	Include information pertaining to skills and confidence to increase self-efficacy. Also, apply modelling, reinforcement and knowledge as applicable.
Social Learning Theory	Emphasises the importance of people and groups with whom one associates, deviance and conformity are learned in the same way.	Consider positive role modelling. Social rewards and punishments are important e.g. praise, embarrassment.

Risk taking /behaviour-change model/theory	Key feature	Important considerations for message development
Theory of Planned Behaviour	Consists of three areas that control intentions: 1. attitude – positive and negative evaluations about performing the behaviour 2. subjective norm – perceived social pressure concerning the behaviour 3. perceived behavioural control – perceived ease or difficulty of performing the behaviour. The environment dictates the final behaviour, as certain conditions must allow the intended behaviour to automatically occur.	There is a need to concentrate on attitudes, norms and perceived behavioural control with regard to the behaviour to be changed and provide alternative strategies to not partake in the problem behaviour.
Health Belief Model	Behaviours are influenced by perceived susceptibility, severity, barriers and benefits of the behaviour.	To prevent the uptake of negative behaviours the person must feel personally threatened by the behaviour and the benefits of taking the preventative action outweigh the perceived barriers to, or costs of, preventive action. Perceived threat messages have been found to change intentions, attitudes and behaviours.
Transtheoretical Model	A stages of change model with five main stages that one may cycle through: 1. precontemplation – no intention to change 2. contemplation – intending to change in the 'foreseeable' future 3. preparation – planning to change very soon 4. action – having recently changed behaviour (in the last six months) 5. maintenance – having changed and sustained the behaviour for at least six months.	Decision-making, self-efficacy, and various cognitive and behavioural change processes all affect movement through the various stages of change. Thus providing effective strategies to address these components is important.
Precaution Adoption Process Model	A stages of change model with seven main stages: 1. being unaware of the issue 2. being aware of the issue but not personally engaged 3. being engaged and deciding what to do 4. having decided not to act 5. having decided to act 6. acting 7. maintenance.	Increasing awareness of safety issues and providing strategies to engage in safe behaviours is important. Different messages may be required for drivers at different stages of change.

Risk taking /behaviour-change model/theory	Key feature	Important considerations for message development
Protection Motivation Theory	A process of threat appraisal and coping appraisal where behavioural options to diminish the threat are evaluated. The appraisal of the health threat and the appraisal of the coping responses result in the intention to perform adaptive responses (protection motivation) or may lead to maladaptive (health risk) responses.	Using a high-fear message, where severe consequences and a high probability of occurrence are indicated, are considered more effective than a low-fear message with respect to producing stronger intentions to remain 'abstinent' (in relation to the behaviour being targeted) than the lower-fear message.
Extended Parallel Process Model	Focuses on the link between threat and efficacy and their combined influence on behaviours. When a person feels at risk of a particular threat, they become scared and thus motivated to take action. This is linked to a person's self-efficacy. Thus, if the person believes they can avert the negative consequences of the threat, they are motivated to control the 'danger' and protect themselves (using a campaign's recommended actions for example).	Promote strong perceptions of severity, susceptibility, response efficacy and self-efficacy to promote the greatest degree of 'danger control actions'. Perceptions of efficacy need to be strong enough to counterbalance the perceptions of threat to prevent fear control responses.
Information-Motivation-Behavioural Skills Model	Proposes that preventive behaviour is a function of prevention motivation, prevention information and prevention behavioural skills. The model states that prevention information and motivation work through prevention behavioural skills to influence risk reduction behaviours.	Preventive behavioural skills represent a final common pathway for predicting complex preventive behaviours. Thus, the provision of appropriate strategies to enable safe behaviours is required.

Other important considerations are:

- Protection Motivation Theory and the Extended Parallel Process Model are particularly relevant to behavioural change, how people respond to fear messages and how people process messages.
- If perceived control and behavioural skills need to be addressed, then the most successful intervention may be one that focuses on interpersonal skills e.g. role plays.
- Behavioural interventions that are not directed at increasing skills or removing environmental constraints should attempt to reinforce and strengthen intentions to engage in desirable behaviours and weaken intentions to engage in negative/unsafe behaviours.
- To assist a person to behave in a particular way, it is important to ensure:
 - there are no environmental constraints that make it impossible for the behaviour to occur
 - strategies are provided to perform the behaviour
 - information is provided on how the advantages (benefits, anticipated positive outcomes) of performing the behaviour outweigh the disadvantages (costs, anticipated negative outcomes)
 - the person's emotional reaction to performing the behaviour is more positive than negative
 - the person perceives that he or she has the capabilities to perform the behaviour under a number of different circumstances – in other words, the person has self-efficacy with respect to executing the behaviour in question.

APPENDIX D FACTORS INFLUENCING RISK TAKING WHILE DRIVING

D.1 Introduction

The research on risk taking has found that risk taking behaviours do not occur in isolation, 'they tend to cluster in somewhat predictable ways' (Igra & Irwin 1996, p. 37). Studies have found that sexually active adolescents were more likely than non-sexually active adolescents to report driving or riding in a car under the influence of drugs, or to use alcohol and marijuana. Conversely, alcohol and drug use has been linked to becoming sexually active within a year. Three types of theories have been proposed to explain these inter-relationships between risk taking behaviours (Igra & Irwin 1996):

1. a finite number of factors are responsible
2. risk taking behaviours are viewed as alternative manifestations of a general tendency toward deviance
3. individual behaviours influence one another.

Whether a young driver will engage in risk taking behaviours is influenced early in the person's life. Family, peers and society all play a role. The following family influences are important (Igra & Irwin 1996):

- Parental role modelling – children and adolescents learn to engage in risk taking behaviours from observing parents engage in them. Parental modelling of and permissive attitudes toward substance use have been implicated in the initiation of substance use in early adolescence. Adolescents, who have emotional support and acceptance from, and a close relationship with, their parents, are less likely to abuse substances and initiate sexual activity.
- Family structure – adolescents from single-parent families are more likely to use illicit substances and initiate sexual intercourse and less likely to use contraception. This may be of a result of less parental supervision in single-parent families.

Peer influences have been found to be a factor in adolescent substance use and a greater influence of peers than parents is associated with an increased proneness to problem behaviours. It is not clear whether risk taking behaviours are initiated in order to conform to a peer group or those inclined to engage in such behaviours are drawn to similar peers. Finally, societal influences may play a role, for example the influence of mass media and community norms (Igra & Irwin 1996).

Thus, influencing risk taking driver behaviours could be considered quite difficult due to the range of factors driving these behaviours. The different factors involved in influencing risk taking driving behaviours are discussed below.

D.2 Psychosocial Maturation and Gender

It is well known that young drivers have a higher crash risk due to their young age and as they mature their crash risk decreases (psychosocial maturation). Hewitt et al. (1995) outlined three 1980 studies to this effect (Jonah & Dawson; Mayhew et al. & Williams). The studies illustrated that young drivers (under 25) reported greater risk taking than drivers aged 25 and over, with higher crash and offence rates.

A recent review (McCartt et al. 2009) of 11 (1990 or newer) studies that separated the crash effects of age and experience, controlled by length of licensure also found an age effect. The studies reviewed separated the effects of age and experience on crash risk. Age and experience were found to have independent effects on crash risk, whilst controlling for distance travelled. The studies showed that teenage drivers (aged 16 to 19) had higher crash rates than older drivers, particularly those aged over 25, after controlling for length of licensure. Studies that attempted to quantify the relative importance of age and experience factors, found a more powerful effect from length of licensure (i.e. experience was the more important factor). When controlling for distance travelled, both age and length of licensure had a substantial beneficial effect on crash trends for young drivers. Although this review did not look at risk taking, it shows that age is an important factor in crash risk, and the studies outlined below show how age is linked to risk taking behaviours.

Catchpole and Styles (2005) who conducted a telephone survey of 300 ACT drivers aged 17 to 21 years also found less of an effect of age. The authors found that after controlling for age, experience had no effect on offence rates. Catchpole (2005) found that after controlling for age, risk taking (as reflected in offences) increased with experience for the first few years of driving.

Interestingly, a US study (Males 2009), found that driver age was not a significant predictor of fatal crash risk once several factors associated with high poverty status were controlled. The Biopsychosocial Model of Risk Taking discussed in Appendix C.9 illustrated that poverty was a factor in risk taking. The factors associated with poverty status in the US 2009 study were lower education levels, more driving, lower state population density, lower state per-capita income, older and smaller vehicle use, and more occupants in the vehicle driven.

The fatal crash data used in the study came from 50 US states and the District of Columbia for the period 1994 to 2007. Stepwise multivariate regression was used to explain the poverty factors influencing crash variance. The authors outlined that a greater number of vehicle occupants was the most 'efficient' predictor of crash rates and this 'may not be a causal factor so much as the most efficient operationalisation of a constellation of risks that disproportionately affect both poorer drivers and younger drivers' (p. 447). However, the study showed that young drivers were strongly overrepresented in high rates for poverty (for mean vehicle occupants) and entirely absent from low rates of poverty (for mean vehicle occupants), suggesting that previous findings that young drivers suffer risk from multiple passengers may be modified if poverty and other sociodemographic variables were included. Lower state per-capita income was the best predictor of high fatal crash rates among drivers in general and for each driver age separately (including young drivers aged 16 to 19 and 20 to 24) (Males 2009).

Begg and Langley (2001) used a cohort of 936 New Zealand youth from a longitudinal study at 21 years of age and again at 26 years of age. They found the typical differentiation between the sexes at both ages for risk taking while driving, whereby males engage in higher levels of risk taking than females. There was no major change in the levels of risky driving and sensation seeking from the age of 21 to the age of 26 for females. This was to be expected given the low levels of these behaviours reported by females at the age of 21. Less than 15% of the sample of 21 year old females responded that they participated in the various risky driving behaviours. The three highest percentages were for 'drive within two hours of drinking' (14%), 'drive faster than other drivers' (11%) and 'a better driver than other drivers' (10%). Less than 7% of the 21 year old females responded in the affirmative to the other six risky driving behaviours measured in the study ('drive after drinking too much to drive safely', 'drive after using marijuana', 'drive fast for the thrill of it', 'take risk for fun',

'speed up if someone is trying to pass you' and 'drive faster than 120 km/h on the open road').

There was a statistically significant reduction of five of the nine risky driving behaviours in males at the age of 26. There was virtually no change in the percentage of males who would 'drive after using marijuana' at 21 (8%) and at 26 (9%), and the reduction in the percentage of males who would 'take risks when driving for fun' at 21 (7%) and at 26 (4%) was not statistically significant ($p=.09$). The two behaviours with the largest reduction (both statistically significant at $p<.001$) were 'drive after drinking too much to drive safely' (15% at 21 years to 6% at 26 years) and 'drive fast for the thrill of it' (15% at 21 years to 5% at 26 years). There was an increased desire to take part in sensation seeking behaviours such as white-water rafting and bungy jumping in this group.

A common finding for females and males was a rise in the percentage between ages 21 and 26 who would 'drive within two hours of drinking' and who thought they were 'a better driver than other drivers'. Fourteen percent of 21 year old females would 'drive within two hours of drinking' compared with 27% at 26 (the corresponding figures for males were 16% at 21 to 27% at 26). Ten percent of females felt they were 'a better driver than other drivers' when they were 21 and this rose to 20% when they were 26 (the corresponding figures for males were 13% at 21 to 19% at 26).

Overall, the study showed there was a statistically significant decrease of nearly all risky driving behaviours in the study for males, which may have been associated with a developmental change that 'sees young males mature out of the need to engage in risky driving behaviour' (p. 496). The authors posited that as there was an increase in the young drivers waiting two hours before driving after drinking, that they are heeding drink driving messages. This is supported by a recent reduction in fatal drink driving crashes.

Bingham et al. (2008) studied the mechanism underlying the reduction of crashes as drivers age, psychosocial maturation. This is the term applied to the development into an adult in terms of adopting the roles, attitudes and behaviours typically associated with adulthood. In 2003, data was taken from a longitudinal study of Michigan residents carried out as part of another project via telephone surveys. For the current study, the 2003 telephone survey of 2342 participants (mean age 29) was used. The survey covered driving behaviour, safety belt use, crash experience, conviction experience, substance use, psychosocial variables, adult role acquisition, status on developmental tasks related to psychosocial maturation, perceptions and attitudes about drink driving, parents' perceptions and attitudes about drink driving, alcohol use and misuse, friends' perceptions and attitudes about drink driving, friends' use of alcohol and peers' use of alcohol.

The authors used participants with an average age of 29 years, as they reasoned that marked reductions in crash rates at this age are indicative of psychosocial maturation. They pointed out that crash rates continued to reduce until around the age of 45, therefore, this time-point is the beginning of the maturation process.

Using a Poisson regression model, Bingham et al. (2008) found that the significant predictors of lower levels of risky driving, drink driving and drug driving were having higher numbers of psychosocial maturation markers. This was true for both females and males. The statistically significant predictors listed for male risk taking drivers were: being employed, not being a parent, not being married, feeling like an adult less of the time. For females the statistically significant predictors for risk taking drivers were completion of formal education, being employed, not being a parent, not having completed childbearing, not being married and feeling like an adult less of the time. Male participants who drove after drinking had the

following statistically significant predictors: being employed, not being married, less financial independence, being less capable in adult roles and feeling like an adult a smaller part of the time. For females who drove after drinking, the statistically significant predictors were being employed, not being a parent, not being married, being less financially independent, being less capable in adult roles and feeling like an adult a smaller part of the time.

The authors recommended finding ways to create and/or strengthen the perceived belonging to mainstream society. It is these bonds, according to Social Control Theory (Hirschi, cited in Bingham et al. 2008), that make a society's members act according to social convention as they do not wish to be ostracised.

D.3 Beliefs and Attitudes About Risk Taking

Manstead (1991) applied the Theory of Planned Behaviour to violation-prone and non-violation-prone drivers. He found that violation-prone groups believed less strongly that various negative outcomes (being stopped and fined, putting pedestrian lives at risk and being involved in a crash) were likely. There were no differences between driver groups on positive outcomes, such as arriving at one's destination more quickly. Thus, drivers need to be persuaded about the potential negative outcomes of driving. In addition, the violation-prone driver groups perceived that same-sex partners and friends expect them to engage in behaviours such as speeding. Thus persuading violation-prone drivers that their closest same-sex and opposite-sex friends expect them not to engage in risk taking behaviours may be effective.

Ginsburg et al. (2008) investigated the experiences and beliefs of school-aged teens about what constitutes risky driving behaviour. Their National Young Driver Survey (NYDS) was carried out in the spring of 2006 throughout USA high schools amongst 9th, 10th and 11th graders (14 to 17 years old). Of the 6665 students invited to participate, 5665 did so in the survey that included both quantitative and qualitative items. Driving experience was not necessary for inclusion, although 74% of respondents were either learning to drive or licensed drivers.

The sample was evenly balanced between the sexes and grades. While the majority were of White ethnicity (61.8%), Blacks (15.8%) and Hispanics (16.5%) were also represented. Most were city dwellers (77.2%) and had A or B grade averages (73.1%). Seventy percent of the sample wore a seat belt whilst in a vehicle and 20.2% had been a passenger in a vehicle, which had been in a crash within the last year.

Ginsburg et al. (2008) assessed the survey respondents' perceived exposure to risk either as a passenger or driver. The 32 items in the exposure risk list included in the survey were compiled from previous iterations of the NYDS development and respondents assigned them into one of six ranks from lowest to highest perceived risk. They also reported how often they were exposed to each of the risky behaviours or situations.

One of the most important findings was that the teen respondents did not feel that lack of driver experience is an important factor in crashes, nor was lack of experience very prevalent. The respondents placed higher priority on substance abuse (especially drinking) as a primary factor in crash causation. This is despite there being fewer crashes where the teen driver has been drinking. This result, the authors felt, was due to the high minimum drinking age in the USA. While teens in the minority ethnicities were less likely than white students to feel that drinking or taking drugs increased the risk of crashing, they were more likely to have observed these behaviours.

Based on the study results, Ginsburg et al. (2008) believed that an important teen perception to understand was what constituted 'inexperience'. This is due to the majority (60%) of the respondents identifying inexperience as a risk factor while only 15% indicated that they had been exposed to inexperienced drivers (or, indeed, were themselves inexperienced drivers). While this finding is of interest, it should be noted that when asking this question the authors did not ascertain who usually drove the teens. If, for example, they were passengers in a vehicle driven by a parent then the finding is not surprising (especially for the pre-drivers). Analysis of the qualitative data revealed that inexperience was defined by respondents in terms of having a driver's licence rather than by distance driven or by exposure to a wide variety of driving situations. Ginsburg et al. (2008) suggested that research is needed to understand how teens define 'experience' and that programs will need to highlight how lack of experience affects safety.

The data also revealed a 'hierarchy of increasing danger'. For example, while talking on mobile phones while driving was not considered particularly dangerous, texting and having a conversation that results in emotional situations was. Carrying teen passengers was believed to be safe by the majority of respondents, but (in order from lower to higher perceived risk) carrying teen passengers who are dancing and singing, are drunk, goad the driver to speed or 'act wild' were seen as risky situations. Teens in the sample deemed situations they rarely encountered as more dangerous than those they experienced most often, when in reality fewer teen crashes occur due to the perceived dangerous activity (drink driving) than the perceived benign activity (teen passengers, mobile phone use). The authors outlined this may be due to familiarity with the 'benign' activity taking place with a lack of consequences. The authors indicated one way of tackling risky driving was to understand the attitudes and beliefs of teens.

Waylen and McKenna (2008) were interested in examining young people's attitudes to road safety before they had learnt to drive. This was in order to discover whether risky attitudes to driving predated their driving experience. UK high school students between the ages of 11 and 16 participated in the study. The 567 participants filled out a questionnaire regarding attitudes towards speed, driving violations, sensation seeking and deviant behaviour.

Statistically significant gender differences were found for all four factors, with males consistently having higher scores than females for all six age groups. While males were statistically significantly more likely to find driving violations acceptable, the scores were low for both genders. This indicates that both genders had low levels of acceptance towards speeding violations. There was a statistically significant correlation between liking speed and sensation seeking for both genders and between finding driving violations somewhat acceptable and sensation seeking. This was true for deviant behaviour and speed, and for deviant behaviour and finding driving violations somewhat acceptable. Risky attitudes towards driving, therefore, existed in this group before they even start driving.

Waylen and McKenna (2008) outlined the pre-driver's attitudes toward speed and the acceptability of risky behaviour would, to some extent, have been modelled by their parents. They recommended that any efforts to educate pre-drivers about the effects of risky driving also include parents and that these efforts should take place well before teens learn to drive.

D.4 Lifestyle Factors

Bina et al. (2006) found lifestyle factors amongst young (14 to 17 year old) Italian males to be associated with risky driving. To be eligible to answer a questionnaire the young males had to have driven a car, motorcycle or moped in the two months before the study. The male respondents who were risky drivers had statistically significant high levels of antisocial

behaviour, smoked cigarettes, partook in comfort eating and spent time with their friends in activities that were not part of organised events. The females who were risky drivers had lifestyle factors that were characterised by taking part (at statistically significant levels) in other types of risky behaviour, being antisocial and using drugs. These findings should be viewed with some caution as licensing laws in Italy differ from those in Australia.

Møller's (2004) study used focus groups to delve into the lifestyle of young Danish drivers and their motives for driving that may mediate this relationship. The author's knowledge of the psychosocial function of driving for this age group informed the questions used in the two types of focus groups, which were differentiated by level of education. 'Education level 1' consisted of drivers between 18 and 24 years of age who had graduated from lower secondary school, some of whom were in (or had graduated from) vocational training (assumed to be TAFE-style courses). 'Education level 2' consisted of the same age group who had graduated from senior high school, some of whom were in middle-range courses or higher education courses. All participants in the focus groups had held a driver licence for a minimum of six months and drove a minimum of once a week. Findings from this study should be viewed with the knowledge that the sample size was small ($N^5 = 29$).

Results of the study were based on qualitative analysis of the focus group transcripts. The four psychosocial functions of driving that came out in the study as being of primary importance were visibility, status, control and mobility. Visibility was a means of gaining attention, the status function of driving enabled the young drivers to achieve status and express their perceived status. Status was characterised by three sub-functions: adulthood; recognition by friends for status-related activities such as winning races; and establishing personal rights to their space on the road. The control function had three sub-functions. They were vehicle, risk perception and everyday life. The vehicle sub-function refers to taking pride in being able to control a vehicle they perceive to be large and heavy, while the risk perception sub-category refers to the driver's ability to engage in risky driving while maintaining control. The mobility sub-function covers both the physical aspect of being able to travel and the psychological aspect of being in control of where they are heading, both in life and in terms of their destination.

There were education level group differences with respect to driving as part of each group's lifestyle, and the function it provided (Table D 1).

⁵ N = number.

Table D 1: Lifestyle category and driving behaviour for Education level 1 and Education level 2

Lifestyle category	Education level 1	Education level 2
Leisure time: - organisation - interests	Being with friends most important aspect	Involved in various regular organised activities
Friends: - group structure - social life	Single group of close-knit friends Activities are spur of the moment Prefer driving around to staying in one place The car is an integral part of their activities together	Varied friend groups which are activity based Drive to go to a planned event Some of this group were risky drivers but carried out risky behaviours either alone or with friends
Driving pattern: - entertainment - self-expression	Use risky driving as entertainment and showing off/competing Tell 'driving' stories with enthusiasm and passion Others participants would reply with own similar stories or interrupt with supportive comments Driver and passengers share in the driving experiences	Driving not seen as a key part of being a 'youth' Less emotion attached to driving experiences If a participant told a driving story the other participants did not share their own stories Use other means of expressing their individuality or showing off/competing

Source: Møller (2004).

The results indicated that for those with a lower level of education driving in a risky manner performs the function of entertainment for the driver and their friends, and is a bonding experience. The car itself is a venue in which to socialise. For those of a higher education level a car is merely a means of travel and risky driving does not appear to provide any sort of social function (Møller 2004).

D.5 Substance Use

Lang et al. (1996) investigated the behaviours predicting single vehicle and injury crashes in high school students. Single vehicle and injury crashes were focused on as these crash types were considered to be linked to risk taking behaviours. The rationale was that these crash types are more likely to be associated with behaviours such as not wearing a seat belt and speeding, both of which are under the driver's control. High school seniors from five schools in Michigan filled out questionnaires in 1992 and 1993. Then in December 1994, the authors accessed driving history data from the Michigan Department of State for the 2201 questionnaire respondents. Of this sample, records were found for 1909 respondents. The authors analysed only data on respondents who had been driving for two years. After merging the respondent information with the driving history data, 1660 met this criterion.

The authors analysed each gender separately as their previous work had found different predictors for each group. This 1660 sample consisted of 773 females and 887 males (46.6% and 53.4% respectively) whose mean age was 18.2 years. There were no statistically significant differences between the two groups in terms of age, gender or the matching rate of questionnaire respondents and those with two years driving history for the final sample. The factors of interest to Lang et al. (1996) as predictors of single vehicle and injury crash involvement were:

- demographics
- environment
- perceived parental attitudes
- friends' involvement with substances (cigarettes, smokeless tobacco (for males only, since only 0.3% of females chew tobacco), alcohol and marijuana)

- personality
- academic (estimate of current year's grades, and whether the respondents enjoyed school and found it interesting)
- driving (frequency and if they drove to/from school, to/from work, to/from extra-curricular activities, to/from social activities and for personal or family errands)
- substance use (same as for friends)
- alcohol misuse variables.

The crash data showed that 25.6% (N = 198) of the 773 females had one or more crashes, 4.4% (N = 34) had at least one single vehicle crash and 9.8% (N = 76) had at least one injury crash. The males (N = 887) had higher crash rates with 33.3% having one or more crashes. Of the males, 7.4% (N = 66) had at least one single vehicle crash and 11.3% (N = 100) had at least one injury crash. The factors associated with the probability of having at least one single vehicle or injury crash in the first two years of driving and the percentage probability (derived from regression models) of doing so are presented in Table D 2.

Table D 2: Percentage probability and associated factors of having at least one single vehicle crash or injury crash in the first two years driving

Gender	Females				Males**			
Factors associated with probability level	Single vehicle crash	% probability of single vehicle crash	Injury crash	% probability of injury crash	Single vehicle crash	% probability of single vehicle crash	Injury crash	% probability of injury crash
Low probability	Average cigarette propensity	3.9%*	Average alcohol misuse Average level of friends involvement with alcohol and marijuana	8.6%	No substance availability No marijuana propensity High driving frequency	0.6%	Lived with both parents No marijuana use Average substance availability	8.6%
							Lived in situation other than with both parents Average substance availability No marijuana use	12.8%
High probability	High propensity of cigarette use	10.6%	High alcohol misuse	20.2%	High substance availability High propensity to use marijuana High alcohol misuse High marijuana use Low driving frequency	59.7%	Marijuana use Average substance availability	13.5%
							Lived in situation other than with both parents Average substance availability Marijuana use	19.6%

* Note: rate for women in general 4.4%.

** Note: authors mention the percentage probabilities are extremes.

Source: Lang et al. (1996).

The level of substance availability and substance abuse were predictors of crash involvement for both sexes. Unlike males, females were more at risk of having an injury crash if their friends use alcohol and marijuana, even at average levels. Lang et al. (1996) suggested that programs aimed at preventing crashes in young drivers use peer-based appeals for females, and family-based interventions that involve parents for males.

D.6 Parental Influences and Socialisation

Lang et al. (1996) indicated that parents and the home situation play a role in substance use. Colmar Brunton Research reviewed the literature on risk taking behaviours for young people and found that adolescents from single parent families engage in more problem behaviours and alcohol consumption (cited in Hewitt et al. 1995). A study by Elliott and Shanahan Research (cited in Hewitt et al. 1995), found that in relation to seat belt use, parental attitudes towards it were influential in adolescent seat belt use. If adolescents had to wear seat belts as children, then this behaviour was consolidated in adolescence.

Individuals learn by observing others (role models) performing specific behaviours. This is the basis of social learning theory (Appendix C.10.4). This theory also implies that peers are often the most influential role models in people's social learning and that encouraging adolescents to engage in safe road use behaviour, in peer situations, may be effective in improving this behaviour (Coutts & Styles 2004).

Catchpole and Styles (2005) conducted a telephone survey of 300 ACT drivers aged 17 to 21 years. The results clearly revealed the influence of parental driving style on risk taking by respondents. Respondents explicitly acknowledged the influence of their fathers' and their mothers' driving on their own driving style. In addition, there were statistically significant associations between the self-reported frequency of risky driving behaviours by the respondent and the frequency of their parents engaging in the same behaviours. All associations were positive, with a higher frequency of risky behaviour by the parent being associated with a higher frequency of the same risky behaviour by the young driver.

Socialisation, where people acquire the systems of beliefs and attitudes, and behaviour rules that equip them to function effectively as a member of a particular society, may also explain the reckless behaviour of adolescents. Arnett (cited in Hewitt et al. 1995) argued that narrow socialisation (e.g. restrictions on behaviour by parents), as opposed to broad socialisation (e.g. few restrictions on adolescent behaviour), reduces the opportunity for sensation seeking or development of an egocentric predisposition. Arnett indicated that there are seven components of socialisation: media, cultural belief system, legal system, community, school, peers and family.

D.7 Personality Factors, General Attitudes and Behaviours, and Anti-Social Behaviours

D.7.1 Personality Factors

Beirness, cited in Hewitt et al. (1995), found the following six personality dimensions to be involved in risky driving, crash involvement and violations: thrill or sensation seeking, impulsivity (to act without thinking about the future consequences of behaviour), hostility/aggressive tendencies, emotional instability, depression and locus of control (the extent to which one is in control of their own actions, internal locus of control, or controlled by other factors, external locus of control, where high external locus of control is related to higher risky driving). The author pointed out that these dimensions only accounted for 10% to 20% of the variance in driver crash involvement and up to 35% of the variance of risky driving measures.

Low self-esteem has a mediating role on behaviour and is related to a strong need for peer group acceptance. Low self-esteem has also been linked to drinking behaviour. Perceived risk has been shown to be negatively correlated with self-esteem, rigidity and risk taking (Hewitt et al. 1995).

The Patil et al. (2006) study made use of a unique data source (the same used by Bingham et al. (2008)), young people who were part of longitudinal studies that began in 1984 and 1987. As part of the longitudinal studies, the participants' official driving records were obtained annually from the Michigan Department of State. Participants in the study took part in a telephone survey between 1997 and 2000, and the driving records for the previous four years were used. The 5362 participants had a mean age of 23.5 years.

Driving history was categorised into 'all offences', 'serious offences' (listed as: driving at more than 15 mph (24 km/h) over the posted speed limit, reckless driving, vehicular homicide, other major moving offences and non-driving drug offences), 'all points' (demerit points), 'all crashes' and 'serious crashes' (listed as: alcohol related crashes, single vehicle crashes and at-fault crashes). Self-report data was also collected for the study. Questions covered whether participants had a competitive driving attitude, took risks while driving, violated road rules while driving, were aggressive drivers and if they drove after drinking. Other questions were designed to uncover their risk taking propensity, physical/verbal hostility, general aggression, tolerance of deviance and expectations for achievement. These factors were then used to discover which predicted the behaviours recorded in official records and self-report data using univariate and multivariate ordinary least squares regression models. Patel et al. (2006) used the results from the multivariate models for most of the data interpretation, but used the univariate models for the simpler associations. All of the factors listed in Table D 3 were statistically significant at the .05 level.

The authors noted that their study adds to past research showing an association between personality measures and self-reported crashes or offences. There were not many associations between personality factors and crashes. Patil et al. (2006) stated that, after carrying out a search, it appeared their study of personality factors and crashes is the only one to have used official crash data. Other studies have only used self-report measures. This may account for the lack of predictors for crashes, as official crashes reported could be a rarer event than crashes that do not come to their notice, but would be collected via self-report data. Offences, the authors stated, are an acceptable alternative to crashes in identifying risky driving behaviour.

The results supported other research showing that personality characteristics and driving behaviours are mediated by attitudes and other behaviours. Patil et al. (2006) noted that many interventions have attempted to reduce risky driving with limited success. This may have been due to poor targeting or use of an overly homogenous intervention to change behaviours whose determinants are heterogeneous across individuals that tend to be person-specific. Thus, the authors recommended that personality factors be used to match interventions to individuals, providing a 'closer link between intervention message and purpose, and the characteristics of the person receiving the intervention' (Patil et al. 2006, p. 333).

Patil et al. (2006) recommended using what is revealed about the personality characteristics associated with different types of risky driving to tailor programs aimed at reducing these behaviours. It was also recommended that programs be computer-based.

Table D 3: Factors predicting risk taking behaviours and attitudes toward driving

Risky attitudes and behaviours	Females	Males
Competitive attitude	Risk taking propensity* Physical/verbal hostility General aggression Tolerance of deviance	Risk taking propensity* Tolerance of deviance
Risk taking driving	Risk taking propensity* General aggression Tolerance of deviance Physical/verbal hostility	Risk taking propensity* General aggression Tolerance of deviance
Drink/driving	Tolerance of deviance Risk taking propensity	Tolerance of deviance Physical/verbal hostility
Driving aggression	Physical/verbal hostility	Physical/verbal hostility
High risk driving, driving aggression, drink/driving	Risk taking propensity* Tolerance of deviance* Physical/verbal hostility	Risk taking propensity* Tolerance of deviance Physical/verbal hostility
All offences	Physical/verbal hostility	Physical/verbal hostility* Risk taking propensity
Serious offences	Risk taking propensity Physical/verbal hostility* General aggression	Risk taking propensity Physical/verbal hostility* General aggression Expectations for achievement
Licence points	Physical/verbal hostility	Physical/verbal hostility * Risk taking propensity
All crashes	General aggression	No significant predictors
Serious crashes	Tolerance of deviance	Physical/verbal hostility

* Strongest predictor(s) based on the Beta level.

Source: Patil et al. (2006).

Wundersitz and Burns (2006) used a questionnaire to compare the personality characteristics and attitudes of two groups of young people in Adelaide: driving offenders and undergraduate psychology majors. Recruitment of the 336 young driving offenders (63 females and 273 males) caught violating the conditions of their provisional licence took place at a Driver Intervention Program carried out by the South Australian Department of Transport, Energy and Infrastructure between October 2003 and January 2004. The participants' ages ranged from 16 to 24. The University of Adelaide undergraduate psychology major students, who also had their provisional licence, participated in return for course credit. The group consisted of 192 females and 78 Males (N = 270) who ranged in age from 17 to 21.

The questionnaire consisted of various items assessing personality characteristics and attitudes. It also contained questions about the number of fines the participant had received for moving traffic violations. The authors were also given permission to access official records to find out about the number of crashes and driving offences of participants in the 12 months after the questionnaire by 62% of the offenders and 70% of the students.

Unlike other research, it was found that there were no differences between the young driving offenders and the comparison group in terms of personality characteristics. The authors pointed out that a group that has formerly been termed 'dysfunctional' is, in fact, well adjusted and feel in control of life. Wundersitz and Burns (2006) believed this irregular

finding was because other studies use offenders guilty of serious (and usually multiple) offences such as drink driving. The offenders in this study mostly consisted of first-time speeding offenders.

Despite this, statistically significant differences between the groups were found on some aggression measures. Compared with the male students, the male offenders were more likely to drive to reduce tension and all offenders reported higher levels of overt hostility and aggression while driving when compared with all students. Attitudes to road safety differed between the offenders and students. The offenders believed that behaviours such as drink driving were acceptable, and that the risk of crashing was not high and if they did crash then there would be no serious consequences (all these differences were statistically significant). In addition, the offenders had no desire to change their behaviour and most of their peers also drove in a risky manner. A number of study limitations were raised by the authors, but not the potential for the differences found between the offenders and students to be due to levels of educational attainment rather than traffic offending.

Wundersitz and Burns (2006) cited Deffenbacher et al. (2000) as having success with teaching relaxation and cognitive restructuring to those high on aggression, but although there was a difference in aggression while driving between the groups in the study, the difference was not large and therefore success on such an intervention may not result. Wundersitz and Burns (2006) suggested that group discussion exercises may be effective if they focus on coming up with strategies to recognise and manage aggression while driving.

Wundersitz and Burns (2008) undertook further work with the above control and treatment group that included checking for offences 12 months after questionnaire completion. This resulted in a driving offender sample of 208 (39 females, 169 males, with an age range of 16 to 24). It was found that traffic offences, a measure of risky driving behaviour for the offender group, were predicted by the number of kilometres the participants had estimated they drove per year along with using driving as a means to reduce tension. In addition, using driving as a means to reduce tension was a predictor of the number of kilometres the participants had estimated they drove per year and number of traffic offences. The authors pointed out that this was a behaviour not a personality trait. There were no personality trait measures that predicted traffic offences. Wundersitz and Burns (2008) noted that 'social learning theory suggests that if an individual has not learnt sufficient means of coping with tension or frustrations, driving may be used as a way of venting these feelings' (p. 199). Gregersen and Berg (1994, cited in Wundersitz & Burns) also found that high-risk young drivers with a greater level of driving exposure had an increased interest in cars, being 'out and about' and driving for extra motives other than transport.

Caspi et al. (1997) utilised the data from a longitudinal study in New Zealand that has followed a cohort since 1972 to investigate if there was a relationship between risky driving and health-related risky behaviour. The findings were based on health-risk behaviour measures taken at age 21, personality measures taken at age 18 and temperament measures taken at age three. Levels of self-reported risky sex, violent crime, alcohol dependence in relation to dangerous driving habits was investigated, as well as whether temperament at age three could predict behaviours and personality traits in later life.

Caspi et al. (1997) found that temperament at age three statistically significantly predicted personality traits at age 18, and personality traits at age 18 statistically significantly predicted health-risk behaviours at age 21. While temperament at age 3 predicted health-risk behaviours at age 21, this predictor dropped to statistically non-significant levels when personality traits at age 18 were added into the equation. The traits at 18 that were statistically significantly associated with higher numbers of health-risk behaviours at 21 were

negative emotionality and constraint. In particular, low traditionalism, harm avoidance and social closeness scores, and high alienation and aggression scores were the traits found to be statistically significant.

Machin and Sankey (2008) undertook an online survey study with students from the University of Southern Queensland. The survey measured personality, risk perception and driving behaviour factors. The ages of participants ranged from 17 to 20 and consisted of 112 females and 46 males (N = 159). Speeding was used as the measure of risky driving. The predictors of higher levels of speeding amongst the participants were higher scores on excitement-seeking, lower scores on altruism (concern for others), scores indicating the participants thought they had a higher likelihood of a crash, and lower scores for aversion to risk taking. The study found the typical sex differences with males having more speeding incidents.

Machin and Sankey (2008) recommended new drivers be tested to determine their levels of excitement-seeking and altruism, with the aim of identifying those who score more highly than average on the excitement-seeking scale and those who score lower than average on measures of altruism. Such drivers should then undergo an education program to raise increase their understanding of how their personality affects their decision making. Rather than stressing the importance of following the road rules, the focus would be placed on the issue that society depends on everyone co-operating and that all people contribute toward the safety goal. Altruistic norms need to be positively reinforced and the potential risky driver needs to gain an understanding of the way in which their behaviour will impact negatively on others. This recommendation was based on the Theory of Planned Behaviour, which states that behaviour is influenced by perceptions of social norms.

Ulleberg and Rundmo (2003) undertook survey research with 1932 Norwegian high school students, 84% of whom had held their driver licence for at least three months. Their mean age was 18.5 years and they ranged between 16 to 23 years. The questionnaire measured the personality traits of sensation seeking, aggression, anxiety, altruism and normlessness on a five point Likert scale (strongly agree to strongly disagree). Risk perception was also measured, where participants rated their estimate of how likely it was that they would have a crash in the future (1 - not probable at all; 7 - very probable). Participants also rated how worried and/or concerned they were about being injured in a crash (1 - not worried at all; 7 - very worried). There were also three risk taking attitude scales, and three behavioural scales on risk taking in traffic.

Structural modelling was used to analyse the results. It was found that high scores on sensation seeking, normlessness (low barriers towards socially unapproved behaviour) and aggression were associated with both risk taking attitudes and risky driving behaviour. Those who had a high altruism and anxiety scores had a higher likelihood of being in favour of road safety and had a lower likelihood of taking risks while driving.

The authors suggested using what is known about the personality traits associated with risk taking while driving, especially their low levels of altruism and anxiety, and high levels of sensation seeking and normlessness (i.e. not concerned about social norms), to produce targeted campaigns e.g. using messages with high sensation value to target high-sensation seekers. Those who behave aggressively while driving would benefit from being taught how to identify and manage their aggressive responses.

D.7.2 General Attitudes

Parker et al. (1992) measured the attitudes and intentions of a large sample of drivers towards four driving violations (drink driving, speeding, close following and dangerous overtaking) in relation to the Theory of Planned Behaviour (see Appendix C.10.5 for an explanation of the theory). It was found that younger drivers perceived less pressure from others to avoid committing violations by comparison to older drivers. The importance of the respondent's peer group and partner for the formation of young drivers' normative beliefs was illustrated. The authors outlined the following to be important in relation to education:

- There is a need to highlight the disapproval of peers and partners in educational messages for young drivers.
- The negative consequences of risky driving behaviour should be made more salient to younger drivers whilst reminding them that perceived positive consequences are either much less likely than they believe them to be or are insignificant by comparison to the potential negative outcomes.
- A person can exert some control over whether violations are committed.
- An emphasis on the potential costs and benefits of committing driving violations.

In 1997, Queensland Transport mailed Queensland licence holders questionnaires seeking details of their crash history, and attitudes towards driving and risk taking behaviours. Of the 689 respondents, 65% were males. The age of respondents ranged from 17 to 88 years with a mean of 47.7 years (Turner & McClure 2003).

The questionnaire used the Driver Aggression Score, which has a scale from 0 to 15. The sample mean was 3.61 with males scoring statistically significantly higher than females (3.77 and 3.33 respectively). The age groups 17 to 29 and 30 to 39 were not statistically significantly different at 5.45 and 4.36, but each was statistically significantly different to the other age groups. The scale for the Thrill Seeking Score ranged from 0 to 7. The sample mean was 1.52 and the age group with the highest mean (4.17) was 17 to 29. This was statistically significantly different from all other age groups. There were no sex differences in the mean scores. The Risk Acceptance scale requires a yes/no response and asks 16 questions (e.g. 'Do you own a gun?', 'Do you drive when extremely tired?' and 'Do you have a high fat diet?'). Possible scores ranged from 0 to 16 and the sample mean was 3.38. The mean for males was 3.96, which was statistically significantly higher than the mean of 2.50 for females. The 17 to 29 year olds had a statistically significantly higher mean (5.69) than all other age groups. Turner and McClure (2003) reported that increasing age was associated with a lower mean Risk Acceptance Score.

Turner and McClure (2003) used logistic regression (adjusted for number of years driving and kilometres driven per week) which revealed that twice the number of males had at least one crash compared with females. The same result was found for those aged 17 to 29. The logistic regression model that included risk taking behaviours was adjusted for three factors: occupation, number of years driving and kilometres driven per week. This showed that males had a 70% increased risk of having a minimum of one crash when compared with females. Respondents who had high risk acceptance scores also had a 70% increased risk of having a minimum of one crash when compared with those who had low scores. The factors associated with having two or more crashes were being male, having a high score on Risk Acceptance and having a high score on Driver Aggression.

The group the authors identified as being the most at risk of having a crash were those who are male and aged 17 to 29. Interestingly, the authors also found that while having a high

likelihood of being involved in a crash was associated with high scores on risk acceptance and driver aggression, having a high score on thrill seeking was not.

D.7.3 General Behaviours

A study by Wundersitz and Burns (2005) differs from the others discussed previously as they used Cluster Analysis in an effort to identify if there were differing levels of risk taking amongst their participants rather than just separating them into high and low levels of risk taking. However, the validation of the clusters relied on self-report data (traffic offences and crashes). There were 270 participants (192 females, 78 males) who were University of Adelaide psychology students. They all held a provisional driver licence and their ages ranged from 17 to 21 years ($M^6 = 18.1$). An internet questionnaire was administered.

The authors used Cluster Analysis, a method of exploratory analysis that sorts data into groups based on the similarity of the attributes measured. The results of the Cluster Analysis (Table D 4) show the score level (low, moderate, high) for each Cluster for the sub-scales of each of the Scales (driving, personality, and hostility and aggression).

Wundersitz and Burns (2005) then proceeded to check the validity of the clusters by using other measures collected in the questionnaire. They used participants' attitude concerning road safety, driving style, speeding, alcohol consumption, number of traffic offences and number of crashes as their validation checks. The authors found that the clusters had quite different attitudes toward road safety at statistically significant levels for driving style, levels of mild social deviance, the amount of alcohol they drank per occasion, attitudes about speeding, their perceptions of how likely it was they would get caught when violating road rules, their concern about hurting someone else if they crashed, driving skills/hazard perception and level of motivation to drive in a safe manner. Driving style (aggressive driving, competitive speeding, not being an inhibited driver and driving to reduce tension were all characteristics of the highest risk takers, Cluster 3), attitude about speeding, amount of alcohol they drank per occasion were the measures that best differentiated between the four clusters.

Post-hoc tests revealed that Clusters 2, 3 and 4 were all differentiated from Cluster 1 by the risky manner in which they drove and higher levels of social deviance. Clusters 2 and 4 were not statistically different from one another, and Cluster 3 drove in the riskiest manner. While those in Cluster 3 reported having a statistically significantly greater number of traffic offences than Cluster 1, this difference was no longer significant when the number of kilometres each cluster drove per week was taken into account. Cluster 3 had a greater number of traffic offences, in part, as they drove nearly double the kilometres per week compared to Cluster 1. The authors suggested that understanding the characteristics of driver sub-types and their underlying motivation for risky driving would enable training and education to be targeted for each sub-type.

⁶ M = mean.

Table D 4: Scale and sub-scale scores for each Cluster

Scale	Sub-scale	Cluster 1 (32%, N = 86)	Cluster 2 (20%, N = 54)	Cluster 3 (24%, N = 66)	Cluster 4 (24%, N = 64)
Driving	Aggression	lowest scores	moderate scores	highest scores	moderately low scores
	Competitive speeding	lowest scores	moderate scores	highest scores	moderately high scores
	External/internal locus of control (external – events and outcomes are determined by outside factors; internal – events and outcomes are determined by self)	lowest external highest internal	moderate scores for both	moderate scores for both	highest external lowest internal
	Inhibition	most inhibited	moderate lack of inhibition	least inhibited	moderately inhibited
	Tension reduction	lowest scores	moderately high scores	high scores	moderately low scores
Personality	Assertiveness (driving to increase feelings of assertiveness)	moderately low scores	lowest scores	highest scores	moderately high scores
	Depression	low scores	highest scores	low scores	moderately low scores
	Emotional adjustment	well adjusted	maladjusted	moderately well adjusted	well adjusted
	External/internal locus of control	lowest external moderate internal	high external low internal	low external highest internal	high external lowest internal
	Sensation seeking	lowest scores	moderately low scores	high scores	highest scores
Hostility and aggression	Assaultiveness	lowest scores	moderately high scores	highest scores	moderately low scores
	Indirect hostility	lowest scores	moderately high scores	highest scores	moderately low scores
	Verbal hostility	lowest scores	moderately high scores	highest scores	moderately low scores
	Irritability	lowest scores	moderately high scores	highest scores	moderately low scores
	Resentment	lowest scores	highest scores	low scores	moderately low scores

Source: Wundersitz and Burns (2005).

Hatfield and Fernandes (2009) recruited two age groups for their study, 16 to 25 (N = 89) and 35 and over (N = 110). The participants, who filled out a survey, were recruited outside motor vehicle registries in New South Wales. The survey contained measures of:

- risk aversion and risk propensity
- risk motivation

- social desirability
- risk perception (included measures of illusory invulnerability)
- risky behaviour.

The measures used endeavoured to uncover the motives for risk taking using correlation analyses to investigate which motives predicted risky driving (speeding and drink driving). These motives were:

- experience seeking
- excitement
- sensation seeking
- prestige seeking (doing things that will result in others admiring the person)
- social influence
- confidence and familiarity
- underestimation of risk
- irrelevance of risk
- 'let off steam'
- 'get there quicker'.

The authors suggested interventions or campaigns targeting young male drivers should address the eight motives in their study that statistically significantly predicted self-reported speeding: excitement seeking, prestige seeking, social influence, confidence/familiarity, underestimation of risk, irrelevance of risk, 'let off steam' and 'get there quicker'. The statistically significant predictors of young female participants' speeding were risk aversion, confidence/familiarity and underestimation of risk.

Hatfield and Fernandes (2009) also investigated the predictors of self-reported drink driving. They found all ten motives were statistically significant predictors for young male drivers: experience seeking, excitement, sensation seeking, prestige seeking, social influence, confidence and familiarity, underestimation of risk, irrelevance of risk, 'let off steam', and 'get there quicker'. Confidence/familiarity and 'get there quicker' motives were found to be the statistically significant predictors of young females drink driving. The authors concentrated on the motives for risk taking as it is, they believe, easier to try and change attitudes compared with personality traits.

D.7.4 Anti-Social Behaviour

Vassallo et al. (2008) investigated the co-occurrence between risky driving and other problem behaviours in early adulthood (19-20 years) and the extent to which multiple problem behaviours are evident among risky drivers in early adulthood, and examined the association between problem behaviours in adolescence (13 to 18 years) and risky driving in early adulthood. Problem behaviours examined included substance use (cigarette, marijuana and alcohol use, and binge drinking), early sexual activity, antisocial behaviour, anxiety and depression. Data from the Australian Temperament Project (ATP) was used. The ATP is a longitudinal study of a cohort of 2443 Australian children (born in Victoria between September 1982 and January 1983) from infancy into early adulthood. Assessment of driving behaviour occurred in the most recent data collection in 2002, when participants were aged 19 to 20 years. Approximately two-thirds of the sample is still participating.

One thousand one hundred and thirty-five young adults (19-20 years, 74% of the retained sample, 56% female) participated in the recent driving survey and all participants resided in Victoria. There were 983 (87%) participants who held a probationary licence, 82 (7%) who held a learner permit and 25 (2%) who held a motorcycle licence. Sixty-seven participants did not have a permit or licence and hence were not included in the study, leaving 1068 participants. Various mail surveys were used to measure the constructs of interest. In relation to risky driving: eight items covering whether the participant had engaged in speeding, drink/drug driving, non-seat belt use and fatigued driving in their last 10 trips at age 19 to 20. Based on a cluster analysis, participants were divided into low, moderate or high risky driving groups.

Alcohol and cigarette use was assessed at 13 to 14, 15 to 16, 17 to 18 and 19 to 20 years by the number of days in the past month the substances were used. Marijuana was assessed by lifetime use at 13 to 14, and by the number of days in the past month the substance had been used at 15 to 16, 17 to 18 and 19 to 20 years. Binge drinking was assessed as the number of days in the past month where participants consumed seven or more drinks (males) or five or more drinks (females). Participants' levels of each substance use were classified as high or not high and different cut-off scores used depending on the substance. In addition, three different patterns of use were established – stable low (little or no use at all time points), transient (high use in early or mid-adolescence only) and stable high (high use at two or more points including late adolescence).

Antisocial behaviour was assessed at all survey waves using a short form of the Self-Report of Delinquency Scale and participants were classified as high or not high. The same patterns of use were also established as had been for the substance use. Differing scales were used to obtain self-reports of depression and anxiety over the different time spans, and the same high or not high levels, and patterns of use were established. For early sexual activity, participants were asked if they had had sexual intercourse and at what age. Participants were classified as having first engaged in sexual intercourse prior to age 16 or 16 or older/never.

Multinomial logistic regression was used to compare the high and low risky driving groups, and the moderate and low risky driving groups on rates of high substance use, antisocial behaviour, anxiety and depression. This type of statistical analysis was also used to compare the rates of transient or stable high substance use or for the behaviours under investigation. Results included:

- Risky driving was statistically significantly associated with all form of substance use in early adulthood (19 to 20 years) (alcohol use: $p < 0.01$; marijuana use $p < 0.001$; cigarette use $p < 0.001$ and binge drinking $p < 0.001$):
 - odds ratios indicated that high-risky drivers were 9.6 times more likely to have high antisocial behaviour, 4 times more likely as low-risky drivers to engage in high marijuana use, 2.8 times more likely to engage in cigarette use and 2.3 times more likely to engage in high binge drinking
 - there were no statistically significant differences between risky driving and anxiety and depression.
- Seventy percent of high-risky drivers had one or more additional types of problem behaviour in early adulthood. This was statistically significant ($p < 0.001$).
- Rates of alcohol use ($p < 0.01$), cigarette use ($p < 0.001$), marijuana use ($p < 0.001$) and antisocial behaviour ($p < 0.001$), were statistically significant precursors of risky driving in early adulthood:

- high-risky drivers were 3.86 times as likely as the low risky group to have a history of stable high cigarette use across adolescence, 3.2 times as likely to have had a stable high pattern of marijuana use, 2.8 times as likely to have had a stable high alcohol use and 8.4 times as likely to have demonstrated antisocial behaviour
- there were no statistically significant differences between risky driving groups and their patterns of anxiety, depression and engagement in sexual intercourse.

To the authors' knowledge this was the first study to examine the association between risky driving and internalising problems (anxiety and depression). The results of the study were consistent with previous research in that the externalising problems in early adulthood (alcohol, cigarette and marijuana use, binge drinking and antisocial behaviour) co-occurred with risky driving. The authors indicated that many young high-risk drivers had a history of antisocial behaviour and/or substance use, and that these problems may precede the development of risky driving. Therefore, it was concluded that interventions that target these adolescent problems may assist in impeding the development of risky driving, and that research is required to examine the impact of such interventions on risky driving.

The authors also indicated that their results offer partial support for Problem Behaviour Theory that posits that problem behaviours are closely related to each other and may be caused by a common underlying propensity. Thus, young adults who engage in risky driving behaviours tend to experience other problem behaviours. Given this finding, the authors concluded that no single approach is likely to reduce risky driving and that a 'mixture of targeted initiatives and broader common solutions' will probably yield better results.

D.8 Self Assessment and Optimism Bias

It has been shown that drivers overrate their own abilities that then may contribute to misperception of risk and hence crash causation. Svenson (1981, cited in Brown & Groeger) showed that the majority of drivers regarded themselves as more skilful and less risky than the average driver. Brown and Groeger's (1988) further analysis on the Svenson data found that the younger drivers (mean age 22) overrated their skills and safety more than the older sample (mean age 33). However, the analysis, although statistically significant was flawed as the younger sample was from the USA and the older from Sweden, hence cultural differences may have accounted for the finding.

This misperception of one's own ability is known as optimism bias, the tendency of people to be excessively and unrealistically optimistic and overconfident when judging the degree of personal risk associated with events or situations. Optimism bias has been shown to be related to driving and health behaviours. Studies in 1986 by Finn and Bragg, and Matthews and Moran (cited in DeJoy 1989) found that people were optimistic concerning their own driving ability, but also when judging the risk associated with a variety of specific driving behaviours, situations and crashes. DeJoy (1989) also found that optimism seems to arise as people overestimate the degree of control they have over events. Thus, efforts should be directed at reducing the driver's sense of perceived control over the driving environment. Education should demonstrate the limits of one's driving skill in crash avoidance. Further, drivers should be given more realistic appraisals of perceived vulnerability, as drivers do not believe that the risks apply to them personally. As such 'standard educational efforts, warning and statistics are not likely to be effective' (p. 340).

Finn and Bragg (1986) studied the perceptions of risk amongst younger and older male drivers. They chose to concentrate on male drivers as this group accounts for the majority of

crashes in the younger age group. The male drivers in the study had answered a newspaper advertisement in Boston requesting participants. No effort was made to ensure the sample was representative of the male driving population. While the authors acknowledged that their sample was possibly more homogenous than the general population due to their recruitment method, they felt that any differences found between the homogenous sample's groups would be 'all-the-more interesting' as these differences would be even more pronounced in the general population.

The participants were of two age ranges: 18 to 24 and 38 to 50. There were 45 participants in the younger age group and 48 in the older age group. There were no statistically significant differences between the groups for the number of miles driven, number of crashes or traffic violations, safety belt usage and the proportion of driving within the city of Boston. Participants were shown 10 photographs depicting various driving scenarios (Table D 5) and asked to rate the level of risk in comparison to a baseline photograph scenario depicting a vehicle being driven in daylight, on a dry day, on a divided six-lane highway and amidst light traffic. Participants were asked to rate the level of risk in the driving scenario for other drivers in comparison to themselves. For example, a young driver was asked to rate the risk of driving at night for a same age peer in comparison to themselves, and then for an older driver in comparison to themselves.

Table D 5 presents the results. In all instances where crash risk has been estimated as 'less' or 'higher' the finding were statistically significant. The highlighted table cells indicate when a difference was found (i.e. higher or lower crash risk). Based on the findings it appears that young male drivers perceive their likelihood of crashing as generally being the same as their peers but less than for older male drivers when tailgating, driving at night, speeding, driving on snowy roads and after drinking six beers in one hour. They did believe that they would be less likely to crash than their peers if driving on a wet road and driving after drinking six beers within one hour. Older male drivers generally thought they had the same likelihood as their peers of crashing in all except the following scenarios: driving at night, driving on a wet road and driving on a snow-covered road. They believed that they would be at more risk of crashing than their peers if they drove after drinking six beers in one hour. In the majority of the scenarios older male drivers felt that young male drivers were more at risk of crashing than themselves. The exceptions were tailgating and driving slowly where they felt that both age groups had an equal likelihood of crashing.

Table D 5: Older and younger male drivers' crash risk ratings for 10 driving scenarios comparing the level of risk for themselves versus their peer group and their non-peer group

Scenario	Age group	Young male drivers	Older male drivers
Urban driving	Younger	Same as peer	Same for myself and older males
	Older	Higher for young males	Same as peer
Rural driving	Younger	Same as peer	Same for myself and older males
	Older	Higher for young males*	Same as peer
Bald tyres	Younger	Same as peer	Same for myself and older males
	Older	Higher for young males	Same as peer
Tailgating	Younger	Same as peer	Higher for older males*
	Older	Same for myself and young males*	Same as peer
Slow driver (driving 10 mph/16 km/h slower than other drivers)	Younger	Same as peer	Same for myself and older males
	Older	Same for myself and young males*	Same as peer
Night driving	Younger	Same as peer	Higher for older males*
	Older	Higher for young males*	Less than for peer
Wet road	Younger	Less than for peer*	Same for myself and older males
	Older	Higher for young males	Less than for peer
Speeding	Younger	Same as peer	Higher for older males
	Older	Higher for young males*	Same as peer
Snow-covered road	Younger	Same as peer	Higher for older males*
	Older	Higher for young males*	Less than for peer*
Drinking (6 beers in one hour)	Younger	Less than for peer*	Higher for older males*
	Older	Higher for young males*	Higher than for peer*

* Significant at $p < .05$.

Source: Finn and Bragg (1986).

Interestingly, five studies reported that optimism is not necessarily associated with the adoption of risky behaviour and can even be related to safe behaviours (Causse et al. (a); Causse et al. (b); Harris & Middleton; Martha & Delhomme; Rutter et al., cited in Delhomme et al. 2009). A 2009 study of 3002 French young drivers (52% men, mean age 22.3) from the MARC survey (Mobility, Attitudes, Risk and Behaviour) supported this premise. The study found that most drivers in the sample exhibited comparative optimism, believing their driving abilities to be better and vulnerability to crashes lower, than the average driver. However, the drivers' comparative risk judgments were realistic in that those who expressed comparative optimism reported less statistically significant extreme speeding behaviours and less driver-related sensation seeking than those who expressed similarity judgments (they see their own risks as similar to others) or comparative pessimism (they see their risks as higher than others). The comparative pessimism drivers had higher statistically significant extreme speeding behaviours and higher driver-related sensation seeking than those who expressed similarity judgments or comparative optimism. Perhaps drivers who are comparative optimistic justify feeling less likely to be in a crash by obeying speed limits. Overall, the authors concluded that optimism and pessimism about specific-behaviour risks may be based on drivers' realistic assessments. Thus determining how realistic drivers' judgments

about speeding risks actually are, may be helpful in message development (Delhomme et al. 2009).

D.9 Factors Influencing Speeding

Many investigators have found significant relationships between speeding and sensation seeking (Zuckerman 2007). There have also been studies to illustrate that both sensation seeking and aggression traits are related to fast and reckless driving. Rosenbloom (cited in Zuckerman 2007) investigated the effects of showing a film depicting graves marked with the kilometres per hour of the person in the grave with high and low-sensation seekers. Low-sensation seekers were found to want to decrease the tendency to risk speeding, but the high-sensation seekers reported increased speeding after viewing the threatening film. The author suggested that attempts to reduce risky driving with messages outlining mortality risks were unlikely to be successful with high-sensation seekers.

Hatfield and Job (2006) investigated the beliefs and attitudes toward speeding via a survey with 362 NSW drivers. Median age of the sample was 35, 57% were male and 90% had a full licence. The following results were obtained:

- 24% of respondents were likely to speed 'under typical conditions in the middle of the day'
- relatively high self-reported likelihood of speeding was observed for 'you need to overtake', 'you are in a hurry to get to an appointment', 'to avoid an accident'
- speeding was more likely to occur in situations where there was less perceived risk (i.e. less likely to crash), e.g. 'you know the road very well', 'you need to overtake'
- approximately 5% of the sample reported engaging in practices to reduce their chance of being booked while speeding e.g. 'slowing down when you see police or a camera', 'avoiding known locations of police or cameras', 'speeding if the traffic around you is speeding' etc.
- approximately 80% of respondents believed that speeding increased crash risk on a clear, dry day
- over 50% of respondents indicated that their chance of being booked for speeding is 'even' or 'unlikely', indicating it may be worthwhile to promote the view that detection is more likely
- some respondents believed they cannot be booked for speeding when it is for overtaking, going down a hill or being no more than 10% over the speed limit
- 64% of respondents agreed that demerit points were a consideration in whether to speed, and 68% agreed the fine was a consideration, 35% felt the penalties were revenue raising.

Hatfield and Job (2006) made the following recommendations in relation to campaigns:

- identify speeding as a factor in road crashes, but do not publicise actual figures
- make the message that 5 km/h above the speed limit doubles the chance of casualty crash the basis of social disapproval of drivers who exceed the limit by greater amounts
- address the perception that speeding is safe under some circumstances and that skill is not a reason for speeding
- increase the social disapproval of speeding.

Fleiter et al. (cited in Lewis et al. 2008) found that regular speeders reported a lack of awareness of, and inattention to, posted speed limits. These drivers were more likely to base their speed choice on their own preference. Further, a telephone survey of 1000 drivers (aged 17 to 60+) in the ACT and NSW found (Morphett et al. 2005):

- Young drivers (17 to 24 years) were blamed for the problem of speeding – almost all drivers (91%) nominated this group as the most likely to cause crashes. The young driver group was more likely to implicate their own age group, thus the authors outlined young drivers are more likely to speed due to self-motivation and overconfidence rather than to ignorance of the issues involved.
- The possibility of licence loss (82%) or crashing (80%) were the most influential consequences on decisions about driving speed, whereas 'embarrassment with family or friends if caught' was the least nominated consequence (24%). This indicates that 'social norms' are that speeding is acceptable. However, 57% considered 'not breaking the law' and 58% considered 'the possibility of getting fined' or caught by police (56%) as an influence on decisions about speeding.
- Many drivers were motivated to exceed the speed limit in a number of different situations, the most likely being to 'keep up with the general flow of traffic' (58%), with 35% speeding 'where you feel speed limit is inappropriate', 'in light traffic conditions' (33%), 'if you feel the risk of crashing is low' (28%) and 'if you feel the risk of being caught by police is low' (27%).

In 1997, Palamara and Stevenson (2003) carried out a longitudinal study of new drivers who answered a survey. The authors then checked police records and determined how many speeding fines they had at 12, 24 and 36 months after obtaining their probationary licence. The survey data was then used to find out if any of the measured factors predicted receiving speeding fines. The factors measured in the survey were:

- health
- health-related behaviours (smoking, alcohol consumption, exercise, use of sunscreen)
- extent of prior driving experience
- results of on-road probationary licence assessment
- their perception of their preparedness for driving under different conditions (e.g. at night, on a motorway)
- expected driving behaviour in the first 12 months
- normative beliefs about speeding
- attitudes toward speeding
- self-reported style of driving
- self-reported driving skill
- impulsivity and sensation seeking
- socio-economic status (all analyses assessing predictor variables were adjusted for socio-economic status).

There were 741 females and 536 males aged 17 who participated in the study. Recruitment took place outside urban driver licensing centres in Perth. The return rate of the survey was 38.1%. The authors gathered some information (demographic, impulsivity and sensation

seeking measures) from 606 of those who declined to participate and found no statistically significant differences between the two groups at the time of the survey.

By the end of the first year, 342 of the participants had received 469 speeding fines. At the 24-month point, 523 had received 849 speeding fines and at the 36-month mark, 472 participants had received 715 speeding fines. By the end of the study 841 (66%) of the 1277 participants had received at least one speeding fine. At the 12-month mark, the number of fines for those who had been caught speeding ranged from one to six. By the end of the 36-month period, the total number of fines incurred ranged from 1 to 16 for the entire three-year period Table D 6 presents the percentage of fines issued within each infringement category for each of the three years.

Table D 6: Percentage of fines issued within each infringement category for each year of driving.

Speeding infringement issued for	Year of driving		
	Year one (%)	Year two (%)	Year three (%)
up to 9 km/h	9.2	11.8	11.9
10 to 19 km/h	49.3	65.7	68.3
20 to 29 km/h	31.6	16.5	15.0
30 to 40 km/h	9.0	4.5	3.8
over 40 km/h	1.1	1.5	1.1
Total	100	100	100

Source: Palamara and Stevenson (2003).

Other results of the study included:

- males received a greater number of fines than females at statistically significant levels
- at the 12-month point males had received 48% more speeding fines than females. This rate dropped by around 10% at 24 and at 36 months
- drivers who had high risk taking scores had two and a half times the number of speeding tickets at 12 months compared with drivers who had low scores. At the 24 and 36-month point this had reduced but was still double that of the low scoring group
- drivers who had high impulsivity and sensation seeking scores were caught speeding throughout the three-year period. The number of speeding fines showed a linear function
- drivers who had self-reported having a confident/adventurous driving style had 82% more speeding fines at the 12-month point than those who felt they had a low or moderate confident/adventurous driving style. By the 24-month point this difference had nearly halved (45%) and remained about the same at the 36-month point
- positive health behaviours were a protective factor with those who reported high levels having 39% fewer speeding fines than those who reported low levels of positive health behaviours. This rate dropped slightly to 35% at 24 months and 27% at 36 months.

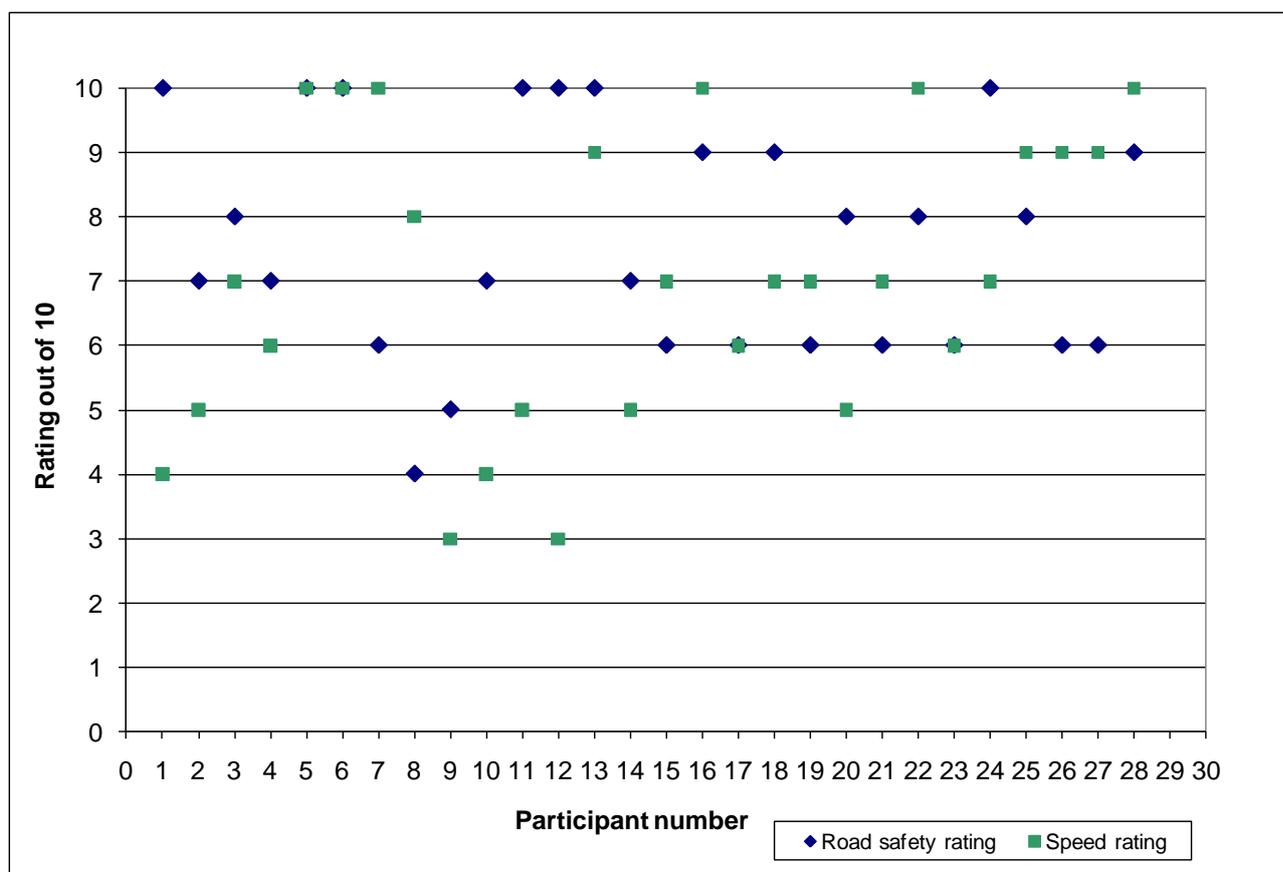
Palamara and Stevenson (2003) also analysed repeat speeding offenders in their sample. Of the drivers who had received a speeding fine within the first 12 months, 26.4% had accumulated two or more fines. At the 24-month point, this had risen to 49% who had received two or more speeding fines throughout the 24 months and by the end of 36 months 61% of participants had received more than one fine over the three-year period. The predictors for this group were gender (being male), high levels of confidence/adventurousness and high scores on impulsivity and sensation seeking.

Palamara and Stevenson (2003) as a result of their study suggested:

- Driving practice and education needs to cover the effect of driver demeanour on the likelihood of crashing. Focus should be turned to the effects of risk taking and characterising oneself as a confident/adventurous driver.
- Campaigns should concentrate on portraying driving at safe speeds as a positive health behaviour. This, they believed, would help form life-long safe speeding behaviours.
- Developing less gender neutral campaigns as males are the group requiring targeting about speeding.
- A tougher system of demerit points be put in place, e.g. four demerit points incurred in the first year would result in licence cancellation, which compares with nine points at the time of writing the report (2003). At the end of 12 months the four point demerit point limit should increase to six points.
- Increasing the number of demerit points for speeding over a particular speed limit (e.g. more than 10 km/h above).
- Incur increasing numbers of demerit points for repeated speeding offences.

Redshaw (2004) conducted three focus groups in New South Wales with 17 to 25 year olds to investigate their views and beliefs about speeding. The 32 participants were sourced by Road Safety Officers in each of the three Local Government Areas. The participants consisted of their children, their friend's children and youths who police officers had warned and/or received fines for risky driving. As such, the results from this sample could be biased and results may not generalise to the whole population of 17 to 25 year olds.

There were 10 female participants and 22 males. The sample's mean age was 18 years. Five females and one male did not have a driver licence, two were on their learner permit, 22 were on their provisional licence and two were fully licensed. On average, the participants either drove their friends or were passengers in cars with their friends for 20 hours a week. Participants were asked to give ratings to two questions: 'How would you rate road safety as an issue out of 10?' (10 was very high) and 'How would you rate speeding as an issue? (1 was not really a problem and 10 was a big problem)'. The ratings are shown in Figure D 1. These questions were not answered by four participants; therefore, data is shown for 28 rather than 32 participants. Twenty-six participants rated the road safety issue as being higher than 5, whilst 20 participants rated the speeding issue as being higher than 5.



Source: Redshaw (2004).

Figure D 1: Rating of road safety and speeding as issues

The 26 participants who drove were asked about their highest speeding behaviour. Three reported never speeding while the remainder reported their highest speeds to range from 8 km/h to 150 km/h above the speed limit. Most reported speeding between 10 and 20 km/h over the limit. A large number admitted to having travelled 70 to 150 km/h above the speed limit. When asked about their normal speed most participants admitted to usually driving up to 10 km/h above the speed limit in suburban, in 60 to 80 km/h zones and on motorways. Four of the participants reported normally driving 20 km/h above the speed limit on motorways.

All participants had experienced being a passenger in a vehicle that was going above the speed limit, with 19 stating that this happened regularly. When asked to estimate how far above the speed limit the driver had gone nine participants thought it was 10 to 20 km/h, five thought it was 30 to 60 km/h and three thought it was 90 to 110 km/h. Only four participants stated that they would never again travel with a speeding driver.

When the groups were asked 'What do you think are the issues for youth in this area relating to cars and driving?' only one group mentioned speeding, despite being told that this was the purpose of the focus group and being exposed to the speeding in the questionnaire. Indeed, Redshaw (2004) stated that the other two groups did not see speeding as an issue and had to be asked to do so. The author reported that rather than talking about speeding being an issue the two groups talked about the problems of people driving too slowly and that speed limits should be raised. The issues that were brought up by at least two of the three groups were people driving too slowly, drink driving, drug driving, old people, fatigue and 'not

enough reckless driving opportunities (expressed as 'no big paddock for P-platers to hand out with their cars' by the other group).

The participants were asked to define speeding. All three groups had one member who deemed speeding to be going over the posted limit but most had differing definitions. Redshaw (2004) listed these as:

- driving fast
- exceeding the speed limit
- driving too fast for the conditions
- 5 to 10 km/h over the speed limit
- speeding easy to achieve
- oblivious to speed
- related to other issues
- more than 15 to 20 km/h over the speed limit
- faster than flow of traffic
- unsafe speed.

While 10 km/h over the limit was felt to be normal speeding, speeding was more generally viewed as driving at speeds where the driver did not feel safe and in control.

Each group was then asked why drivers speed. Running late was mentioned by all three groups as a reason to speed and to get an adrenalin rush by two of the groups. One group felt drivers might want to impress others or give in to peer pressure. Using speed as a means to gain recognition as a respected adult was mentioned in one group. The only valid reason for speeding was deemed by all three groups to be if there was an emergency. Interestingly, one group, when considering why drivers speed, held a discussion about why drivers go slowly. They thought that it may be because they are old, nervous, have a slow car or they are driving slowly in deference to their passenger.

The final topic for discussion was speeding campaigns. The participants were shown the (then) current television campaign by the New South Wales Roads and Traffic Authority (RTA) about the effects of speed on stopping distances. Opinions varied about the effectiveness of the advertisement with some thinking it was 'cool' and others that it was incorrect or unrealistic. Some found it too complicated as they could not grasp the concept that travelling 5 km/h faster would have such an effect on being able to stop and one group spent a great deal of time critiquing technical aspects of the scenario. They hypothesised that the different effects might be due to differential brake wear between the two vehicles and different reaction times of the drivers.

While the participants understood that the campaign was aimed at, all drivers they felt it would be more effective with their own age group if a scenario they could relate to was depicted. One suggestion was showing a street drag race. Themes they thought would be effective were highlighting that they would lose their licence, could hurt their friends or that, not only would they fail to impress their peer group, but that they would look stupid or uncool.

The Redshaw (2004) study has highlighted that speeding is common amongst 17 to 25 year old drivers and that those who have not yet gained their licence experience speeding as a passenger with their friends. Speeding was the social norm for this group. Additionally, they had their own personal (and possibly group-defined) definitions of what constitutes speeding which generally encompasses the idea that speeding is the point at which a driver no longer feels in control or safe which allows for a great deal of individual variation. Speeding campaigns, this group believed, needed to be targeted at their age group using familiar scenarios and depictions of peers with whom they could identify.

Fernandes et al. (2006) surveyed Sydney drivers in an effort to find out the factors that predicted their self-reported levels of intentions to speed in the future. Participants (aged 16 to 25) were sourced from the customer service centres of the RTA's motor registries. They gathered data from 127 drivers (49.6% females, 50.4% males) who had held their driver licence for a minimum of one year. The mean age of the sample was 21 years.

The factors measured were illusory invulnerability, general perceived susceptibility (of being caught), specific perceived susceptibility (of receiving a fine, demerit points, crashing), general perceived severity (of the consequences of speeding), perceived benefits (of not speeding), perceived costs (of not speeding), peer influence, personality scales, infringement and crash history. These were used to find out the factors predicting their intention to speed and how often they would speed.

Fernandes et al. (2006) found that the participants' intention to speed was statistically significantly predicted by:

- authority rebellion
- driver anger
- illusory invulnerability (non-road related)
- perceived costs (of not speeding)
- perceived benefits (of not speeding)
- peer influence.

A precursor to the study by Fernandes et al. (2006) was carried out by Fernandes and Hatfield (2004) using University of Sydney students. One part of the study consisted of asking the participants to rate some statements about their perceived costs of not speeding. The authors found 68% of the participants agreed or strongly agreed with the statement 'Sticking to the speed limit would make me impatient while driving', 60% with 'Not speeding while driving would be inconvenient for me because it takes more time to get to my destination' whereas only 27% agreed or strongly agreed with 'Not speeding while driving would not give me the thrill and excitement I would normally feel when speeding'. This contrasts with other studies that have concentrated on the thrill aspect of speeding without enquiring about time pressures and emotional frustration. Some consideration should be taken of these findings as a later study by Fernandes et al. (2007) found that results from Study 1 which used university students for their sampling about risky driving did not match the results from Study 2 where their age-matched sample was drawn from the general population.

Fleiter et al. (2010) used focus groups to determine the factors that influence speeding in relation to what types of people exert an influence on another's driving speeds and in what way, and to expand the knowledge about the role of social reinforcement of speeding. Participants from Queensland were divided into eight different groups, females below 25

years, males below 25 years, females 25 to 50 years, males 25 to 50 years, females over 50, males over 50, speed excessively (i.e. frequently exceeded speed limits by much more than 10 km/h; 2 male, 10 female) and speed rarely (5 males, 5 females). Their investigation used the social learning theory (Appendix C.10.4) framework to guide the study design and analysis.

The findings included:

- Carrying passengers generally resulted in drivers driving slower. This related to drivers wishing others to view them as considerate and responsible (a 'self-presentational motive').
- Young men drove more slowly with parents in the car only to appease their requests to drive safely.
- Young men were the only group to consistently indicate a willingness to speed with friends in the vehicle.
- Speeding alone was viewed as more acceptable than when carrying passengers, particularly among excessive speeders and young males. The consequences of solo speeding were regarded as unrelated to the ability to cause harm to people outside the vehicle, therefore dispelling such beliefs and promoting the concept of shared responsibility for safe road use to be important. In addition, there was a perception of invincibility in relation to personal safety and speeding and that little thought is given to other road users who may be involved in the event of a crash.
- Young drivers and women wished to be viewed as responsible and trustworthy. Receiving a speeding ticket was seen as jeopardising this view, with the embarrassment associated with a speeding ticket representing social disapproval from others (differential reinforcement of social learning theory). Young drivers in particular did not wish to tell their parents about receiving a speeding ticket.
- The embarrassment of receiving a ticket was also raised if work colleagues found out e.g. loss of respect.
- For some participants receiving a ticket did not deter them from speeding, as social disapproval was not as important or relevant to them, especially amongst excessive speeders, as well as young and mid-age drivers.
- Influence of parents was a factor with younger drivers indicating they modelled their parents' driving, including imitating their speeding behaviour. The authors outlined that future anti-speeding campaigns should portray how impressionable people may copy what they observe (e.g. as shown in the 'Kids absorb your drinking' Australian public health campaign).
- Having had friends killed by or involved in car crashes was discussed by young females, including young female excessive speeders with the effect of slowing down at the particular crash site in question.
- Keeping up with the traffic flow was raised by all groups e.g. irrespective of the speed limits, participants reported that they use the speed of the surrounding traffic to gauge how fast to drive.
- Excessive speeders and young males indicated they increase speed when they wish to race or beat other anonymous drivers.

- Perceived pressure from other drivers to speed was raised by all groups e.g. from tailgating and flashing their headlights. This situation was perceived as potentially dangerous. Pulling over in this situation was seen by some as 'catering to those who wish to break the law, thereby sending the wrong message about speeding' (p. 56).
- Non-social punishments such as fines and loss of demerit points was seen as frustrating and annoying.
- Social rewards for speeding e.g. overt praise, were rare.
- Non-social rewards for speeding were identified (e.g. 'adrenaline surge', 'addiction') particularly by excessive speeders; this was not surprising considering personality traits such as risk-propensity and sensation seeking are associated with speeding.

The authors concluded that the social influence on speeding should not be underestimated. Role modelling, social reinforcements and attitudinal influences appear relevant to speeding drivers in Australia.

D.10 Factors Influencing Mobile Phone Use

Lerner et al. (2008) investigated the decision processes and strategies that drivers engaged in when undertaking distracting tasks using in-vehicle technologies. They conducted focus groups and in-vehicle monitoring of people who used in-vehicle devices and compared the results of different age groups: teen (17 to 18 years⁷), young (18 to 24 years), middle (25 to 59 years) and older (60 years and older). The on-road study involved participants following a set route with an instructor giving directions (as in a driving test). At set points along the route, the instructor asked questions about willingness to perform different in-vehicle tasks and perceived levels of risk. The driving component took two hours. Deployment of a take-home booklet followed. It gave participants the opportunity to explain why they rated certain situations as they did. Additional questions about willingness to engage in distracting tasks and to rate their perceived riskiness were included.

From the focus group discussion, Lerner et al. (2008) determined that participants in general, but particularly the teen group, used in-vehicle technology on impulse. Little or no thought went into the decision to use a mobile telephone while driving. Lerner et al. quoted one teen participant: 'It's like breathing – we don't think about doing it or whether or not we should do it – we just do' (p.9). Many teen and young drivers talked on their mobile telephones continuously while driving and justified their behaviour by explaining that they were naturally able to multi-task, as they had grown up with the technology. The teens took pride in being better than their parents' generation at operating technology and being able to complete multiple tasks at the same time.

Several participants mentioned that they were more likely to talk on their mobile telephone if they had peers in the vehicle and were making plans for the evening. Others said it was the boredom of driving alone in a vehicle that led them to use their mobile telephone. Although the focus group recruitment specifically targeted users of in-vehicle technology, the teen group thought that they were representative of teen drivers as a whole, indicating a perception of social acceptability.

Involvement in crashes that were precipitated by use of in-vehicle technology such as a mobile telephone or CD player had little or no influence on self-reported use of the technology among teens, even for a short period. Lerner et al. (2008) noted that the teens

⁷ The overlap between the teen and young drivers is as described in the report.

were more likely to blame external factors than acknowledge that their behaviour may have caused the accident. For example, one participant who had been text messaging while driving on icy roads said that he would stop driving on icy roads rather than stop text messaging while driving.

Further, teenage and younger drivers consistently rated a greater willingness to engage in distracting tasks and rated distracting driving tasks as less risky than older participants.

White et al. (2010) explored the psychological influences relating to the Theory of Planned Behaviour (Appendix C.10.5) of hands-free and hand-held mobile phone use while driving with 796 Australian drivers aged 17 to 76 years of age, who owned a mobile phone. A questionnaire with open-ended questions, as designed by Ajzen (the developer of the Theory of Planned Behaviour) was used. Analysis of the questionnaire involved frequency analyses to determine the level and type of mobile phone use while driving. Two multivariate analyses of variance (MANOVA) were used to determine 1) beliefs that differed between drivers who frequently and infrequently engaged in hands-free mobile phone use while driving, 2) differences in beliefs between drivers who frequently and infrequently engaged in hands-held mobile phone use while driving. Finally, logistic regressions were undertaken to examine whether beliefs increased or decreased mobile phone use frequency.

Nearly half (43%) of drivers reported answering calls while driving on a daily basis, followed by making calls (36%), reading text messages (27%) and sending text messages (18%), irrespective of handset type. Nearly two thirds (64%) of drivers did not own a hands-free kit and of the drivers that did, 32% did not use them all of the time. The following results were obtained in relation to behavioural, normative and control beliefs for hands-free mobile phone users:

- behavioural beliefs:
 - frequent users were more likely than infrequent users to report using time effectively as an advantage of mobile phone use while driving as well as receiving information (e.g. directions, important news) (statistically significant)
- normative beliefs:
 - frequent users were more likely than infrequent users to report that friends, family members and work colleagues approved of them using a mobile phone while driving in the next week (statistically significant)
 - there was no difference for the frequent and non-frequent users in approval from partners, police and other drivers
- control beliefs:
 - infrequent users were more likely to not use a mobile phone whilst driving due to the risk of fines, demanding driving conditions (e.g. weather, changing lanes), risk of a crash, police presence and heavy traffic (statistically significant)
- as a set, the behavioural, normative and control beliefs reliably distinguished frequent and infrequent mobile users while driving (statistically significant). Thus higher levels of perceived social approval for mobile phone use while driving were associated with a higher likelihood of frequently using a mobile phone while driving, while stronger concerns about the perceived barriers to the behaviour were associated with a lower likelihood of use.

The following results were obtained in relation to behavioural, normative and control beliefs for hand-held mobile phone users:

- behavioural beliefs:
 - frequent users were more likely than infrequent users to report using time effectively as an advantage of mobile phone use while driving as well as receiving information (e.g. directions, important news) (statistically significant)
 - frequent users were more likely than infrequent users to report the disadvantages of being distracted from driving and being caught and fined by police (statistically significant)
- normative beliefs:
 - frequent users were more likely than infrequent users to report that friends, family members, partners, work colleagues, other drivers and police approved of them using a mobile phone while driving in the next week (statistically significant), but levels of approval were low
- control beliefs:
 - infrequent users were more likely to not use a mobile phone whilst driving due to the risk of fines, risk of a crash, lack of a hands-free kit and heavy traffic (statistically significant)
- as a set, the behavioural, normative and control beliefs reliably distinguished frequent and infrequent mobile users while driving (statistically significant). Thus higher levels of perceived social approval for mobile phone use while driving as well as believing more favourable outcomes would result were associated with a higher likelihood of frequently using a mobile phone while driving, while stronger concerns about the perceived barriers to the behaviour were associated with a lower likelihood of use.

The authors made the following suggestions in light of their results:

- strategies to increase awareness of the risks of hands-free mobile phone use (i.e. as it is as risky as hand-held mobile phone use) are warranted
- strategies highlighting unexpected driving challenges in most driving situations and associated hands-free mobile phone use risks are warranted
- demonstrating favourable and unfavourable outcomes of hands-free mobile phone use alone in campaigns is likely to be ineffective
- design messages that emphasise disapproval from significant others, i.e. friends and family, e.g. 'Your friends don't want you to be dying to talk to them' (p. 17) to decrease hands-free mobile phone use whilst driving
- disapproval strategies could also be applied to hand-held mobile phone use, such as referring to the driver as irresponsible (e.g. 'bloody idiot' Transport Accident Commission drink driving campaign), or if adopting a positive approach, reinforcing approval for the decision not to use a hand-held mobile phone while driving
- as drivers are aware of the risk of hand-held mobile phone use, but they engage in the behaviour as they see the call as important, strategies to reduce the perceived advantages of the behaviour and the need for improved time management and trip preparation may be helpful
- an analysis challenging drivers to weigh up the favourable outcomes (e.g. time effectiveness) against unfavourable outcomes (e.g. distraction) may also be effective for those who use a hand-held mobile phone whilst driving

- publicise the dangers of hand-held mobile phone use – the number of crashes and fines to make the dangers more salient to infrequent users.

D.11 Factors Influencing Tailgating

Begg and Langley (2004) analysed data from participants in a longitudinal study that began in 1972 in New Zealand. The authors used answers given by the participants when they were 26 years old about their road safety attitudes and behaviours. The sample consisted of 459 females and 474 males. The risky driving behaviours Begg and Langley focused upon were driving fast for the thrill of it, taking driving risks to make driving more fun, driving over 120 km/h on the open road, following closely behind slow drivers, speeding up if another driver tries to pass, overtaking when there is a solid yellow line and rating their abilities as a driver as higher than other drivers. The authors defined the 26 year old drivers who continued to take part in these behaviours as persistent risky drivers. Their reasoning was that at approximately 24 years of age there is a reduction in crash involvement (compared to younger drivers) which they assume is due to no longer driving in a risky manner.

The number of females who reported driving in a risky manner was so small that the authors were unable to run analyses. Some males in the sample were identified by the authors as being persistent risky drivers for seven of the behaviours. Seventeen percent (N=80) of males drove faster than 120 km/h on the open road, 7% (N=35) drove fast for the thrill of it, 5% (N=25) rated their driving abilities as better than others, 4% (N=20) followed closely behind slow drivers and 1% (n=7) took risks while driving to make it more fun to drive.

Begg and Langley (2004) used participant data gathered at 18 and 21 years of age to establish the predictors of each of the risky driving behaviours. The predictors of reporting driving as speeds over 120 km/h on the open road were two personality measures taken at the age of 18: low constraint and aggressive behaviour. The authors found that those who had low constraint, high levels of negative emotionality, high use of substances, behaved aggressively, had at least one conviction for traffic offences and held a motorcycle licence at the age of 18, and reported being dependent upon cannabis at the age of 21 were also the participants who reported driving fast to experience a thrill. Those who believed they were better drivers than others were also those who had gained their licence at 15 and/or had a motorcycle licence by the age of 18. There was only one predictor of following closely behind slow drivers and that was having low constraint scores at the age of 18. As only 1% of the males in the sample reported taking risks while driving to 'make it more fun' no analyses were able to be run.

Boyce and Geller (2002) investigated whether speeding and following distance could be predicted from a driver's age, personality type and driving style. The participants recruited were in three age groupings: 18 to 25, 35 to 45 and 65 and over. There were 61 participants, 23 of whom were in the younger age group (13 females, 10 males), 22 were in the middle age group (12 females, 10 males) and 16 were in the older aged group (7 females, 9 males). The oldest participant was 82 years of age.

The risk taking factors measured in the study were venturesomeness, impulsivity, hostility, perceptions of invulnerability, locus of control and Type A⁸ personality. Participants drove alone along a predetermined route that included going through the Virginian town's business district, driving on rural roads and a highway. The route was 22.3 miles (35.9 km) in total and was approximately 45 minutes in duration. The instrumented vehicle used was able to record

⁸ Type A personality pertains to a pattern of behaviour characterised by a sense of urgency, impatience and hostility (Friedman 1996).

seat belt use, when the indicators were used, average speed, velocity changes, velocity variance and following distance. There were also cameras concealed in the car that captured the drivers gaze, hand position, and forward and rearward road environment.

The authors presented their results in terms of the percentage of safe behaviours. It was found that the older group (90% safe) had statistically significant higher percentages of maintaining a safe speed than both the younger (62% safe) and middle (81% safe) age groups. The middle age group also maintained a safe speed compared with the young group at statistically significant levels. There were no statistically significant differences between the sexes.

When a participant was travelling 20 mph (32 km/h) or faster, and was closer than two seconds behind another vehicle this was counted as a tailgating incident. The expected age related differences were observed with older (82% safe) drivers having statistically significant levels of safe following distances than younger (49% safe) and middle (67% safe) age group drivers. In addition, middle age group drivers had statistically significant levels of safe following distances compared with the younger age group. There were no statistically significant differences between the sexes.

When determining the predictors of the two behaviours Boyce and Geller (2002) used the percentage of safe behaviours and then the mean of the behaviours. Using stepwise regression they found that the percentage of safe speed behaviours was predicted by age. As drivers grew older they maintained safer speeds for a greater percent of the trip. When using the mean speed driven the statistically significant predictors were age and Type A personality measures: it was found that as participant age decreased their mean speed increased and as Type A personality characteristics increased so too did the mean speed driven.

The percentage of safe following distances (i.e. not tailgating) was predicted solely by age with older drivers maintaining a safe distance more often than younger drivers. In common with speeding, mean following distance was best predicted by age and Type A personality. As participant age increased their following distances increased while increases in Type A personality characteristics were associated with decreases in following distances. In summary, it was found that participants in the 18 to 25 year old group travelled at higher speeds a greater percentage of the time and also had higher mean speeds. They also tailgated more often and maintained smaller mean following distances. Tailgating was associated with Type A personality characteristics.

APPENDIX E ADDRESSING THE PERCEPTION THAT RISK TAKING BEHAVIOURS ARE SAFE

E.1 General School-Based Education

Ulleberg (2002) aimed to identify sub-types of drivers and evaluate how they responded to a school-based driving safety campaign with 2856 Norwegian students, who had held their licence for a minimum of six months, in the age range 18 to 23 years ($M = 18.5$ years). Of the sample, 47% ($N = 643$) were surveyed after the campaign had taken place to ascertain how favourably they rated the campaign. The focus of the campaign was crashes caused by speeding, driving off the road and head-on collisions and aimed to enhance traffic safety attitudes, generate increased awareness of crash risks and promote safe driving.

The campaign consisted of visiting high schools and showing two movies. Class-based projects about road safety were undertaken after the school visit and the teacher based the assignments on information provided in a manual. Additional reminders about the campaign were delivered in the form of airing advertisements at movie theatres, posters, free CDs, free t-shirts, web pages and a road safety competition. Enforcement of road safety rules was increased and driving schools made their learner drivers aware of the campaign. Two groups were specifically targeted: sensation seekers and those with high levels of normlessness (those who do not follow or obey social norms and rules). The two groups were treated differently, in that a different role model were used, a typical sensation seeker or a typical normlessness adolescent.

Ulleberg (2002) performed cluster analysis on participants' self-report data that included measures such as sensation seeking, normlessness, altruism and levels of anger when driving to determine if being part of a high or low risky driving-style cluster was associated with how favourably the campaign was rated. Six clusters were identified:

- Risk taking drivers group one – mostly male, low on altruism and anxiety, high on sensation seeking, irresponsibility and driving-related aggression. They demonstrated risk taking attitudes and behaviours, and perception of risk of injury in a crash was low, and a high confidence in their own driving skills.
- Risk taking drivers group two – high on sensation seeking, aggression, anxiety and driving anger (i.e. low levels of emotional adjustment). As per group one they demonstrated risk taking attitudes and behaviours, but were low on self-reported driving skills.
- Three groups of low-risk drivers.
- One group of medium-risk drivers (they had high sensation seeking scores but also scored highly on altruism).

Ten questions about the campaign were rated by the participants. These were satisfaction with the campaign in general, posters and videos, information during the visit at school and the way the school prioritised the campaign, and if the participants found the campaign: meaningless-meaningful, boring-funny, disappointing-giving, negative-positive and 'concerning' or not.

Overall, ratings of the campaign were positive and none of the ratings for any of the clusters fell below the halfway mark. Ratings were from one to seven, with seven being the most positive rating. The lowest rating given to the campaign evaluation questions was 3.79 on the 'Did you find the campaign boring-funny?' (from the highest risk-taker cluster) and the

highest was 6.17 in relation for the question 'Did you find the campaign meaningless-meaningful?' (from the lowest risk-taker cluster). Unfortunately all clusters felt that the projects created by their school were not of much value.

Ulleberg (2002) stated that, while actual differences between the ratings of the clusters were small some were statistically significant. Post-hoc analyses found that the highest risk taking cluster (group one) had statistically lower scores on eight ratings. Seven of their 10 ratings were rated 4 (range 4.12 to 4.92) and their highest ratings were 5.36 for meaningless-meaningful and 5.39 for negative-positive. This high-risk group found the campaign boring, disappointing and felt it had no relevance. The study indicated the campaign appealed most to low-risk takers and that there is a need to make sure that campaigns are highly salient to specific risk taking groups to sufficiently engage their attention. General high-school campaigns, involving class-based assignments such as the one in this study appear to have little effect on high-risk taking young drivers.

McKnight and McPherson (1986) compared two programs that endeavoured to reduce the levels of drink driving among high school students (N = 213) in Rhode Island, USA. One program was a traditional information-based format (control group) and the other provided information and peer intervention strategies (treatment group). Both programs were administered to students who attended driver education classes and lasted a total of nine hours. The peer intervention program provided information about alcohol and the ways in which it affects driving ability, as well as ways in which to control drinking. After one hour of general information, the remainder of the sessions involved role playing scenarios for intervening in peer-related drink driving situations. Initially the scenarios were scripted but eventually students created their own scenarios and trialed their own intervention strategies. Discussion was held after each role play to highlight the main points and to clarify strategies that were not effective.

The authors measured attitudes to alcohol use pre- and post-intervention and found no attitude change in either group. There was, however, a reported increase (at statistically significant levels) in drink driving intervention behaviours for both groups immediately after the programs had finished. The increase at one to four months post-program had disappeared for the control group but was still present for the peer intervention treatment group. Providing and practising strategies to intervene should a peer try to drink drive may be a useful tool in the prevention of risky driving behaviour.

Materials were developed by Meadows and Stradling (2000) in a two-pronged approach aimed at improving the attitude of novice drivers to various risky driving behaviours. The novice drivers had lessons with driving instructors and received a take-home learner pack that consisted of four lessons, where one lesson was completed per week. The driving instructors received an instructor pack that outlined strategies to help them teach novice drivers safer driving attitudes. Rather than using a fear-based approach the material highlighted the importance of teaching learner drivers strategies to help them avoid risky situations, made the learner driver imagine the consequences of being involved in crashes (including getting them to imagine how their friends and family would react) and asked the learner driver to think about the positive and negative aspects of risk taking.

The learner's pack took much the same approach to attitude change. The exercises covered a general introduction, speeding, how to cope with pressure from passengers and the effect emotion can have on driving behaviour, and excuses that are often made for risky driving. This last item aimed to show that typical excuses are not valid reasons to commit driving violations. Novice drivers were encouraged to imagine themselves in scenarios that might elicit the desire to drive in a risky manner (e.g. late for an appointment and tempted to speed

to get there more quickly), and to imagine safer ways of handling the situation and to imagine the possible consequences. The material also made a point of acknowledging the perceived benefits of speeding (for example) but challenged these by highlighting that speeding is not a great time-saver and that their anxiety levels would be raised. Alternative strategies were suggested for the thrill-seeking aspect of speeding such as finding alternative routes where dealing with tight corners could provide an element of enjoyment or taking advanced driving lessons that would teach them to handle cars driven at speed.

The attitudes chosen by Meadows and Stradling (2000) for evaluation were speeding, dangerous overtaking, running traffic lights and tailgating. These behaviours were chosen as in their previous studies the authors have found them to be the most commonly reported driving violations. Attitudes to the risky driving behaviours were assessed at the time of signing up with a driving instructor, immediately after learner-pack completion (i.e. four weeks later) and three weeks post-completion. The group receiving the driving instruction that included attitude change strategies and the learner pack was compared with three other groups: learner got pack/instructor got no pack, learner got no pack/instructor got pack, and learner got no pack/instructor got no pack.

Most of the results reported here pertain to the group who received the full intervention (learner and instructor both got packs) and the control (neither learner nor instructor got a pack). Both groups were asked about their future intention to commit the four road safety violations. There was little change in the intention to speed, but there were low levels of intention to speed at the beginning of the intervention. The intention to overtake in a dangerous way decreased in both groups from time point two to three but not at statistically significant levels. This risky behaviour was not targeted in the learner pack but was in the pack given to driving instructors. The intention to run traffic lights showed a statistically significant decrease in the treatment group between time point one and two ($p=.013$), and remained stable at time point three ($p=.781$). The control group, however, had a statistically significant increase in intentions to run traffic lights between time point two and three ($p=.033$). They also had a slight increase in intentions to run traffic lights between time point one and two but this was not statistically significant. The intention to tailgate rose in the control group from time point one to two (statistically significant: $p=.025$), but there was no statistically significant difference from time point one to three as the intention to tailgate had fallen at time point three. The drop in intention to tailgate from time point two to three was statistically significant ($p=.016$). The intervention group showed no change in their intention to tailgate at any of the time point.

The effect sizes in this study were small and many factors could have affected the study's results. Individual variation in the ability of instructors is unknown, as is how closely they followed the instructions in the pack. Some of the instructors who did not receive the pack may have taught in a manner similar to the intervention methods and this would have reduced the between group differences. No mention was made of whether checks were performed to ensure that the novice drivers who received packs were carrying out their weekly exercises. Further, analysis of the level of effort and thinking that went into the exercises would be required to uncover the effects of individual variation. Lastly, intentions do not necessarily reflect actual behaviours. It appears that further research is required to determine if the behavioural intervention of Meadows and Stradling (2000) would be useful.

E.2 Fear and Shock Tactics

Fear and shock tactics have been used for a long time to reduce risk taking behaviour and crash involvement of young drivers. These tactics include the use of isolated 'stunts' such as putting a crashed car on display, a visit to the morgue, presentations of graphic crash

scenes etc. Usually very graphic depictions of potential negative consequences of risky behaviours are displayed with the aim of arousing fear or anxiety to result in a behaviour change (Shanahan et al. 2000). Ruiter et al. (2001) reviewed the literature on fear appeals to the adoption of self-protective behaviour and found it lacking. The authors concluded that fear arousal can inhibit as well as facilitate effects on assimilation of protection motivation, and can also lead to avoidant coping. They outlined that a great focus on precautionary information, the promotion of action and personal relevance of the message are more likely to be effective.

Unfortunately, young drivers who have a high risk taking propensity and are most in need of being convinced about their vulnerability, are least likely to be persuaded by fear and shock messages and will be the most resistant to change (Australian Transport Safety Bureau 2004; Shanahan et al. 2000). There is no evidence that using fear and shock tactics is effective when the research is conducted in real-world situations with members of the general public and particularly with young people. It has been effective in experiments with a simulated environment. This is because young people do not see the message as personally relevant and do not identify with the message (Donovan & Henley 2000; Donovan & Henley 2003). This relates to optimism bias discussed earlier. Further, there is growing evidence to suggest that males are not persuaded to modify their driving behaviour as a result of fear-based messages. Males reported that such messages have greater influence on other drivers than themselves, while females reported that such messages had a greater influence on themselves than other drivers. In addition, males reported less intentional change in response to such messages than females. Overall, messages that contain positive emotions such as humour may be more persuasive with males (Godenbeld, Twisk & Houwing; Lewis, Watson & Tay, cited in Lewis et al. 2008).

To influence a person's attitudes, intentions and behaviours they must be convinced of and, hence, perceive their own vulnerability to be under threat. Young people do not generally become persuaded by or personally involved in the threat and therefore it is difficult to raise fear in them and therefore for fear-based messages to be effective (Hastings et al. 1990).

According to Maddux and Rogers (cited in Shanahan et al. 2000), if fear appeals are to be used the following four actions are essential:

1. inform the audience of the harmful nature of the problem
2. explain the high likelihood of suffering the negative consequences of the behaviour if this behaviour is not changed
3. outline the steps to reverse the negative consequences
4. explain the ability of target audience members to personally carry out the required behaviours to reduce the negative consequences.

E.3 Incentives

Wilde (2001) indicated it is possible to motivate people to perform safe behaviours by either:

- increasing the perceived benefit of cautious behaviour
- decreasing the perceived cost of cautious behaviour
- increasing the perceived cost of risky behaviour
- decreasing the perceived benefit of risky behaviour.

Wilde (2001) outlined that incentive programs in enhancing safety have been effective, especially in occupational accident prevention. Such programs work as they motivated people toward acting safely as the incentives enhance the expected benefits of the safe behaviour. Incentives might include reward for crash-free and violation-free driving through insurance discounts and free or discounted licence renewal. Disincentives work by increasing the perceived cost of the risky behaviour, for example a study of the elimination of Connecticut state subsidies for driver education in high schools, resulted in obtaining a driver licence becoming more expensive. Thus, obtaining a licence at a later age was a result (there was an 18% reduction in those aged 16 to 17 years obtaining a licence compared to 7% in communities where the education was retained). One can decrease the perceived cost of cautious behaviours by providing subsidies for transport, tax exemptions for safety equipment etc. In order to increase the perceived cost of risky behaviour, increased penalties for traffic violations, building vehicles to become uncomfortable at high speeds etc. can be considered. To decrease the perceived benefit of risky behaviour schemes such as having truck drivers paid by the hour, rather than by how far they drive or how many drop-offs/pick-ups they may perform could be considered.

Trimpop (1994) reviewed the psychology of risk taking behaviour and outlined that incentive programs may show some long term benefits, but due to habituation, people get used to increased rewards and therefore will eventually begin to take risks again. Thus it was recommended that rewards should be changed periodically, they should be flexible to accommodate individual needs and differences, and finally be non-material and material in nature. The author also outlined that the research on risk taking indicated that regardless of rewards and punishments, people will always take risks, as risk taking is essential for survival, fun, and is rewarded intrinsically and by society. Therefore, risk taking cannot be eliminated, but should be channelled into domains that are less risky for people and society.

APPENDIX F MESSAGE DEVELOPMENT

F.1 General Factors to Consider in Message Development

Wilde (2001) provides the following information on important components of messages:

- The effect of a message will be greater if the communication source is depicted as credible, knowledgeable, trustworthy and free from selfish interest in the attitude or behaviour that is being promoted.
- Message effectiveness will be greater if the source is perceived as similar to the receiver e.g. on characteristics such as gender, age, linguistic style, social class, personality traits, group membership etc. In addition, the message may express views that are held by the audience to increase this similarity component.
- Research has shown that the promoted change 'should not exceed the latitude of acceptability' (p. 104) (the message should contain some attitudes held by the receiver, but also advocate change, but not too much change). If the latitude of acceptability is exceeded, no change will occur or worse, it will produce the opposite change in attitude.
- Messages that employ a lecturing approach should be avoided.
- Messages should be specific in relation to the behaviour change required, e.g. general slogans such as 'Safety First', 'Live a Healthy Life' will not have an effect, 'Had a few drinks? Get a ride' is more likely to be successful.
- Messages should be perceived as personally relevant by the recipient. The target behaviour should be evident in the message, and it should enhance the processes of imitation and modelling.
- A motivational message should be adopted, i.e. the presentation of conditions for people to achieve (e.g. belongingness, self-actualisation etc.) or avoid (e.g. pain, fear, death, horror etc.). However, the motivational appeal of humour has been shown to be ineffective when promoting safe behaviours and the use of fear has had mixed results. Strong fear appeals can lead to 'defensive avoidance' whereby recipients turn their attention away from the message (either at the instant of exposure or by refusing to think about the message later). Mild or intermediate fear appeals can be useful, provided the audience can take action to reduce their state of anxiety.
- Messages are more likely to be effective if they reach the audience who are in the related situation, so that the advocated behaviour can be undertaken by recipients. Thus, a television advertisement about seat belt wearing may be ineffective compared to one on the radio heard whilst driving. Whereas a television advertisement on drink driving may be effective if a person is drinking and plans to soon drive.

Lewis et al. (2008) found the following to be important:

- Positive emotional appeals provided information on how to perform a task correctly and to prevent adverse outcomes.
- Negative emotional appeals helped to 'grab attention' and provide a 'top-up' of fear to remind drivers that driving is dangerous.
- If persuasive advantage was found for negative appeals, it was immediately after exposure, whereas the advantage for positive appeals was found later, after the exposure.

- The persuasive effect of different emotions does vary, hence a need for thorough testing of communications.
- Appeals were more effective when the individual identified with them in terms of perceived involvement and gender influence, highlighting the difficulty in designing messages to target individuals who believe road safety has little relevance for them.
- High efficacy (belief in being able to perform the behaviour in the message) is needed, especially for positive emotional appeals.

Shanahan et al. (2000) in their literature review assessing the components of effective mass media campaigns for risk taking behaviour, found the following principles to have some importance, which in turn should be considered when developing messages:

- Messages should build on the target audience's current knowledge and meet pre-existing beliefs, motives, values and needs.
- Aim to increase knowledge and change beliefs that impede adoption of positive behaviours.
- Demonstrate the personal and social benefits of the desired behaviour. Focus on the immediate, high-probability consequences of positive behaviours.
- Use self-management strategies (e.g. self-monitoring, positive self-talk) for behaviour change.
- Emphasise positive behaviours rather than negative consequences, and current rewards rather than the avoidance of distant negative consequences.
- Repetition of a single message is more likely to have an impact.
- Educational messages for high-risk youth should also have messages for parents of such youth.
- Highlight themes in the development of adolescent identity, including freedom, autonomy and peer-group acceptance.
- Campaigns with a persuasive orientation requesting behaviour change/modification are better than those with an education (informative approach).
- Arousing fear is rarely successful. If it is used, mechanisms for reducing the anxiety created should be employed.
- Educational messages should be presented in entertainment contexts.
- Messages should:
 - be relevant to, and understood by, the target group. They should be based on the beliefs and attitudes of the group
 - not be overly complicated. They must be easy to understand
 - have a single focus e.g. do not drink and drive, rather than do not drink, speed and drive
 - be concrete, clear and realistic
 - be engaging and hold the interest of the audience
 - encourage involvement of the audience by being personally relevant to them e.g. engage the audience in the issue (get them to think about it), rather than telling them what the issue is

- be relevant and address the priorities of the audience. Thus they may be different for different sub-groups of young drivers. Personalising the message can generate self assessment
- establish it is not acceptable to engage in the negative/risk taking behaviour
- lead to questioning of the positives of engaging in negative behaviour
- use non-judgmental tonal qualities
- stimulate self-assessment rather than be exaggerated
- be presented in ways that use important influences and interests of the target group
- consider the language and culture of target subgroups, particularly ethnic minorities or culturally and linguistically diverse backgrounds
- be diverse, as different pieces of information vary in salience between subgroups within youth culture
- outline enforcement and legal consequences where relevant
- be repeatedly exposed, as the impact of health messages 'decays over time'
- arouse a strong, relevant, emotional response, whether positive or negative
- use simple, concrete words and visual demonstrations of both positive and negative effects
- use mnemonics (i.e. verse or formula to assist in retaining in memory) for informational objectives
- ensure prescriptive norms and popular norms are in agreement
- be genuine and not preach
- not always be serious and/or frivolous, i.e. it should be entertaining
- contain settings and situations that relate to the target audience.

Donovan and Henley (2003) outlined communication principles for successful communication campaigns, and although not particular to message development are helpful to consider:

- A message's impact is not reliant on the content alone, as members of the target audience need to be active participants. The participant's beliefs, attitudes, knowledge and experiences affect them attending to, interpreting and accepting the messages presented.
- Target audiences must be segmented by beliefs and attitudes before message development.
- Formative research, including message pretesting, is essential. This requires gaining an understanding of each target audience's beliefs and attitudes on the issue to be addressed. Then messages should be pretested to ensure the audience understands the message and minimal 'counter-arguing' occurs. The pretesting should also ensure messages aimed at a primary audience do not have unintended negative effects on any secondary audience.
- Communication campaigns should occur with other environmental and 'on-the-ground' strategies to increase the possibility of attitude and behavioural change.
- Using a number of message delivery channels and more than one message source is more likely to be successful.
- Mass media communication campaigns that 'stimulate interpersonal communications' (page 58) are also more likely to be successful.

- Campaigns guided by theoretical frameworks are more likely to succeed.
- Communication campaigns must be sustained to achieve and maintain success.

Noar et al. (2007) undertook a meta-analysis of 57 studies to determine if tailored messaging is effective in changing health-related behaviours. Tailoring messages for a particular sub-population, rather than for the public generally, requires individualised assessments of the members of the target group, so that messages are based on the group's characteristics. The meta-analysis found this to be in case, but that other factors moderate the effects of tailoring. These factors were that the health behaviour change interventions:

- intervened on preventive or screening behaviours
- produced newsletters, pamphlets or magazines (perhaps with visual components)
- used more than one intervention contact
- had shorter periods between intervention and follow-up
- were based on four to five theoretical concepts (or more) as well as behaviour and demographics
- used behavioural theory that includes concepts such as self-efficacy, attitudes, stages and processes of change, and social influence
- used new media technologies such as internet websites, email, instant messaging (over the internet), personal desktop assistants, text messaging (mobile phones) and computerised kiosks.

F.2 The Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) (Petty & Cacioppo 1986) outlines the basic processes underlying the effectiveness of persuasive communications. It posits that variations in persuasive effect are a function of how people process information and the degree to which they engage in issue-relevant thinking (elaboration). The model distinguishes between two routes to persuasion: the central route and the peripheral route. The central route involves careful assessment of the persuasive communication to determine the merits of the arguments (i.e. a high degree of elaboration). Thus the person is engaged in careful, systematic thinking about the issue. The peripheral route is used when the audience does not pay close attention to the persuasive communication and is instead swayed by more superficial characteristics of the message, such as the perceived credibility or attractiveness of the source or the quality of the presentation. This involves a low amount of elaboration.

Attitude change via the central route appears to be more persistent, resistant to change and predictive of behaviour than that which occurs via the peripheral route (Petty & Cacioppo 1986). Petty and Cacioppo (1997) suggested that when using the central route, people will react in a similar way to the same argument because they have considered all sides of the argument. This suggests that central route processing leads to more predictable change.

When central route processing (Figure F 1) is considered in isolation, more persuasive messages will be those which:

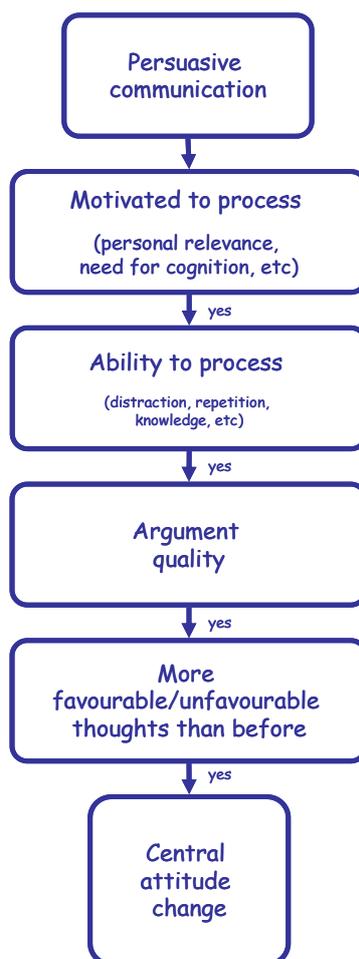
- occur with the ability to process. Processing is more likely to occur if the individual is not distracted at the time and if the messages are repeated. The information must also be accessible (for example, in terms of the language used) and understandable

- enhance motivation to process thoroughly. Persuasion has more of the central route if the issue at hand is of high personal importance/relevance. Thus the issue must be seen as meaningful and relevant to the audience
- are well-constructed and convincing (incorporating evidence, examples, reasoning and logic). The exact nature of a good quality argument depends upon the person receiving the message and how it corresponds with their perspective on the target issue.

The ELM can be used as a framework to tailor road safety messages for particular audiences. To determine how to tailor messages for a particular target group, information should be obtained from the group on:

- the relevance of the particular road safety topic
- the level of cognition (low versus high) in relation to the topic
- their capability to understand the information associated with the topic
- the personal relevance of the topic
- their level of emotional involvement with the topic.

The need for cognition can be assessed by asking people to agree or disagree with statements such as 'I really enjoy a task that involves coming up with new solutions to problems' (high need) and 'I like tasks that require little thought once I have learned them' (low need), thus the central or peripheral mode of processing is identified (Wilson 2007).



Source: Petty and Cacioppo (1997).

Figure F 1: Central Processing according to the Elaboration Likelihood Model of Persuasion

Wilson (2007) indicated the following concepts on persuasive messages to be important.

Messages' source:

- the message source must be credible. This is based on expertise (e.g. from a road safety professional) and trustworthiness (e.g. from a celebrity). Further, credibility will depend on the target audience, and a source with high credibility is more influential when message receivers are engaged in peripheral processing (i.e. low personal interest in the topic at hand)
- timing of source identification – if the source is identified at the outset of the communication it must be a credible one
- likeability of the source is important, especially when the topic has low personal relevance to the audience
- similarity between the source and the audience (e.g. age, gender), although this has produced mixed results
- physical attractiveness of the source, as they are generally more persuasive than unattractive ones.

Drawing a firm conclusion:

- persuasive messages that have an explicit conclusion or recommendation are most effective
- advocating a specific course of action is more effective than offering general guidelines.

Giving one-sided versus two-sided messages:

- a one-sided message focuses only on one viewpoint, whereas a two-sided message presents both sides of the issue. Further, a two-sided message can acknowledge the opposition in a descriptive way, or it can present the opposition and then refute it with evidence/solid reasoning
- research shows that a refutational two-sided message is more persuasive than a one-sided message, whereas nonrefutational two-sided messages are less persuasive. Thus, either refute the oppositional message or do not mention it at all.

Using fear appeals:

- strong fear messages are generally more effective than weak or moderate ones, as long as people are convinced the threat is severe, they are vulnerable to the threat, and that an effective response can be followed to reduce or eliminate the threat
- people must be personally convinced they are susceptible to the safety risk if persuasion is to occur and strong fear appeals may be most effective with people who are in high need of cognition
- Lewis et al. (2007) reviewed the literature on fear (threat) appeals in road safety and found mixed results on effectiveness, with the viewpoint being to avoid threat appeals or use them with great caution. Relevance (i.e. vulnerability) and provision of coping strategies were considered to be more important.

Providing statistics or examples:

- the research has had mixed findings – some research indicates using examples is more effective, whilst others find provision of statistics more effective.

The ELM outlines that identifying if the target audience uses a central or peripheral route of processing is important. Those using the central route will be highly motivated and think critically about the safety issue. Those using the peripheral route are less motivated and will be less capable of undertaking safety issues (Wilson 2007).

The ELM aligns well with some general principles of adult education, which include (Fell 2005):

- Build on the knowledge and experiences of the group/individual.
- Ensure the learning environment is comfortable and encouraging.
- Ensure that the learning activity meets the needs and relates to the problems of the group.
- Activities should actively involve people, be stimulating and participatory.
- Allow time for people to reflect on what they are learning, take difficult subjects slowly and allow questioning.
- Ensure the group feels it is making progress towards its learning goals.

F.3 Rossiter-Percy Model

The Rossiter-Percy model identifies the appropriate motivations for a target group's basis for attitude and behaviour change. The model has two dimensions: (1) the level of involvement associated with decision making (high or low) and (2) the nature of the primary motivations in driving the decision (positive or negative). People who are high-involvement decision makers wish to reduce the risk of making a wrong decision and need to be convinced that they will make the right decision. Low-involvement decision makers adopt a 'try-it-and-see' attitude, as the consequences of making the wrong choice are inconsequential. This is similar to the ELM's model of central and peripheral routes (Donovan & Henley 2003).

Primary motivations largely determine the message strategy. Positive motivations have a 'drive induction or increase' goal and to achieve a positive experience, whereas negative motivations have a 'drive reduction' goal and to remove/avoid a negative experience and return to 'normal'. Positive motivations (e.g. 'exercise to look good and feel great') are not used frequently in health messages as most health behaviour adoption has negative motivations. Further to motivations is the role of emotions in message strategy. Each motivation has its own relevant emotion and it is necessary that (1) communications portray the correct emotion(s), and (2) the sequence of emotions (for negative motives in particular) are correctly applied (not just the arousal of single emotions). The appropriate emotions and emotion sequences appear in Table F 1.

Table F 1: Rossiter-Percy model links between motivations and emotions

Negative motivations	Emotional sequence
Problem removal	Annoyed → relieved
Problem avoidance	Fearful → relaxed
Incomplete satisfaction	Disappointed → optimistic
Mixed approach-avoidance	Conflicted → reassured
Normal depletion	Mildly annoyed → content
Positive motivations	Emotional sequence
Sensory gratification	Dull/neutral → joyful
Intellectual stimulation/mastery	Bored/neutral → excited Naive/neutral → competent
Social approval	Apprehensive/neutral → flattered
Social conformity	Indecisive/neutral → belonging
Self approval	Conflict/neutral → serene, confident

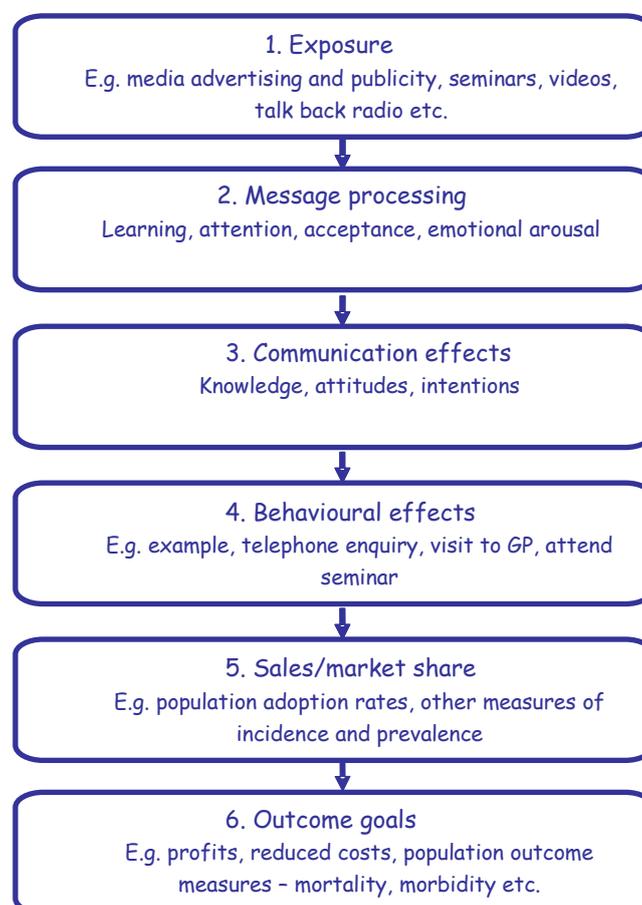
Source: Donovan and Henley (2003).

Donovan and Henley (2003) point out how emotions have been used in road safety advertising:

- fear, anxiety: about the possibility of detection, about loss or serious injury of loved one, loss of licence or personal injury
- guilt/remorse: for not having followed advice that could have avoided a negative consequence or at having unintentionally caused the loss or serious injury of a loved one
- sadness: the loss of a loved one, the impact on others of the loss or serious injury of a loved one

- surprise: at particular information, e.g. 'the dose response relationship' between injury and speed or the relationship between speed and distance travelled in a moment's distraction
- shame/embarrassment: being caught for an offence, but particularly for a socially despised offence
- anger: at the irresponsible behaviours of other road users, e.g. drink drivers
- acceptance, love, warmth: for protection of the vehicle's occupants (particularly children) or complying with another's request to drive safely
- relief, peace of mind: removal of anxiety and tension by compliance with the road rules.

The Rossiter-Percy model provides a six-step communication process (Figure F 2).



Source: Donovan and Henley (2003).

Figure F 2: The Rossiter-Percy six-step communication process

The six steps of the model are (Donovan & Henley 2003):

1. Exposure of the message to the target audience, delivered in a variety of ways e.g. publicity and factual information, and in a variety of media e.g. websites, newspapers, billboards, radio talkback, posters and television advertisements. This includes maintaining the effects of message exposure.

2. Processing of the message in short-term memory from attention to the message. This involves attention to the message content, comprehension and learning, emotional arousal and acceptance/rejection of the message. Items that influence message processing include the message execution (colours, graphics etc.), source factors (who delivers the message) and message content.
3. Long-term memory effects or communication effects, which refer to attitudes towards, beliefs about, and intentions with respect to the message.
4. Behavioural effects which are the desired communication effects that are recalled during decision making, e.g. increasing intentions and therefore behaviours to act in the recommended manner. This might include neutralising misperceptions and negatives, and justifying costs and other factors that inhibit adoption of the recommended behaviour.
5. Achievement of objectives and goals to provide sales and market share, e.g. participation rates.
6. Achievement of overall goals relating to risk reductions, health cost reductions etc.

Donovan and Henley 2003 outlined the following to be important in message construction:

- Link the desired belief to an already accepted belief (e.g. most smokers accept that smoking is unhealthy).
- Any claimed threat or promised benefit must be credible.
- Use two-sided messages as opposed to a one-sided message (e.g. smoking is enjoyable, acts as a social facilitator etc.) to pre-empt potential counterarguments that might distract from the message/lead to source denigration and therefore message rejection.
- Leave the target audience to make their own conclusions rather than telling them to adopt the promoted stance, i.e. do not preach or dictate in the message.

F.4 Heuristic Systematic Model

The Heuristic Systematic Model (HSM) developed by Chaiken and Eagly in 1989 is similar to the ELM in that they both posit that persuasion can be accomplished by two dissimilar routes. As outlined above, in ELM this is via the central and peripheral routes, in HSM it is via the systematic and heuristic modes. Systematic processing involves using all information available during the judgement task. It is considered a comprehensive analysis of the information. Heuristic processing is considered a limited processing mode that demands less cognitive effort and capacity. Thus, people focus on a subset of information and apply simple inferential rules/schemata/cognitive heuristics⁹. Personal relevance of a message is important for both modes of processing (Kruglanski & Thompson 1999).

Kruglanski and Thompson (1999) outlined that systematic and heuristic processing can co-occur. Three effects of this dual processing are:

- attenuation: systematic processing may provide people with additional evidence regarding message validity, which may contradict any persuasion heuristics being utilised. Therefore the impact of the heuristic may be attenuated (weakened)

⁹ A heuristic is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently. Heuristics are informal, speculative, intuitive strategies or rules that may or may not result in an effective solution to a problem (Sternberg 2009).

- bias: refers to the probable validity of persuasive messages, e.g., if the message is provided by an expert it may be viewed more positively than one given by a nonexpert
- additivity: systematic processing can override the impact of heuristic processing.

F.5 Limited Capacity Model of Motivated Mediated Message Processing

The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) developed by Lang in 2000 is a theory about how people process mediated messages. The theory applies to different message contents, media and goals, each of which are variables within the theory. People are considered to have a limited capacity of information processing, and processing suffers when there are insufficient resources available. There are two motivational systems, the appetitive/approach system and the aversive/avoidance system. These systems activate in the presence of motivationally relevant stimuli in the environment and influence cognitive processing. Aspects of a message influence the motivational and cognitive systems, and aspects of those systems influence how the message is perceived, encoded, stored and eventually retrieved. Thus in the LC4MP there are three major sub-processes – encoding, storage and retrieval (Lang 2006).

The elements of a message are encoded when limited cognitive resources are allocated to them, either as the result of controlled or automatic mechanisms. Stimuli that are novel or motivationally relevant are encoded automatically. For the message to then be stored in long-term memory, it must be encoded and linked to already stored information. If encoding is poor, then storage will be poor. Similarly, retrieval of the messages will be dependent on the resources allocated to it. The model outlines that the level of activation in the motivational systems affects how resources are allocated across the processes described above.

At low levels of activation, the appetitive/approach system will be more active than the aversive/avoidance system. An increase in negative stimuli leads to increased activation in the aversive system, and an increase in positive stimuli leads to an increase in the appetitive system activation. An extremely positive stimulus is required for a high level of appetitive activation, whereas a moderately negative stimulus achieves an equivalent level of aversive activation. At low levels of aversive activation, few resources are allocated to encoding and recent studies suggest that calm negative messages (messages about negative topics that are not arousing) receive few resources for thorough processing, and therefore tend to be very poorly encoded. Thus activating the aversive motivational system may be more effective, although adding too many motivational items could result in cognitive overload. Despite this, messages that result in cognitive overload that have been rated as enjoyable have led to a positive attitude toward the message/advertisement and intent to purchase the product. Thus some overload may be acceptable if persuasion is a primary goal.

To apply the above theory to message development, the following questions must be posed (Lang 2006):

- What is the message aim? E.g. if the aim is awareness, then a message needs to attract attention and be well encoded; if it is knowledge gain, the message will need to be well stored; if persuasion then the message should result in positive evaluations, be perceived as effective and alter attitudes; if behaviour change, then the behaviour to change, reasons to change and how to change must all be encoded and stored at the required level of motivational activation.
- Who is the target audience? E.g. high versus low-sensation seekers.

- What medium will carry the message?
- What is the motivational and personal relevance of the message for the target audience? E.g., will the message receiver seek out the message or purely just be exposed to the message? Will it activate the appetitive/approach system or the aversive/avoidance system?.

Lang (2006) provided further information on using the LM4CP in relation to message development:

- When the message is personally relevant then it will result in aversive activation and both automatic and controlled processes will allocate resources to processing the message. The use of structure and emotion to increase automatic resource allocation may 'backfire' as the aversive system may become over-activated.
- When a message is not personally relevant, the less controlled and motivationally related resource allocation will occur, therefore the use of structure and emotional appeals to increase resource allocation is a good strategy to apply.
- Using positive appeals will be helpful when there is a need to combat the tendency to withdraw from negative stimuli e.g. messages about cancer treatment for high-risk cancer groups will have greater aversive activation (associated with the greater risk of getting cancer).
- When designing television messages, use structural features to increase the probability that important parts of the message are encoded and then allow periods when sufficient resources can be allocated to storage. Thus, when messages are simple and familiar use graphics to increase resource allocation, but when messages are new and/or complex simplify the presentation to maximise storage.
- To maximise encoding and storage begin a message with a measured emotional appeal to activate the motivational system. Do not introduce much information at this time, but once the emotional story has activated the motivational system, then present factual information, which will be more likely to be stored.
- With audio messages, it is likely that either structural complexity or emotional content improves processing, but the combination does not. The use of multiple voices, concrete language and chronological presentation of information are good combinations for increasing message encoding.
- Overall the LC4MP illustrates that attentional limits and distractions of messages must be considered in relation to the audience's ability to process the message.

F.6 Unimodal

Kruglanski and Thompson (1999) developed and provided evidence for a Unimodal influencing persuasion rather than the dual processing model outlined by the ELM and the HSM. The Unimodal is a process during which beliefs are formed from appropriate evidence, which requires the construction of evidence from the information presented and that stored in memory. Persuasion is substantially affected by motivation (including the three motivations of the HSM), and the availability and accessibility of relevant knowledge structures influencing a person's cognitive capacity to construct evidence, by the type and amount of information presented, the person's motivation to process the information deeply (versus superficially) and the person's cognitive capacity for doing so.

Kruglanski and Thompson (1999) argued, in contrast to dual processing models, the Unimodal indicates that message arguments do not differ on variables such as accessibility

or availability, degree of relevance, length and complexity of information, or the order they are processed by the recipient, even though there is evidence to the contrary as described earlier. The authors conducted experiments to support this premise, but as this is one study, and there is greater support for dual processing models, the rules for message development will focus on these dual processing models rather than the Unimodal.

F.7 Activation Model of Information Exposure

The Activation Model of Information Exposure, sometimes called the sensation seeking or variety theory, outlines that humans seek out 'newness, change, sensation or inconsistency and that such inputs, in moderate amounts, provide a pleasurable experience' (p. 296). Thus 'activation' provides a person with energy and is responsible for psychological and motor activity. A person will engage in behaviour designed to increase activation if it is lower than the optimal level, seeking novel situations. However, when activation or the 'processing state' goes beyond preferred limits of variety (over arousal), a person will reduce the variety input and seeks consistent or redundant information (Donohew et al. 1980).

In relation to a message, the model outlines that an individual will be attracted to a message and continues attending to it if the arousal generated by the message is consistent with the arousal desired by the individual. Thus when the arousal generated matches that desired, the individual experiences positive affect and continues exposure to the message. If an individual finds a message overstimulating, less arousing content will be sought. Finally, a message can fail to be stimulating enough so that an individual's arousal level is not achieved or maintained (Stephenson & Southwell 2006).

It has been acknowledged that other factors, not just arousal will result in an individual's attendance to a message e.g. due to a cognitive reason such as the particular source of the information. Another problem with this model is that determining the 'optimal' level of arousal for individuals and how to frame and construct a message to meet this level is problematic (Stephenson & Southwell 2006). Thus, this model appears to be unscientific and will not greatly assist in message development.

F.8 Sensation Seeking Targeting (SENTAR) Prevention Approach

Palmgreen et al. (2001) found that televised campaigns aimed at reducing marijuana use among high-sensation seeking adolescents were successful when designed for such adolescents. The authors outlined that high-sensation seekers' needs for stimulation are associated with distinct preferences for high-sensation-value messages, as they result in higher affective, sensory and arousal responses. Such messages are dramatic, novel, emotionally powerful or physically arousing, unconventional, graphic or explicit, suspenseful or fast-paced. Such messages have proven successful with high-sensation seeking adolescents and young adults, than have low-sensation-value messages in producing intentions to call a prevention hotline, message recall, lower behavioural intentions to use drugs and more negative attitudes towards drugs. Further, anti-drug public service announcements placed in high-sensation-value television programming also result in greater attention from high-sensation seekers than those placed in low-sensation-value programs.

The above findings led the authors to develop the SENTAR (Sensation seeking-Targeting) prevention approach, which targets a population with members high in sensation seeking and includes four principles:

- 'use sensation seeking as a targeting variable
- conduct formative research with target audience members

- design high-sensation-value prevention messages
- place messages in high-sensation-value contexts (e.g. television programs)' (p. 292-3).

The use of sensation seeking as a targeting variable involves directing a campaign to a specific audience demographic rather than the general public. Further, targeting should also segment on the basis of 'psychographic variables' such as values, beliefs, attitudes, personality characteristics, linked to the behaviour of interest (e.g. mobile phone use) and the communication channels and message styles most preferred by the target audience (Stephenson et al. 2002).

The way in which Palmgreen et al. (2001) developed their public service announcements (PSAs) that were successful involved:

- research with focus groups of high-sensation seeking adolescents for opinions on existing PSAs and marijuana risks
- PSAs developed used teenage actors; employed high-sensation-value characteristics such as drama, surprise, novelty and strong emotional appeal; and depicted the negative consequences of marijuana use
- risks incorporated into the PSAs were supported by relevant research and were considered salient by the focus group participants
- advertisement storyboards were further assessed by other focus groups.

Previous research by Palmgreen et al. (1991) on sensation seeking and message sensation value on drug use PSA effectiveness found that for:

- high-sensation non-drug users – use a message that stresses exciting alternatives to drug use. High sensation messages are more likely to be effective than one that stresses peer resistance skills and is lower in sensation value
- low-sensation non-drug users – use a message that stresses peer resistance skills and is low in sensation value.

A 2002 SENTAR-designed campaign that decreased marijuana use among high-sensation seekers illustrated that placing television advertisements at times the target audience watched television was vital, and that targeting viewer characteristics, activities and behaviours, or ensuring consistency with their lifestyle, increased message identification, which in turn increased the chance of having an impact on attitudes and behaviours. In relation to the latter trait of matching to the target audience's characteristics, examples used in the 2002 campaign included as the teenager leaves the house to light up (a joint) after a disagreement with parents, a friend comes along and encourages the teenager to engage in other ways to decrease the stress of the situation. These ways of de-stressing (with an alternative high-sensation activity) were then shown.

A study by Zimmerman et al. (2007) on the effects of PSA television advertisements on condom use amongst young adults who were considered high-sensation seekers was also found to be successful. The authors focused upon heterosexual 18 to 23 year olds who had sexual intercourse at least once in the three months prior to being surveyed, using a cross-sectional design over a 20 month period (by the end of the study the cohort age range was 19 years 8 months to 24 years 8 months). The campaign consisted of 10 PSAs that were shown during programs that were popular with this age group.

To enable the effects of the advertisements on condom use to be monitored Zimmerman et al. (2007) televised them in one town (Lexington, Kentucky) and compared survey results with a similar town (Knoxville, Tennessee). The messages were designed to target those high in sensation seeking and/or those who make impulsive decisions using health-related behavioural theories. The advertisements were shown between January 2003 and April 2003 and had been pre-tested with focus groups before airing.

Four thousand and thirty-two participants were recruited via the telephone over the entire 20 month period. The time periods when recruitment took place were eight months before the advertisements were shown, monthly for the time period the advertisements were shown and 10 months after the advertisements had finished. The Lexington sample consisted of 1158 females and 858 males, similar to the number of participants recruited in Knoxville (1123 females, 893 males). While the two samples were similar in many respects, they differed statistically significantly on some measures. There were more Black Americans in Lexington, and the Lexington sample had a lower age for when they had their first sexual experience and a higher mean number of sexual partners within the previous year. Knoxville had more participants who were still attending school. Eighty-five percent of the participants in Lexington saw at least one of the PSAs.

While the authors reported that condom use in Lexington rose by a statistically significant 13% ($p < .05$) in high-sensation seekers compared with use by Knoxville's participants that showed fairly stable levels of use throughout the entire period, there were some study limitations. The most important of these was the control and treatment groups did not have similar levels of condom use before the PSAs. From the eight month pre-campaign period until the beginning of the campaign self-reported condom use showed a downward trend in Lexington, whereas it remained stable in Knoxville, thus the two cities may not have been comparable or that factors unknown to the authors were influencing the results.

The authors suggested that 'booster' campaigns might be required as there was a decline in condom use a few months after the advertising campaign finished. These, they pointed out, would need to be new messages in order to maintain the target audience's interest. They stated that media campaigns would be more effective if coupled with behavioural classroom-based interventions.

F.9 Framing – Positive Versus Negative Messages

Loroz (2007) described framing as the focus on the persuasive effects of a positive frame (benefits gained) or a negative frame (consequences suffered) by choosing an option in some decision context. Prospect theory supports framing by indicating that people tend to be risk-seeking in losses and risk-averse in gains. Thus, when applied to a framed message, the theory suggests that a negatively (loss) framed message will be more effective than a positively (gain) framed message to promote behaviours that invoke a level of risk (i.e. the individual perceives the behaviour to be risky or result in an unpleasant outcome e.g. it may detect a health problem). By contrast, a positively-framed message will be more effective than a negatively-framed message in promoting cautious behaviours (i.e. the individual perceives the behaviour to have a low risk of unpleasant outcome e.g. it prevents the onset of a health problem, a 'prevention' behaviour).

However, although recent research supports this premise, it has not been universally supported in older research. However, Rothman et al. (2006) believed that there is sufficient evidence to recommend the use of gain-framed messages when developing initiatives to promote prevention behaviours and the use of loss-framed messages when developing initiatives to promote detection behaviours. An example of a positive-framed message is

'flossing your teeth daily removes particles of food in the mouth, avoiding bacteria, which promotes great breath' (p. S204). In contrast, an example of a negative-framed message is 'if you do not floss your teeth daily, particles of food remain in the mouth, collecting bacteria, which causes bad breath' (p. S204) (Rothman et al. 2006). In terms of a road safety behaviour, e.g. speeding, an example of a positive-framed message is 'if you don't speed you won't get a ticket', and an example of a negative-framed message is 'speeding regularly in shopping strips will increase your chances of killing a pedestrian'.

The involvement level of the message recipient is an important factor that influences the persuasiveness of message frames. Research has shown that people engaging in elaborative processing were more persuaded by negative frames advocating detection behaviours (those where one engages in risky behaviour, as opposed to a preventative health behaviour such as driving a car with a five star safety rating) for heart disease, sexually transmitted diseases and skin cancer. In contrast, less effortful processing led to improved attitudes following positively-framed messages. For prevention contexts, the opposite pattern occurs, whereby people will be more persuaded by positively-framed messages in the context of promoting safe driving (preventative behaviours) (Loroz 2007).

Meyers-Levey (cited in Loroz 2007) combined much of the research on health-related message framing by clarifying that the level of risky implications in performing a behaviour is important. Further, the level of risk interacts with personal relevance of the message to determine the type of message processing. Thus the following conditions resulted in the message being more persuasive:

- negatively-framed messages when there is high personal relevance and high-risk implications
- positively-framed messages when there is low personal relevance and either high- or low-risk implications.
- no effect of the message frame when there is high personal relevance and low-risk implications.

The research by Loroz (2007) investigated how providing reference to one's self versus the self and others affected the way messages should be framed. It was found that when a person must process a message related to themselves and others, then the message processing under these conditions might be less involving, resulting in less processing, thus requiring a positively-framed message. An example of how this research might apply to smoking cessation is:

- when aimed at individuals only, a negative message approach should be used (e.g. focussing on the 'hard-line' personal consequences of smoking)
- when aimed at others, a positive message approach should be used (e.g. quitting smoking can benefit one's kids as opposed to the harm caused them through continuing smoking).

Monahan (cited in Shanahan et al. 2000) provided the following guidelines as to when to use positive appeals:

- when the audience is unfamiliar with the issue; use emotional benefit appeals in the 'form of comparison, demonstration, satisfaction and testimonials'
- use indirect affective appeals once the audience is familiar with the issue. Humour and/or other positive feelings are effective in overcoming boredom and overexposure issues

- once there are strong negative feelings over an issue, use positive emotion very carefully or avoid it
- stress positive outcomes rather than negative ones to gain greater compliance, and emphasise control over the issue rather than helplessness.

Rothman et al. (2006) outlined that when messages are repeated over time the framing used needs to be reviewed after information about the actions people have taken in response to an initial appeal have occurred. People's actions and their associated thoughts about them need to be assessed. For example, women who had a mammogram may feel satisfied and reassured about their health, and thus respond to a positive-framed message in the future. However, other women could feel anxious about the possibility of finding a negative mammogram result in the future and therefore may see the monitoring process as an illness-detecting procedure. The women in this latter group would therefore respond to a negative-framed appeal.

Undergraduate students from the University of Auckland were participants in a study designed to explore the explicit and implicit effects of positively and negatively-framed road safety television advertisements (Sibley & Harré 2009). The 150 students ranging in age from 17 to 33 ($M = 19.23$), most of whom were female ($N = 98$), watched three drink driving advertisements. All three either portrayed negative consequences of drink driving or safe alternatives to drink driving. The control group watched three advertisements about how to be supportive of those with mental illness. The participants were told the purpose of watching the advertisements was to give ratings about aspects such as their realism and clarity, whereas the actual purpose was to investigate the effect of the different approaches on perceived driving ability and perceived driving caution in terms of the self and others.

Implicit perceptions were tested using the Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, cited in Sibley & Harré 2009). The IAT uses a computer to present concepts that participants have to match as quickly as possible. The quicker the reaction time, the closer the concepts are assumed to be associated within the participant's brain. In the perceived driving ability IAT there were equal numbers of positive and negative 'abilities' presented, such as expert driver, capable driver, unskilled driver and clumsy driver. The same approach was taken with the driving caution IAT where phrases such as careful driver, law-abiding driver, dangerous driver and risky driver were used. Participants are seated at a computer and words are presented on the screen (in this case two words). Two different keys are used by the participant to indicate which of two categories they believe the words best represent. For example, in this study participants were required in one of the tasks to decide whether the words representing driver ability (e.g. expert driver) best represented themselves or others. The faster a participant reacts to the words, the more closely the words are associated with (and presumed to be more representative of) the concept of (in this case) self/good driver or other/bad driver (assuming the participant considers themselves to be a good driver and other drivers as bad drivers) in the participant's brain.

Participants performed two trials. In the first they used two different keys to assign the words presented on the screen (outlined above) into two separate categories: self or other. In the second trial, participants performed the same task but the categories were driver ability or driver caution. In the first two of four test conditions the words presented on the screen were combinations of self/other and driver ability/inability, and self/other and driver caution/recklessness. In the final two test conditions the pairings were swapped so that, for example, a self/driver inability pairing was now a self/driver ability pairing.

Explicit perceptions of participants' belief about their driving abilities were also recorded. They were asked 'Do you think you are more or less (attribute) as a driver than other people your age?' on various attributes. The attributes were:

- Driving ability: capable, competent, skilled, expert, hopeless, useless, clumsy and unskilled.
- Driving caution: risky, careful, reckless, safe, dangerous, law-abiding, responsible and careless.

Analysis of the results showed effects on perceptions of driving ability but not driving caution. Participants who had watched advertisements showing safe alternatives (positively-framed messages) to drink driving had a statistically significant reduction in their self-perceived driving ability compared with those who watched advertisement portraying negative consequences, or the control group who watched advertisements about supporting those with mental illness. This was the same for both men and women. This effect, however, was only apparent for the explicit (participant's replies to the questions) and not the implicit (i.e. IAT) test measures. This, the authors posited, could have been due to consciously available perceptions (i.e. explicit perceptions) being more malleable in the short-term than the unconsciously held perceptions (i.e. implicit perceptions). While it seemed that showing coping strategies for (positively-framed messages) rather than the negative consequences of drink driving is more effective at altering perceptions (at least those consciously available), the authors pointed out that this gives no indicator of subsequent behaviour.

F.10 Narratives and Transportation Theory

Narratives or stories may range from brief public service announcements (advertisements) to a television series such as a soap opera. Narratives or engaging, 'transporting' stories can reduce counterarguments (or lowering resistance to change or reducing the characteristic of opposing persuasive appeals), provide role models for behaviour change, facilitate the mental stimulation of difficult, unknown or frightening (health) procedures and create strong attitudes that are based on both emotion and cognition. The premise of transportation theory is the experience of becoming immersed in a story and the ways in which this 'transportation into a narrative world' can lead to belief and behaviour change. Thus a person can be 'transported' into factual or fictional communications, and into spoken, visual or written narratives (Green 2006).

Research has shown that individuals who are transported into a narrative world are likely to change their real-world beliefs in response to information, claims or events in a story. In addition, narratives may sustain attention in low-motivation audiences. There are at least three ways a person can undergo transportation, by creating connections with characters, reducing counterarguing and making narrative events seem more like real experience (by providing concrete examples of events and vivid mental images of story events and/or characters). Transportation into a story also helps the person to engage in mental simulations of events or behaviours. Effective narratives need to be well written, evoke mental imagery, have engaging characters (perhaps matched to the reader on relevant characteristics), have health information that is accurate and be tested with the target audience. Transportation theory complements theories such as the Elaboration Likelihood Model (ELM) discussed earlier, which focus upon argument-based messages. Narratives can assist in leading people to form appropriate intentions and in motivating them to act on those intentions (Green 2006).

F.11 Message Development and Speeding Behaviour

Lewis et al. (2008) examined positive and negative emotional message influence over self-reported speeding behaviour with 205 participants who held a current driver licence, with age ranging from 17 to 59 years ($M = 30.89$; $SD^{10} = 10.63$). The messages emotional content was developed from the Rossiter-Percy motivational model framework. This model identifies an emotion in persuasive messages as appealing to negative emotions such as fear and as appealing to positive emotions such as humour.

Two self-reported surveys were used to measure the extent to which participants would obey and monitor the speed limit as a result of exposure to either positive or negative messages (pre-exposure and four week after surveys). Hierarchical multiple regressions were used to examine the extent of message acceptance. The following results were found as statistically significant predictors of self-reported speeding behaviour:

- negative messages:
 - males: past speeding behaviour
 - females: as above, but with the addition of message acceptance.
- positive messages:
 - males: message acceptance
 - females: past speeding behaviour.

The authors concluded that messages could influence future speeding behaviour, but depend upon whether the message is positive or negative, and the gender of the message receiver. It appears that with males a positive message will have the best outcome, but for females a negative message is the best outcome (in terms of potentially reducing future speeding behaviour). The limitations of the study were small sample size and self-reported measures, but a strength of the study was the use of follow-up measures of speeding behaviour. The study also showed the importance of focusing messages on modifying intentions and not just attitudes to speeding e.g. breaking habits (intentions are the nearest determinant of behaviours).

F.12 Summary

Table F 2 outlines each of the message development models/theories that have been discussed, provides a brief description and the important concepts to use during message development to address risk taking. Some models do not provide specific concepts on what exactly is required during message development as message development may be problematic due to components of the model.

Table F 2: Message development models/theories and important concepts to apply during message development to address risk taking behaviours

Message development model/theory	Brief description	Important concepts for message development
General factors to consider message development	NA	<ul style="list-style-type: none"> ▪ Communication source to be credible, knowledgeable, trustworthy and free from selfish interest in the attitude or behaviour that is being promoted. ▪ Information source should match the target audience e.g. on characteristics such as gender, age, linguistic style, social class, personality traits, group membership etc. In addition, the message may express views that are held by the audience to

¹⁰ SD = Standard deviation.

Message development model/theory	Brief description	Important concepts for message development
		<p>increase this similarity component. Be diverse, as different pieces of information vary in salience between subgroups within youth culture. Use settings and situations that relate to the target audience.</p> <ul style="list-style-type: none"> ▪ Target audiences must be segmented by beliefs and attitudes before message development. ▪ Messages should be specific in relation to the behaviour change required, e.g. general slogans such as 'Safety First', 'Live a Healthy Life' will not have an effect, 'Had a few drinks? Get a ride' is more likely to be successful. ▪ Messages should be perceived as personally relevant by the recipient. The target behaviour should be evident in the message, and it should enhance the processes of imitation and modelling. ▪ A motivational message should be adopted, i.e. the presentation of conditions for people to achieve (e.g. belongingness, self-actualisation etc.) or avoid (e.g. pain, fear, death, horror etc.). ▪ Mild or intermediate fear appeals can be useful, provided the audience can take action to reduce their state of anxiety. ▪ Messages are more likely to be effective if they reach the audience who are in the related situation, e.g. a television advertisement about seat belt wearing may be ineffective compared to one on the radio heard whilst driving. Whereas a television advertisement on drink driving may be effective if a person is drinking and plans to soon drive. ▪ Positive emotional appeals should provide information on how to perform a task correctly and to prevent adverse outcomes, and suggest drivers may be rewarded for safe behaviour. ▪ Negative emotional appeals help to 'grab attention' and provide a 'top-up' of fear to remind drivers that driving is dangerous. ▪ Build on the target audience's current knowledge and meet pre-existing beliefs, motives, values and needs. ▪ Aim to increase knowledge and change beliefs that impede adoption of positive behaviours. ▪ Demonstrate the personal and social benefits of the desired behaviour. Focus on the immediate, high-probability consequences of positive behaviours. ▪ Use self-management strategies for behaviour change. ▪ Repetition of a single messages is more likely to have an impact, i.e. have a single focus e.g. do not drink and drive, rather than do not drink, speed and drive. ▪ Highlight themes in the development of adolescent identity, including freedom, autonomy and peer group acceptance. ▪ Request behaviour change/modification rather than purely provide information. ▪ Present messages in entertainment contexts. ▪ Do not overly complicate messages. They must be easy to understand. ▪ Be genuine, concrete, non-judgmental, non-lecturing, clear, realistic, engaging and hold the interest of the audience. Do not preach. ▪ Encourage involvement of the audience by being personally relevant to them e.g. engage the audience in the issue (get them to think about it), rather than telling them what the issue is. ▪ Establish it is not acceptable to engage in the negative/risk taking behaviour. ▪ Lead to questioning of the positives of engaging in negative behaviour and stimulate self-assessment rather than be exaggerated. ▪ Outline enforcement and legal consequences where relevant. ▪ Be repeatedly exposed, as the impact of health messages 'decays over time'. ▪ Arouse a strong, relevant, emotional response, whether positive or negative. ▪ Use simple, concrete words and visual demonstrations of both positive and negative effects. ▪ Use mnemonics (i.e. verse or formula to assist in retaining in memory) for informational objectives.

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		<ul style="list-style-type: none"> ▪ Ensure prescriptive norms and popular norms are in agreement. ▪ Ensure messages are not always serious and/or frivolous, i.e. it should be entertaining. ▪ Use a number of message delivery channels and more than one message source is more likely to be successful. ▪ Stimulate interpersonal communications. ▪ Guide message development using theoretical frameworks e.g. behaviour-change models. ▪ Messages can use new media technologies such as internet websites, email, instant messaging (over the internet), personal desktop assistants, text messaging (mobile phones) and computerised kiosks. 																		
The Elaboration Likelihood Model	<p>Outlines the basic processes underlying the effectiveness of persuasive communications. It posits that variations in persuasive effect are a function of how people process information and the degree to which they engage in issue-relevant thinking (elaboration). Two routes to persuasion 1) central route - careful assessment of the persuasive communication to determine the merits of the arguments (high elaboration) 2) peripheral route - when the audience does not pay close attention to the persuasive communication and is instead swayed by more superficial characteristics of the message, such as the perceived credibility or attractiveness of the source or the quality of the presentation (low elaboration).</p>	<p>Identifying if the target audience uses a central or peripheral route of processing is important. Those using the central route will be highly motivated and think critically about the safety issue. Those using the peripheral route are less motivated and will be less capable of undertaking safety issues. For messages to be persuasive the following concepts are important:</p> <ul style="list-style-type: none"> ▪ the message source must be credible and likeable ▪ similarity between the source and the audience (e.g. age, gender) ▪ an explicit conclusion or recommendation ▪ advocating a specific course of action is more effective than offering general guidelines ▪ use a two-sided message that acknowledges the opposition in a descriptive way, or it can present the opposition and then refute it with evidence/solid reasoning. A refutational two-sided message is more persuasive than a one-sided message, whereas nonrefutational two-sided messages are less persuasive. Thus, either refute the oppositional message or do not mention it at all ▪ strong fear messages are generally more effective than weak or moderate ones, as long as people are convinced the threat is severe, they are vulnerable to the threat, and that an effective response can be followed to reduce or eliminate the threat ▪ people must be personally convinced they are susceptible to the safety risk if persuasion is to occur and strong fear appeals may be most effective with people who are in high need of cognition. 																		
Rossiter-Percy Model	<p>Similar to ELM. Identifies the appropriate motivations for a target group's basis for attitude and behaviour change. Two dimensions: (1) the level of involvement associated with decision making (high or low), (2) the nature of the primary motivations in driving the decision (positive or negative). People who are high-involvement decision makers wish to reduce the risk of making a wrong decision and need to be convinced that they will make the right decision. Low-involvement decision makers adopt a 'try-it-and-see' attitude, as the consequences of making the wrong choice are inconsequential. Primary motivations largely determine the message strategy. Positive motivations have a 'drive</p>	<ul style="list-style-type: none"> ▪ Link the desired belief to an already accepted belief (e.g. most smokers accept that smoking is unhealthy). ▪ Any claimed threat or promised benefit must be credible. ▪ Use two-sided messages as opposed to a one-sided message (e.g. smoking is enjoyable, acts as a social facilitator etc.) to pre-empt potential counterarguments that might distract from the message/lead to source denigration and therefore message rejection. ▪ Leave the target audience to make their own conclusions rather than telling them to adopt the promoted stance, i.e. do not preach or dictate in the message. ▪ Portray the correct emotion(s) and the correct sequence of emotions (for negative motives in particular): <table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top;">Negative motivations</td> <td style="vertical-align: top;">Emotional sequence</td> </tr> <tr> <td>Problem removal</td> <td>Annoyed → relieved</td> </tr> <tr> <td>Problem avoidance</td> <td>Fearful → relaxed</td> </tr> <tr> <td>Incomplete satisfaction</td> <td>Disappointed → optimistic</td> </tr> <tr> <td>Mixed approach-avoidance</td> <td>Conflicted → reassured</td> </tr> <tr> <td>Normal depletion</td> <td>Mildly annoyed → content</td> </tr> <tr> <td> Positive motivations</td> <td> Emotional sequence</td> </tr> <tr> <td>Sensory gratification</td> <td>Dull/neutral → joyful</td> </tr> <tr> <td>Intellectual stimulation/mastery</td> <td>Bored/neutral → excited</td> </tr> </table>	Negative motivations	Emotional sequence	Problem removal	Annoyed → relieved	Problem avoidance	Fearful → relaxed	Incomplete satisfaction	Disappointed → optimistic	Mixed approach-avoidance	Conflicted → reassured	Normal depletion	Mildly annoyed → content	 Positive motivations	 Emotional sequence	Sensory gratification	Dull/neutral → joyful	Intellectual stimulation/mastery	Bored/neutral → excited
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	<p>induction or increase' goal and to achieve a positive experience, whereas negative motivations have a 'drive reduction' goal and to remove/avoid a negative experience and return to 'normal'. Positive motivations (e.g. 'exercise to look good and feel great') are not used frequently in health messages as most health behaviour adoption has negative motivations.</p>	<p>Intellectual stimulation/mastery Social approval Social conformity Self approval</p> <p>Naive/neutral → competent Apprehensive/neutral → flattered Indecisive/neutral → belonging Conflict/neutral → serene, confident</p> <p>Road safety examples include:</p> <ul style="list-style-type: none"> ▪ Fear, anxiety: about the possibility of detection about loss or serious injury of loved one, loss of licence, personal injury, etc. ▪ Guilt/remorse: for not having followed advice that could have avoided a negative consequence, at having unintentionally caused the loss or serious injury of a love one, etc. ▪ Sadness: the loss of a loved one, the impact on others of the loss or serious injury of a loved one, etc. ▪ Surprise: at particular information, e.g. the relationship between speed and distance travelled in a moment's distraction. ▪ Shame/embarrassment: being caught for an offence, but particularly for a socially despised offence, etc. ▪ Anger: at the irresponsible behaviours of other road users, e.g. drink drivers. ▪ Acceptance, love, warmth: for protection of the vehicle's occupants (particularly children), complying with another's request to drive safely. ▪ Relief, peace of mind: removal of anxiety and tension by compliance with the road rules.

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Heuristic Systematic Model	Persuasion can be accomplished by two routes, the systematic and heuristic processing. Systematic processing involves using all information available during the judgement task and is considered a comprehensive analysis of the information. Heuristic processing is considered a limited processing mode that demands less cognitive effort and capacity, whereby simple rules (heuristics) are applied.	Messages should be provided by an expert, rather than a nonexpert. Messages should be personally relevant.
Limited Capacity Model of Motivated Mediated Message Processing	The theory applies to different message contents, media and goals, each of which are variables within the theory. People are considered to have a limited capacity of information processing, and processing suffers when there are insufficient resources available. There are two motivational systems, the appetitive/approach system and the aversive/avoidance system. These systems activate in the presence of motivationally relevant stimuli in the environment and influence cognitive processing. Aspects of a message influence the motivational and cognitive systems, and aspects of those systems influence how the message is perceived, encoded, stored and eventually retrieved.	<ul style="list-style-type: none"> ▪ When using a personally relevant message the use of structure and emotion to increase automatic resource allocation may 'backfire' as the aversive system may become over-activated. Thus, this must be carefully balanced. ▪ When a message is not personally relevant, use structure and emotional appeals to increase resource allocation. ▪ Using positive appeals will be helpful when there is a need to combat the tendency to withdraw from negative stimuli e.g. messages about cancer treatment for high-risk cancer groups will have greater aversive activation (associated with the greater risk of getting cancer). ▪ For television messages, when messages are simple and familiar use graphics to increase resource allocation, but when messages are new and/or complex simplify the presentation to maximise storage. ▪ Begin a message with a measured emotional appeal. Do not introduce much information at this time, but once the emotional story has activated the motivational system, then present factual information, which will be more likely to be stored. ▪ Attentional limits and distractions of messages must be considered in relation to the audience's ability to process the message.
Unimodal	The Unimodal is a process during which beliefs are formed from appropriate evidence, which requires the construction of evidence from the information presented and that stored in memory. Persuasion is substantially affected by motivation.	None.

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Activation Model of Information Exposure (Sensation Seeking or Variety Theory)	Outlines that humans seek out 'newness, change, sensation or inconsistency and that such inputs, in moderate amounts, provide a pleasurable experience'. Thus 'activation' provides a person with energy and is responsible for psychological and motor activity. A person will engage in behaviour designed to increase activation if it is lower than the optimal level, seeking novel situations. However, when activation or the 'processing state' goes beyond preferred limits of variety (over arousal), a person will reduce the variety input and seeks consistent or redundant information.	An individual will be attracted to a message and continue attending to it if the arousal generated by the message is consistent with the arousal desired by the individual. When the arousal generated matches that desired, the individual experiences positive affect and continues exposure to the message. If an individual finds a message overstimulating, less arousing content will be sought. A message can fail to be stimulating enough so that an individual's arousal level is not achieved or maintained.
Sensation Seeking Targeting (SENTAR) Prevention Approach	Targets high-sensation seekers' needs for stimulation which are associated with distinct preferences for high-sensation-value messages, as they result in higher affective, sensory and arousal responses. Such messages are dramatic, novel, emotionally powerful or physically arousing, unconventional, graphic or explicit, suspenseful or fast-paced.	<ul style="list-style-type: none"> ▪ Use sensation seeking as a targeting variable. ▪ Design high-sensation-value prevention messages with characteristics such as drama, surprise, novelty and strong emotional appeal. ▪ Place messages in high-sensation-value contexts. ▪ Segment the target audience based on 'psychographic variables' such as values, beliefs, attitudes, personality characteristics, linked to the behaviour of interest (e.g. mobile phone use) and the communication channels and message styles most preferred. <p>Example:</p> <ul style="list-style-type: none"> ▪ high-sensation non-drug users – use a message that stresses exciting alternatives to drug use. High sensation messages are more likely to be effective than one that stresses peer resistance skills and is lower in sensation value ▪ low-sensation non-drug users – use a message that stresses peer resistance skills and is low in sensation value.
Framing – Positive Versus Negative Messages	Framing refers to the persuasive effects of a positive frame (benefits gained) or a negative frame (consequences suffered) by choosing an option in some decision context. Prospect theory supports framing by indicating that people tend to be risk-seeking in losses and risk-averse in gains. Thus, when applied to a framed message, the theory suggests that a negatively (loss) framed message will be more effective than a positively (gain) framed message to promote behaviours that invoke a level of risk. By contrast, a positively-framed message will be more effective than a negatively-framed message in promoting cautious behaviours.	<p>An example of a positive-framed message is 'flossing your teeth daily removes particles of food in the mouth, avoiding bacteria, which promotes great breath' (p. S204). In contrast, an example of a negative-framed message is 'if you do not floss your teeth daily, particles of food remain in the mouth, collecting bacteria, which causes bad breath' (p. S204) (Rothman et al. 2006). In terms of a road safety behaviour, e.g. speeding, an example of a positive-framed message is 'if you don't speed you won't get a ticket', and an example of a negative-framed message is 'speeding regularly in shopping strips will increase your chances of killing a pedestrian'.</p> <p>Negative frames advocating detection behaviours (those where one engages in risky behaviour, as opposed to a preventative health behaviour) are best. For less effortful processing positively-framed messages are best. For prevention contexts, the opposite pattern occurs, whereby people will be more persuaded by positively-framed messages in the context of promoting safe driving (preventative behaviours).</p> <p>The message is more persuasive in the following contexts:</p> <ul style="list-style-type: none"> ▪ negatively-framed messages when there is high personal relevance and high-risk implications ▪ positively-framed messages when there is low personal relevance and either high- or low-risk implications ▪ no effect on the message frame when there is high personal relevance and low-risk implications ▪ when aimed at individuals only, a negative message approach should be used (e.g. focussing on the 'hard-line' personal consequences of smoking) ▪ when aimed at others, a positive message approach should be used (e.g. quitting

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		<p>smoking can benefit one's kids as opposed to the harm caused them through continuing smoking).</p> <p>Use positive appeals:</p> <ul style="list-style-type: none"> ▪ when the audience is unfamiliar with the issue; use emotional benefit appeals in the 'form of comparison, demonstration, satisfaction and testimonials' ▪ use indirect affective appeals once the audience is familiar with the issue. Humour and/or other positive feelings are effective in overcoming boredom and overexposure issues ▪ once there are strong negative feelings over an issue, use positive affect very carefully or avoid it ▪ stress positive outcomes rather than negative ones to gain greater compliance, and emphasise control over the issue rather than helplessness. <p>In relation to speeding, messages can influence future speeding behaviour, but depend upon whether the message is positive or negative and the gender of the message receiver. One study found that it appears that with males a positive message will have the best outcome, but for females a negative message is the best outcome (in terms of potentially reducing future speeding behaviour).</p>
Narratives and Transportation Theory	Narratives or stories may range from brief public service announcements (advertisements) to a television series such as a soap opera. Narratives or engaging, transporting stories can reduce counterarguments (or lowering resistance to change or reducing the characteristic of opposing persuasive appeals), provide role models for behaviour change, facilitate the mental stimulation of difficult, unknown or frightening (health) procedures and create strong attitudes that are based on both emotion and cognition.	Effective narratives need to be well written, evoke mental imagery, have engaging characters (perhaps matched to the reader on relevant characteristics), have health information that is accurate and be tested with the target audience. Transportation theory complements theories such as the Elaboration Likelihood Model (ELM), which focus upon argument-based messages. Narratives can assist in leading people to form appropriate intentions and in motivating them to act on those intentions.