2008

The Application of Social Marketing in Reducing Road Traffic Accidents among Young Male Drivers - An Investigation using Physical Fear Threat Appeals.

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School of Business, Cork Institute of Technology, Cork, Ireland.

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The Application of Social Marketing in Reducing Road Traffic Accidents Among Young Male Drivers - An Investigation Using Physical Fear Threat Appeals

Brian Harman

2008
The Application of Social Marketing in Reducing Road Traffic Accidents Among Young Male Drivers – An Investigation Using Physical Fear Threat Appeals

Thesis undertaken at Cork Institute of Technology in fulfilment of the requirements of the Masters Degree in Business.

Author: Brian Harman
Supervisor: Maurice Murphy
March 2008
'Our revels now are ended'

Our revels now are ended. These our actors,
As I foretold you, were all spirits and
Are melted into air, into thin air:
And, like the baseless fabric of this vision,
The cloud-capp'd towers, the gorgeous palaces,
The solemn temples, the great globe itself.
Yea, all which it inherit, shall dissolve
And, like this insubstantial pageant faded,
Leave not a rack behind. We are such stuff
As dreams are made on, and our little life
Is rounded with a sleep.

William Shakespeare
From The Tempest, Act 4 Scene 1

For some of us that sleep comes far too soon. I would like to dedicate this work to the memories of all those who have died on Irish roads and to those who are left behind to suffer the physical or emotional consequences of road accidents. I would like to offer a special mention to my neighbour Marie Kiely (24) who died in a car crash in September 2006 and to her family who must learn to go on living without her.
# Table of contents

Acknowledgements................................................................................................ i  
Abstract................................................................................................................. ii  
List of figures........................................................................................................ iii  
List of tables.......................................................................................................... v  
List of appendices................................................................................................. vi  
List of acronyms.................................................................................................... vii

## Chapter 1 - Introduction

1.1 Introduction and objectives of the thesis...................................................... 1  
1.2 Layout of the thesis....................................................................................... 1

## Chapter 2 - A global perspective on road safety

2.1 A global perspective on road safety.......................................................... 3  
2.2 A European perspective on road safety.................................................... 8  
2.3 Road accident causality in the EU............................................................ 23  
2.3.1 Engineering - car design and road infrastructure in the EU...................... 24  
2.3.2 Time of the day as a function of crash probability in the EU............... 26  
2.4 An Irish perspective on road safety........................................................... 30  
2.4.1 The economic cost of road accidents in Ireland........................................ 35  
2.4.2 The human cost of road accidents in Ireland............................................. 37

## Chapter 3 - Contributory factors to young male driver deaths and injuries

3.1 Primary contributory factors to young male driver deaths and injuries.... 40  
3.1.1 Speeding.................................................................................................... 40  
3.1.2 Seatbelts..................................................................................................... 47  
3.1.3 Drink driving............................................................................................. 52
3.1.3.1 The effects of alcohol on driving performance......................................... 58
3.1.3.2 The effects of alcohol on young drivers.................................................... 60
3.1.3.3 Public perception of drink driving law enforcement................................. 62
3.2 Secondary contributory factors to young male driver deaths and injuries 64
3.2.1 Dangerous driving.......................................................................................64
3.2.2 The effects of using a mobile phone while driving.....................................66
3.2.3 The role of fatigue in road accidents...........................................................68
3.2.4 Drug driving in Ireland..............................................................................70
3.2.5 The effects of music on driving behaviour................................................74

Chapter 4 - Psychological profile of young male drivers
4.1 Profile of young male drivers................................................................... 76
4.2 Age and driver experience........................................................................ 76
4.3 Personality................................................................................................ 78
4.4 Sensation seeking...................................................................................... 80
4.5 Risk taking and risky driving.................................................................... 83
4.6 Peer pressure and passengers.................................................................... 86

Chapter 5 - Application of social marketing in road safety
5.1 Introduction to social marketing................................................................. 89
5.2 Best practice and recommendations for running road safety campaigns... 89
5.3 The fear factor: an overview of fear appeals............................................. 93
5.4 The elusive “optimum level of fear” and other theoretical pitfalls........... 95
5.5 High threat fear appeals............................................................................ 97
5.6 Social threat fear appeals.......................................................................... 100
5.7 Personal characteristics of the target market............................................. 101
5.7.1 Coping style of the viewer......................................................................... 101
5.7.2 Intension versus behaviour change in young male drivers................. 102
5.7.3 Age specific psychological barriers to fear appeals............................. 103
5.8 Road safety campaigns worldwide ............................................................ 104
5.8.1 The Australian model - Transport Accident Commission .................... 104
5.8.2 The New Zealand model - Land Transport Safety Authority ............... 109
5.9 The Irish model - National Safety Council and the Road Safety Council 110
5.9.1 Crush advert ...................................................................................... 110
5.9.2 Thump advert ..................................................................................... 110
5.9.3 Shame advert ..................................................................................... 111
5.9.4 Damage advert .................................................................................. 112
5.9.5 Home and Texting adverts ................................................................. 113
5.9.6 Conclusion ......................................................................................... 114

Chapter 6 - Methodology
6.1 Introduction .......................................................................................... 116
6.2 Problem definition ................................................................................ 116
6.3 Research objectives ............................................................................. 117
6.4 Research design ................................................................................... 118
6.5 Data collection method ....................................................................... 119
6.6 Analysis of data .................................................................................. 128
6.7 Presentation of results and findings ...................................................... 128
6.8 Limitations of the research .................................................................. 128

Chapter 7 - Results and findings
7.1 Results in relation to objective 1 ......................................................... 130
7.1.1 Driving history of participants .......................................................... 130
7.1.2 Factors affecting road accidents among focus group participants .... 131
7.1.3 Drink driving among focus group participants ................................. 135
7.1.4 Speeding among focus group participants ......................................... 138
7.1.5 Seatbelt wearing among focus group participants ............................ 141
7.1.6 Drug driving among focus group participants ................................. 142
7.1.7 Fatigued driving among focus group participants ............................ 142
Chapter 7 - Results and findings

7.2 Results in relation to objective 2 .............................................................. 144
7.2.1 Responses to short films ........................................................................... 144
7.2.2 Responses to anti speeding adverts ........................................................... 147
7.2.3 Responses to anti drink driving adverts .................................................... 149
7.2.4 Responses to seatbelt wearing adverts ...................................................... 150
7.3 Results in relation to objective 3 ............................................................... 151
7.3.1 Overview of findings ................................................................................ 156

Chapter 8 - Conclusions and recommendations

8.1 Conclusions and recommendations .......................................................... 158
8.1.1 Enforcement ............................................................................................. 159
8.1.2 Graduated driving licensing systems ........................................................ 161
8.1.3 Hazard perception training ........................................................................ 164
8.1.4 Advanced driving training ........................................................................ 165
8.1.5 Engineering and technology ................................................................. 167
8.1.6 Advertising ............................................................................................... 169
8.1.7 Education activities ................................................................................... 173
8.2 Over conclusion ........................................................................................ 176

Bibliography

Appendices
Acknowledgements

Despite Neichez's assertion that "god is dead", I confess at times during my research I handed over my problems to something bigger than myself. When times got tough I appealed to the sympathetic ear of a higher power. For scientists, this higher power is little more than a subconscious corner of my cerebral cortex privately shouldering the burdens of the day. For the religious, this higher power is the mysterious, all powerful, prime mover of the cosmos that they call God. Regardless, to a higher power, in whatever form you perceive it, I tender my thanks. To my parents, I express my deepest gratitude for their constant belief in me. Thanks to my dad for his unflinching support, unrelenting optimism and gentle enduring spirit. Thanks to my mam for stoically fighting the good fight and always being there for me. I would like to thank the lads for just being "the lads". Unabashed thanks to Willie, Declan, Brian, Ed, Owen, Mick, Dave and all the other members of the motley crew which space dictates go unmentioned. I would also like to thank my fellow postgrads; Amy Jordan, John Lerner, Gill Butler and John Hobbs for their companionship and light-hearted banter throughout the two years. I would like to take this opportunity to thank all the staff and students of the Automotive Department in CIT who facilitated or took part in this research. A special thanks goes to Head of the Automotive Department, Barry O Connor, and lecturer Sean Kelleher who were instrumental in organising the focus groups. I would also like to thank lecturers Clive Atkinson and Roy Kelly who excused their students from lectures in order to participate in this research. To Alan Richardson of the Road Safety Council I extend my deepest thanks for all his help. Alan's help in relation to procuring Strand One funding for this research greatly broadened the research horizons of this work. A special thank you also goes to Regional Activities Executive Martin Heffernan of the Road Safety Authority for provided important research material to the study. I would like to thank all the CIT library staff, especially Caroline Williams for providing encouragement when it was needed, Noreen O Neill for fishing out elusive academic journals and to Tadgh Coakley for imparting his research expertise. I also wish to express my appreciation to Maura Geaney, Mary Gough and Tom Bonner for their IT support and lecturer Joe Keane, for his light hearted, cigarette fuelled cynicism which always brought a smile to my face. I would finally like to extend my thanks to the Head of the School of Business, Tom Rigney, for providing me with the facilities to carry out the research.
Abstract

In 2004, the Irish government rolled out its new two year road safety strategy which aimed to reduce road deaths in the Republic of Ireland to no more than 300 road fatalities by 2006. The strategy failed to reach its target. There were 368 road fatalities on Irish roads in 2006. The effects of the penalty points system, which was introduced in 2003, is considered responsible for reducing Irish road fatality figures to their lowest level since 1964 (335 deaths). However the beneficial effects of the penalty points system have proved transitory and road deaths have risen in recent years. In 2000, the National Roads Authority estimated that 33.7% of road fatalities were represented by young people aged between 16 - 25 years (National Roads Authority, 2000). Furthermore, young driver accidents accounted for 26.1% of all injury accidents on Irish roads in 2000 despite these drivers representing only a small fraction of the Irish driving community. Young male drivers are grotesquely over represented in Irish road fatality figures. The car driver fatality rate was found to be approximately ten times higher for young male drivers than for female drivers (NRA, 2000). Between 2001 and 2002, fourteen per cent of fatal road accidents in Ireland occurred between midnight and 3 a.m. despite the fact that only approximately two per cent of the Irish road fleet are mobile during these hours (Department of Justice, Equality and Law Reform, 2005). Speed is the single largest contributing factor to road deaths in Ireland. Approximately forty per cent of fatal accidents are caused by excessive or inappropriate speed in Ireland. Young male drivers in particular demonstrate a high proclivity for risky driving behaviours. These risky behaviours include drink driving, speeding, drug driving and engaging in aggressive driving. This study will therefore focus on how dangerous driving behaviours may be addressed through social marketing. Social marketing refers to the application of basic marketing principles to design and implement programmes and information campaigns that advance social causes such as alcohol misuse, drug prevention, traffic safety, etc. Social fear appeals and more commonly physical fear appeals (those fear appeals incorporating threats of physical harm including injury and death) are used extensively in road safety communications. This study will analyse the appropriate level of fear that needs to be induced in order to change young male driving behaviour.
List of figures

<table>
<thead>
<tr>
<th>Chapter 2</th>
<th>A global perspective on road safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Road traffic injury mortality rates (per 100,000 people) in WHO regions, 2002.</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>World road traffic deaths by sex and age group in 2002.</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>Performance by mode of passenger transport in (EU25) 1995 - 2003.</td>
</tr>
<tr>
<td>Figure 2.4</td>
<td>Europe’s road safety performance and projected glide path to 2010.</td>
</tr>
<tr>
<td>Figure 2.5</td>
<td>Member states road fatality reduction performance 2001 - 2004.</td>
</tr>
<tr>
<td>Figure 2.6</td>
<td>Road fatality trends in the EU 2001 - 2005.</td>
</tr>
<tr>
<td>Figure 2.7</td>
<td>EU15 fatalities by age in 2004.</td>
</tr>
<tr>
<td>Figure 2.8</td>
<td>EU15 fatalities by road user type among (18 - 25 years olds) in 2004.</td>
</tr>
<tr>
<td>Figure 2.9</td>
<td>EU15 road fatalities by transport mode and age in 2004.</td>
</tr>
<tr>
<td>Figure 2.10</td>
<td>Driver fatalities by age and gender in the EU14 in 2002.</td>
</tr>
<tr>
<td>Figure 2.11</td>
<td>Over and under representation of killed/seriously injured road users by age/gender in Ireland (indexed against population by age/gender 1996 - 2000).</td>
</tr>
<tr>
<td>Figure 2.12</td>
<td>Number of 18 - 25 year olds killed in road accidents, by time/day.</td>
</tr>
<tr>
<td>Figure 2.13</td>
<td>Speed-related fatal and injury accidents by day of week, time of day, 2001 - 2002.</td>
</tr>
<tr>
<td>Figure 2.14</td>
<td>Irish road fatalities, registered vehicles and national population.</td>
</tr>
<tr>
<td>Figure 2.15</td>
<td>Trends in driver fatalities per million head of population aged between 18 - 24 years old in various OECD and EU countries.</td>
</tr>
<tr>
<td>Figure 2.16</td>
<td>Smeed’s law within an Irish context.</td>
</tr>
<tr>
<td>Figure 2.17</td>
<td>Fatal collisions in Ireland 1972 - 2004.</td>
</tr>
<tr>
<td>Figure 2.18</td>
<td>Irish road collisions statistics 1961 - 2005.</td>
</tr>
</tbody>
</table>
Chapter 3  Contributory factors to young male driver deaths and injuries
Figure 3.1  Percentage of fatal crashes involving a single vehicle 1994 - 2004...
Figure 3.2  Percentage of fatal accidents in rural, urban areas and national routes, 1994 - 2004.................................................................
Figure 3.3  Actual and perceived speed enforcement levels in the EU...........
Figure 3.4  Percentage of European drivers fined or otherwise punished for not wearing a seatbelt between 2000 - 2003..........................
Figure 3.5  Relative risk of driver involvement in police-reported crashes.....
Figure 3.6  Blood alcohol levels found in Irish drivers 1997 - 2003..............
Figure 3.7  Accident risk by blood alcohol level and driver age............... 
Figure 3.8  European driver perceptions relating to the likelihood of being checked for drink driving and speeding on a typical journey......
Figure 3.9  Drivers checked for drink driving in the last 3 years, once or more, %.................................................................
Figure 3.10 Percentage of European drivers who “Think their own driving is less dangerous compared to other drivers, a bit or a lot” ......
Figure 3.11 Prevalence of drug taking by age in Irish drivers....................
Figure 3.12 Prevalence of drug taking by age and BAC level in Irish drivers...
Figure 3.13 Prevalence of drug taking by gender/BAC level in Irish drivers....
Figure 3.14 Prevalence of different drug usage among Irish driver age groups...

Chapter 4  Psychological profile of young male drivers
Figure 4.1  High risk drivers in Ireland............................................
Figure 4.2  Irish mortality rates (per 100,000 citizens) for passengers in 2003...
List of tables

Chapter 2  A global perspective on road safety
Table 2-1  Examples of current fatality reduction targets worldwide .......... 7
Table 2-2  Road fatalities in Europe 1991 - 2004 .................................. 14
Table 2-3  Persons killed in Ireland by road user type 1995 - 2004 .......... 17
Table 2-4  Road casualties in Ireland by road user type 1995 - 2004 ...... 17
Table 2-5  Road fatalities in member states by gender and age in 2002 ...... 22
Table 2-6  Distribution of car occupant fatalities by day of week in 2002 ...... 28
Table 2-7  Distribution of car occupant fatalities by time of day in 2002 ...... 29
Table 2-8  Licence, vehicle and road fatality figures in Ireland ................. 32
Table 2-9  Number of passenger cars per 1,000 inhabitants in EU countries ... 33

Chapter 3  Contributory factors to young male driver deaths and injuries
Table 3-1  Fatal/injury collisions by road character in Ireland in 2004 .......... 44
Table 3-2  Seatbelt wearing rates in the EU in 2004 ................................. 48
Table 3-3  Driver wearing rates (%) by gender and road class .................... 51
Table 3-4  Drivers of different age groups who drive after drinking, one or more days a week (in percentage) .................................................. 54
Table 3-5  Statistics for alcohol involvement in road accidents within the EU. 56

Chapter 5  Application of social marketing in road safety
Table 5-1  Road safety campaigns in Australia ........................................ 108
List of appendices

Appendix 1  Interview schedule for focus groups
Appendix 2  Road to Safety strategy 1998 - 2002
List of acronyms

ABS: Antilock Braking System
ADAS: Active Driver Assistance System
BAC: Blood Alcohol Concentration
CARE: Community Road Accident Database
CIA: Central Intelligence Agency
DALY: Disability Adjusted Life Year
DOHC: Department of Health and Children
ECMT: European Conference of Ministers of Transport
EPHA: European Public Health Alliance
ETSC: European Transport Safety Council
EuroNCAP: Euro New Car Assessment Programme
GDL: Graduated Driving Licensing
GPS: Global Positioning Satellite
IIHS: Insurance Institute of Highway Safety
INRETS: Institut National de Recherché sur les Transports et leur Sécurité
ISA: Intelligent Speed Adaption
ITC: Independent Television Commission
ITS: Intelligent Transport System
IVIS: In-Vehicle Information System
JTRC: Joint Transport Research Centre
LTSA: Land Transport Safety Authority (New Zealand)
MADD: Mothers Against Drink Driving
MAT: Mandatory Alcohol Testing
MBRS: Medical Bureau of Road Safety
MEAS: Mature Enjoyment of Alcohol in Society
MUARC: Monash University Accident Research Centre
NACD: National Advisory Committee on Drugs
NHSA: National Highway Safety Administration.
NRA: National Roads Authority
NSC: National Safety Council
OECD: Organisation for European Co-Operation and Development
ROSBUD: Road Safety and Environmental Benefit Cost Effectiveness Analysis for Use in Decision Making
RSA: Road Safety Authority
RTE: Radio Telefis Eireann
SARAC: European Safety Rating Advisory Commission
SARTRE: Social Attitude to Road Traffic Risk in Europe
SPSS: Statistical Package for the Social Sciences
SWOV: SWOV Institute of Road Safety Research
TAC: Transport Accident Commission (Australia)
TRL: Transport Research Laboratory
WBA: World Brewing Alliance
WHO: World Health Organisation
Chapter 1

Introduction
1.1 Introduction and objectives of the study

In recent years the thorny issue of road safety has loomed large in the Irish psyche. News reports of fatal crashes pervade the airwaves and fill up the newspapers. And yet the carnage is not equitable in its distribution. Young male drivers represent a high risk road user group. Despite representing a relatively small section of the road user community, these drivers make a disproportionately large contribution to road fatality figures in Ireland. The folly of youth it appears is difficult to legislate for. These young male drivers see no risk in engaging in drink or drug driving, speeding or executing dangerous driving manoeuvres. Their youthful lust for life results in a misplaced invincibility that too often proves fatal. To complicate matters, these road users have proved particularly resistant to marketing efforts aimed at trying to improve their driving behaviour. In an age when digital communications are ubiquitous, there remains a group of people who are largely impervious to attempts by social marketers to moderate their behaviour. This study will therefore focus on how the above behaviours may be addressed through social marketing. The objectives of this thesis are

1. To investigate the reasons behind the high representation of young male drivers in Irish road fatality figures.

2. To investigate the effect on young male drivers of fear appeals that focus on death and disability as a consequence of bad driver behaviour.

3. To investigate the effect of high physical fear advertisements on young male driver attitudes.

1.2 Layout of the thesis

Chapter two provides an insight into the issue of road safety from both a global and a European perspective. The chapter provides data to highlight the extent of young driver involvement in road accidents worldwide. The latter section of the chapter broaches the issue of road safety within an Irish context and provides relevant domestic and international statistics to frame the problem.
Chapter three explores the factors which contribute to young male driver road deaths. Primary contributory factors such as speeding, drink driving and seatbelt wearing are discussed and evaluated within a European context. Secondary contributory factors such as fatigued driving, drug driving, driving while using a mobile phone, aggressive driving and the effects of music while driving are also discussed.

Chapter four investigates the psychological make up of young male drivers and explores the effects of age, gender, personality, sensation seeking, risk taking propensity and peer pressure in predisposing young male drivers to road accidents.

Chapter five discusses the origins of social marketing and its subsequent application within the sphere of road safety advertising. This chapter explores the nature of fear and considers the merits and drawbacks of utilising social and physical fear appeals as a vehicle for delivering societal change. The personal and psychological characteristics of young male drivers are identified. The implications that these psychological components have for the effective use of fear appeals are also explored. Finally, different road safety campaigns in Australia, New Zealand and Ireland are analysed to identify best practice in road death prevention.

Chapter six outlines the research methodology employed for the study and justifies the approach adopted. Qualitative market research is discussed and the advantages of using focus groups as a research methodology are explored.

Chapter seven details the findings of the focus groups. This chapter investigates the reasons behind young driver behaviour and examines focus group participants’ responses to social marketing efforts which employ various levels of threat appeals.

Chapter eight contains the main recommendations and conclusions of the research.
Chapter 2

A global perspective on road safety
2.1 A global perspective on road safety

At the inquest into the world’s first road traffic fatality in 1898, the coroner was reported to have said “this must never happen again” (Porter, 1998). Despite the highly quotable narrative, compliments of the coroner, it now appears a one Bridget Driscoll no longer holds the dubious accolade of being the world’s first road fatality. New research now suggests that the world’s first road traffic death occurred in Birr in Ireland on the 31st August 1869 (Fallon and O’Neill, 2005). Ms. Mary Ward, a celebrated and respected artist, astronomer and naturalist is now thought to be the world’s first road fatality. The steam carriage built by her husband, William Ward, Earl of Rosse was “travelling at an easy pace” when the vehicle jolted at a corner and Mary Ward was thrown from her seat. At the inquest, it was testified that “the wheel hit the lady and pushed her to one side”. Ms. Ward died almost immediately having broken her neck in the fall.

Approximately 1.18 million people died on roads worldwide in 2002 which equates to an average of 3,242 road fatalities every day (Jacobs et al, 2000). The World Health Organisation estimate, from statistics analysed in 2002, that road traffic crashes injure or disable between 20 and 50 million people worldwide every year. These estimates are based on previous research (Jacobs et al, 2000; Murray and Lopez, 1996b). Road traffic crashes ranked as the eleventh leading cause of death and accounted for 2.1% of all deaths globally in 2002 (Peden et al, 2004).

According to research conducted by the World Bank in 2002, approximately 90% of all road deaths occurred in low income and middle income countries as seen in figure 2.1 (Kopits and Cropper, 2003). Countries in the South East Asia region accounted for more than half of all road deaths worldwide. Men aged between 15 and 44 years of age accounted for over half of all road deaths globally as depicted in figure 2.2 (Peden, McGee and Sharma, 2002).
Road traffic injuries were the second largest cause of the burden of disease in 2000 among young males aged between 5 - 29 years of age (Peden, McGee and Krug, 2002). The “global burden of disease” is a tool used by the WHO\(^1\) to measure the health of a population. It is measured in “disability-adjusted life years” (DALYs)\(^2\). The term can refer to the overall impact of diseases and injuries at the individual level, at the societal level or may refer to the economic costs of the diseases. Road traffic accidents were found to be the ninth leading cause of the burden of disease globally in 1998; fifth in the high income countries and tenth in the low and middle income countries (Murray and Lopez, 1996a). By 2020, road traffic injuries are expected to rise to sixth place among the major causes of death worldwide. It is also projected that road accidents will represent the third leading cause of DALY’s lost by 2020 (Murray and Lopez, 1996a).

Figure 2.1 Road traffic injury mortality rates (per 100,000 people) in WHO regions, 2002


\(^1\) World Health Organisation

\(^2\) Disability-adjusted life years (DALY) are defined as “a health-gap measure that combines information on the number of years lost from premature death with the loss of health from disability”. WHO “Global Burden of Disease” study (Murray and Lopez, 1996a)
The financial costs of road crashes and injuries are estimated to represent between 1% and 1.5% of the Gross National Product of low-income and middle-income countries. The financial cost of road crashes and injuries in high-income countries is estimated to be roughly two per cent of their Gross National Product (Jacobs et al, 2000). By using these crude estimates as guidelines, the Traffic Research Laboratory (TRL) estimate that every year, road crashes and injuries cost US$518 billion globally. Road crashes and related injuries are believed to cost low and middle-income economies US$65 billion each year. This figure exceeds the total value of development assistance these countries receive each year (Jacobs et al, 2000).

**Figure 2.2 World road traffic deaths by sex and age group in 2002**

Figure 2.2 highlights the high risk associated with young male road users. Definitive figures relating to road fatalities and injuries worldwide are impossible to compile. Only 75 of the 192 countries worldwide report annual data on road traffic injuries. However the WHO estimates that 73% of all traffic fatalities are male road users (WHO, 2002). These figures were derived from the WHO Mortality Database as well as studies conducted by the Transport Research Laboratory and the World Bank (Kopits and Cropper, 2003; Jacobs et al, 2000). Road traffic accidents represent the principal cause of ill-health and premature death for men aged between 15 - 44 years (Peden, McGee and Sharma, 2002).

A study conducted by the World Bank predicted that from 1990 - 2020, road traffic deaths will increase by 83% in six regions where low-income and middle-income countries are concentrated. Road traffic accidents represent the second leading cause of death and ill-health in developing countries (WHO, 1999). The study however predicts a 27% decrease in road traffic fatalities among high-income countries by 2020 (Kopits and Cropper, 2003). In an effort to stem the rising tide of road deaths across the world, nations have begun to mobilise resources in an attempt to reverse escalating road fatality figures. Country leaders around the globe are now in a race against time to achieve their respective road fatality reduction targets.

Fragmented road safety strategies have proven inefficient. The trend is now towards integrated road safety strategies which have been found to be highly successful in European countries such as Sweden, Finland and the UK. Australia and the US have also benefited from using integrated road safety strategies. According to Elvik (2000) countries and local governments that have set specific and quantified road safety targets have performed better than those who have not set rigid targets. However there is no definitive template for a successful road safety strategy. According to Wegman (2000) there is no one size fits all strategy. Regional variations and local problems must be analysed and overcome in order to tailor a successful road safety strategy.
Table 2-1 summarises the road safety targets of a number of countries worldwide. Among the most ambitious targets is the European Union target of a 50% reduction in road fatalities within ten years. New Zealand and Poland are also aggressively pursuing ambitious road safety goals with fatality reduction targets of 42% and 43% respectively by 2010.

<table>
<thead>
<tr>
<th>Country or area</th>
<th>Base year for target</th>
<th>Year in which target is to be realized</th>
<th>Target reduction in the number of road traffic fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1997</td>
<td>2005</td>
<td>-10%</td>
</tr>
<tr>
<td>Austria</td>
<td>1998-2000</td>
<td>2010</td>
<td>-50%</td>
</tr>
<tr>
<td>Canada</td>
<td>1991-1996</td>
<td>2008-2010</td>
<td>-30%</td>
</tr>
<tr>
<td>Denmark</td>
<td>1998</td>
<td>2012</td>
<td>-40%</td>
</tr>
<tr>
<td>European Union</td>
<td>2000</td>
<td>2010</td>
<td>-50%</td>
</tr>
<tr>
<td>Finland</td>
<td>2000</td>
<td>2010</td>
<td>-37%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2025</td>
<td>-75%</td>
</tr>
<tr>
<td>France</td>
<td>1997</td>
<td>2002</td>
<td>-50%</td>
</tr>
<tr>
<td>Greece</td>
<td>2000</td>
<td>2005</td>
<td>-20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2015</td>
<td>-40%</td>
</tr>
<tr>
<td>Ireland</td>
<td>1997</td>
<td>2002</td>
<td>-20%</td>
</tr>
<tr>
<td>Italy</td>
<td>1998-2000</td>
<td>2010</td>
<td>-40%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2001</td>
<td>2010</td>
<td>&lt; 3 deaths/10 000 vehicles</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1998</td>
<td>2010</td>
<td>-30%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1999</td>
<td>2010</td>
<td>-42%</td>
</tr>
<tr>
<td>Poland</td>
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<td>2010</td>
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Note: Some of these targets also include reductions in serious injuries and are supplemented by other secondary targets.

Source: Peden et al, 2004
2.2 A European perspective on road safety

In the past 50 years over two million people have died and a further 100 million people have been injured on European roads. There are over 40,000 road fatalities in the EU15\(^3\) every year (Directorate General for Energy and Transport, 2003c). There are 1.4 million road accidents in the EU15 per annum which results in 1.7 million people being injured every year (Directorate General for Energy and Transport, 2003c). This is hardly surprising when according to the European Commission’s White Paper - “Transport Policy for 2010: Time to Decide” (2001), European roads account for 79% of passenger transportation within the EU. The White paper also states that an additional three million cars enter the EU road network every year (Directorate General for Energy and Transport, 2001c). The direct and indirect economic costs attributable to the carnage on EU roads are estimated to be approximately €160 billion or two per cent of the EU Gross National Product (Directorate General for Energy and Transport, 2003d). However in the EU, expenditure on prevention and compensation for these economic costs are estimated to be less than five per cent of this €160 billion cost (Directorate General for Energy and Transport, 2003d). At midnight on Tuesday, the 4\(^{th}\) of April 2006 an agreement was reached regarding the EU budget going forward for the period 2007 - 2013. An additional increase of €2 billion was agreed to raise the overall EU budget to €864.4 billion (EPHA, 2006). Approximately €500 million of this budget will be spent on upgrading road, rail and energy networks.

Figure 2.3 illustrates the significance of the car within a European context. Cars accounted for close to 4,500 billion passenger kilometres in 2003. The next most popular mode of transport is the bus or coach which accounted for less than 500 billion passenger kilometres in 2003 (Directorate General for Energy and Transport, 2005b). Unfortunately with the increased mobility afforded by cars comes an increased risk of road accidents. Approximately 97% of all transport related deaths within the EU occur on the roads\(^4\). Reducing this level of risk has become the preoccupation of safety experts across Europe.

\(^3\) The original EU15: Belgium, France, West Germany, Italy, Luxembourg, The Netherlands, Denmark, the UK, the Republic of Ireland, Greece, Portugal, Spain, Austria, Sweden and Finland.

\(^4\) http://www.etsc.be/documents/copy_of_REA_070606_welcome_P1N.pdf [05/10/06]
Despite the massive rise in road traffic in recent years there has been a general downward trend in road fatalities across Europe over the last 30 years. As part of a pan European effort to help reduce road deaths, the European Commission has proposed an ambitious plan. Contained in the European Commission’s White Paper - “Transport Policy for 2010: Time to Decide” (2001) is the central goal of reducing road fatalities by 50% by the year 2010. This roughly corresponds to a goal of no more than 25,000 road fatalities per year by 2010 (Directorate General for Energy and Transport, 2001a).

EU25: The original 15 member states (see page 8, footnote 3) and new 10 new members; Cyprus, the Czech Republic, Lithuania, Malta, Estonia, Poland, Hungary, Slovakia, Latvia and Slovenia.
This is an ambitious goal considering the high dependency on Europe's extensive road network. There has been a three fold increase in the traffic volume on EU roads over the last 30 years. Despite this increase in traffic volume, road deaths have still fallen by half during this period (Directorate General for Energy and Transport, 2003b). This may be due to a variety of legislative and technological developments that have offset the increased risks associated with higher traffic volumes. The difficulty in reducing road accidents is an ongoing problem that is compounded by the ever increasing volumes of traffic. The population figure for the enlarged European Union as and from July 2005 stands at nearly 457 million people (CIA, 2006). Among the original 15 member states there are approximately 375 million road users, 200 million of whom are licensed drivers and who use the 400 million kilometres of roads in the EU road network on a regular basis (Directorate General for Energy and Transport, 2003b).

According to the European Road Safety Action Programme Mid Term Review, there were 50,000 road fatalities in 2001 within countries which represent the EU25 in 2006. The review estimated there were approximately 41,600 road fatalities in the EU25 for 2005. This figure represents a marked improvement (17.5% reduction) since 2001. However this rate of improvement is considered too sluggish over the four year period. Unless the rate of improvement accelerates dramatically the goal of a 50% reduction in road deaths within the EU by 2010 will not be achieved (Directorate General for Energy and Transport, 2006).

The Mid Term Review in 2006 found that there was, on average, a five per cent decrease in road deaths each year from 2001 - 2005 on EU roads. The number of road accidents decreased by an average of four per cent each year. From 2003 - 2004 there was a five per cent decrease in road accidents across the EU. Projections based on current trends contained in the Mid Term Review suggest that the death toll on EU roads in 2010 will stand at 32,500 road fatalities. This death toll will exceed the EU target proposed in the Transport White Paper adopted in 2001 (Directorate General for Energy and Transport, 2006).
The target, which was repeated in the European Road Safety Action Programme in 2003, aims to reduce to 25,000 the number of road deaths across Europe by 2010. Therefore at the present rate of progress approximately 7,500 lives will be lost as a result of not achieving this target. Young people feature largely in road fatalities across Europe and are considered a high risk driver segment. Young people (18 - 25 years of age) represented ten per cent of the EU population in 2003. However drivers in this age group represented 21% of all road fatalities on EU roads in 2003. Of these fatalities, male drivers represented approximately 80% of the young drivers killed on the roads (Directorate General for Energy and Transport, 2006).

Figure 2.4 Europe’s road safety performance and projected glide path to 2010

Source: Directorate General for Energy and Transport, 2006

6 The World Health Organisation defines “young people” as persons between the ages of 10 years and 24 years of age.
One of the functions of the Mid Term Review was to give member states an indication of their progress in terms of road safety gains relative to other member states. During the period 2001 – 2004, nine member states (Germany, Estonia, France, Italy, Luxembourg, Malta, the Netherlands, Portugal and Sweden) were found to have reduced their national road fatality figures at a higher rate than the average rate observed among the collective EU25 countries. A 14% reduction in road fatalities was the average improvement observed across the 25 member states for the period. Ireland was among eight countries (Belgium, Denmark, Greece, Spain, Ireland, Austria, Finland and Britain) which were deemed to have made “limited progress”. This “limited progress” represents road fatality reductions of between five per cent and the EU average of fourteen per cent (Directorate General for Energy and Transport, 2006).

Figure 2.5 Member states road fatality reduction performance 2001 - 2004

Source: Directorate General for Energy and Transport, 2006
Figure 2.5 details the progress of the road safety gains made by member states within the EU. Sweden is one of the countries that recorded over a 14% decrease in road fatalities during the period 2001 - 2004. In 1997, the Swedish Government endorsed a road safety policy devised by Vagverket (Swedish Road Authority) entitled “Vision Zero”. The policy seeks to reduce road deaths and serious injuries to zero. In 2005, Sweden succeeded in reducing road fatalities to their lowest level since World War II with a 10.2% decrease in road fatalities (Directorate General for Energy and Transport, 2006). This was achieved despite a one percent increase in the number of vehicles on Swedish roads during that period. What perhaps makes the result even more impressive is that Sweden already had one of the best road safety records in the EU even before this dramatic reduction in road deaths.

Similarly, France has also enjoyed a rapid improvement in road safety in recent times under the leadership of former President Jacques Chirac. Making good on his electoral promise to address the escalating situation of road fatalities in France, he set about introducing stricter legislation to curb the carnage on French roads. While the data contained in the Mid Term Review suggests a 32% drop in fatalities from 2001 to 2005, more recent data indicate a 34.8% net reduction in road fatalities (ETSC, 2006b). France boasts poll position in the race against road deaths at the mid point stage of this pan European road safety effort. Baltic States (with the exception of Estonia) and the accession countries are found to be making poor progress with respect to road death reduction. Table 2-2 provides a fuller picture of road fatalities across the EU from 1991 - 2004.

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7 “How Sweden curbed the carnage”, Irish Examiner, 8 Feb, 2006 p.19
### Table 2-2 Road fatalities in Europe 1991 - 2004

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Source: Directorate General for Energy and Transport, 2006a
Community Road Accident Database (CARE)
In 2004, the actual level of road fatalities in the EU exceeded the interpolated target level by ten per cent or 4,200 fatalities (Directorate General for Energy and Transport, 2005a). Furthermore, this projection model, used by the European Transport Safety Council estimates that road deaths will only be reduced to 27,000 among the EU15 by 2010 (ETSC, 2005b). The model predicts a 27% reduction in road fatalities in the EU15 by 2010. However, the model only predicts a ten per cent reduction in road fatalities in newer member states by 2010 (ETSC, 2005b). According to this model, a predicted 13,500 extra road users will die in the EU25 by 2010 due to the failure of countries to meet the target prescribed by the Road Safety Action Programme. A road fatality forecast suggests that given the current trend in road deaths, Ireland will only have reduced road fatalities to 324 road fatalities by 2010 (Directorate General for Energy and Transport, 2005a). Figure 2.6 highlights Ireland's regressive performance in reducing road fatalities between 2001 and 2005. This trend is in stark contrast to the gains made by other EU member states such as France, the Netherlands and Portugal. In 2004, male drivers represented 76% of road fatalities in the EU. The high representation of men in road fatalities is a longitudinal trend that is observed each year across the EU (Directorate General for Energy and Transport, 2006). Figure 2.7 provides a breakdown of EU road fatalities by road user age. Twenty per cent of road fatalities were road users aged from 18 - 24 years in 2004 (Directorate General for Energy and Transport, 2006).
Figure 2.7 EU15 fatalities by age in 2004

Source: Directorate General for Energy and Transport, 2006

Figure 2.8 EU15 fatalities by road user type among (18 - 25 years olds) in 2004

Source: Directorate General for Energy and Transport, 2006

Figure 2.8 demonstrates the elevated risks associated with young car drivers between 18 - 25 years of age. This narrow age profile is over-represented in road fatality figures across Europe. The high car dependency rates in the EU result in high fatality figures among car drivers. In 2004, it was found that 67% or 2 in every 3 road fatalities were car users. Seventy per cent of road fatalities among 18 - 25 year old road users, within the EU in 2004, were the result of car accidents (Directorate General for Energy and Transport, 2006). Car accidents are also consistently found to be the largest contributor to road fatalities in Ireland as evidenced in table 2-3.
From table 2-3 a very strong trend is discernable on Irish roads throughout the ten year period from 1995 - 2004. During this period the three most hazardous modes of transport on Irish roads were cars followed by walking and finally motorcycles. The consistency of this longitudinal pattern permits a number of observations to be made. The major influx of cars on Irish roads in recent years and the car dependent commuter culture in Ireland has created this trend. Pedestrians, a vulnerable road user group, are consistently found to be second only to car drivers in terms of their representation in road fatality figures in Ireland. Road fatalities from car crashes are high due to the fact that these road users represent the largest road user group in the state. The high fatality rate among pedestrians is attributable to other factors. High fatality rates in this comparatively small demographic is most probably due to the vulnerability of the group in a crash situation. Research has established that nine out of ten pedestrians will be killed if hit at 60km/h (An Garda Siochana, 2005). The overall distribution of casualty figures for different Irish road user types generally mirrors the trends witnessed in Irish road fatality figures as seen in table 2-4.
Motorcyclists, like pedestrians are classified as vulnerable road users. Despite their relatively small presence on Irish roads, these road users are consistently found to be the third largest contributor to the death toll on Irish roads as evidenced in table 2-3.

Figure 2.8 illustrates that motorcycle and moped accidents accounted for 13% and 7% of road fatalities respectively among 18 - 25 year old road users within the EU in 2004. Research has found that motorcyclists are the only category of road user in the EU for which fatality rates are in the ascendancy. If the current upward trend in motorcycle fatalities continues, by 2010 one in every three road fatalities will be a motorcyclist as opposed to the current one in six ratio (Directorate General for Energy and Transport, 2006). In light of the relatively high fatality figures among motorcycle riders, European motorcycle manufacturers have committed to providing safer braking systems such as anti lock brakes (ABS) in half of their models by 2010. This commitment was made in a voluntary agreement within the framework of the European Road Safety Charter. It is estimated that approximately 6,300 motorcyclists die on roads within the EU25 each year (Directorate General for Energy and Transport, 2005a). Approximately 1000 motorcyclists could be saved every year in the EU15, if crash helmets were always worn (Directorate General for Energy and Transport, 2003a).

In 2000, motorcycles accounted for only two per cent of the vehicles on Irish roads and yet accounted for between 12% - 16% of all Irish road fatalities that year (An Garda Siochana, 2005). Motorcycle riders aged between 18 - 24 years accounted for 51% of all motorcycle riders killed and 41% of all motorcycle riders injured on Irish roads in 2000 (NRA, 2000). This sees young motorcyclists making a relatively large contribution to the death toll on Irish roads. Young male motorcyclists are disproportionately represented in road fatalities within this road user category. “Traffic Safety Basic Facts 2004 – Motorcycles and Mopeds” is a publication produced by the EU funded Community Road Accident Database (CARE). The database is mined to analyse data relating to road safety statistics from EU member states. It was found that 16 - 24 year old motorcycle and moped occupants in Ireland represented 45.5% of all the fatalities attributed to the Irish motorcycle and moped riders in 2002 (SafetyNet, 2004b).
This was the highest fatality rate among young riders in any of the member states analysed for this mode of transport in 2002 (SafetyNet, 2004b). According to one European Commission report, motorcyclists and their passengers are 19 times more likely to die on European roads than the average road user (Directorate General for Energy and Transport, 2005a). In Ireland, the Gardai estimate that motorcyclists are 30 times more likely to be killed in a collision than a person involved in a car crash (An Garda Siochana, 2005). Motorcycle riders and car users consistently represent a large proportion of road fatalities in the EU.

Figure 2.9 illustrates road fatality figures for different road user types within the EU15 in 2004. Approximately one in every four road deaths on EU roads is a young person aged between 15 - 24 years of age. This roughly translates into 10,000 young lives lost every year from the annual death toll of approximately 40,000 fatalities on EU roads (Directorate General for Energy and Transport, 2003c).

Figure 2.9 EU15 road fatalities by transport mode and age in 2004

Source: Directorate General for Energy and Transport, 2006
Community Road Accident Database (CARE)
According to the EU Commission, traffic accidents are the main cause of death for persons under 45 years of age within the EU (Directorate General for Energy and Transport, 2003b). Estimates suggest young and novice car drivers represent approximately 4,100 road fatalities each year in the EU25 (Directorate General for Energy and Transport, 2005a). Young drivers in France, Sweden, the UK and the Netherlands represent approximately ten per cent of the respective countries population base but they account for between 20% - 26% of all road fatalities in these countries. Young drivers in these countries are over represented by a factor between 2 to 2.6. In Germany, young drivers are over represented in road fatalities by a factor of three. In 2003, it was found that 39% of Spanish road fatalities were road users under 30 years of age. Across the EU, young male drivers are typically three times more likely to be killed on the roads than other road users (Director General of Energy and Transport, 2005a). In 2000, the National Roads Authority estimated that 33.7% of road fatalities were represented by young people aged between 16 - 25 years (NRA, 2000). However an article in the Irish Independent\(^8\) suggested that the RSA (Ireland) have figures which indicate that young male drivers (17 - 25 years) are seven times more likely to be killed on Irish roads than other road users.

Figure 2.10 highlights the stark gender divide in terms of road fatalities between the sexes. The data in figure 2.10 relate to 2002 but similar results are evidenced each year. UK based research has estimated that male drivers between 17 - 20 years of age have an average of 440 injury accidents per 100 million kilometres driven. This far exceeds the average injury accident rate of 106 injury accidents per 100 million kilometres for all male drivers. The research indicates that young female drivers exhibit an injury accident rate of 240 injury accidents per 100 million kilometres. However female drivers as a whole only exhibit a rate of 100 injury accidents per 100 million kilometres driven (Forsyth, 1992a; Forsyth, 1992b). This statistical research demonstrates that young drivers are more likely to be involved in an injury accident than older drivers. It also highlights the fact that women drivers appear to be safer drivers than male drivers. In essence, the research demonstrates that young male drivers are the most accident prone drivers on the roads. The same trend is evident in Ireland as illustrated in figure 2.11.

\(^8\) "A quarter of all crash victims are men under 26 years of age", *Irish Independent*, 24\(^{th}\) Oct 2006, p.5
Figure 2.10 Driver fatalities by age and gender in the EU14* in 2002

Source: CARE (EU road accidents database)

* EU15 countries excluding Germany.

Figure 2.11 Over and under representation of killed/seriously injured road users by age/gender in Ireland (indexed against population by age/gender 1996 - 2000)

Source: Lyle Bailie International, 2004

Figure 2.11 clearly demonstrates that young male road users exhibit the highest risk of involvement in severe or fatal crashes in Ireland. Between 1996 and 2000, three hundred and forty young male road users have been killed or seriously injured on Irish roads.
Young driver accidents tend to be more severe than accidents not involving young drivers, in terms of both the injuries sustained and the mortality rates involved. In 2000, the fatality rate (the number of drivers killed per 100,000 people) was much higher for those aged 18 - 24 years than for any other age cohort (NRA, 2000). A gender bias was also clearly evident. Male road user deaths occur predominantly among car users who accounted for 62.3% of Irish road deaths in 2004 (NRA, 2004). In 2000, young drivers accounted for 37% of all car drivers killed and 18% of car drivers injured despite representing only a small fraction of the driving community. Young driver accidents accounted for 26.1% of all injury accidents on Irish roads in 2000. The car driver fatality rate was approximately ten times higher for young male drivers than for female drivers (NRA, 2000).

Table 2-5 Road fatalities in member states by gender and age in 2002

<table>
<thead>
<tr>
<th></th>
<th>16-25</th>
<th>26-40</th>
<th>41-60</th>
<th>61-99</th>
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<th>Male</th>
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<td>79%</td>
</tr>
<tr>
<td>Denmark</td>
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<td>21%</td>
<td>22%</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
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<td>20%</td>
<td>24%</td>
<td>76%</td>
</tr>
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<td>25%</td>
<td>20%</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
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<tr>
<td>UK</td>
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<td>19%</td>
<td>23%</td>
<td>77%</td>
</tr>
<tr>
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<td>25%</td>
<td>18%</td>
<td>18%</td>
<td>82%</td>
</tr>
</tbody>
</table>

* Data from 2001  
** Data from 1998  

Source: CARE Database / EC  
Date of query: February 2005

Table 2-5 provides a breakdown of road fatalities by age and gender in a number of EU member states. It serves to highlight the over representation of male drivers in road fatalities across Europe. This cross-sectional glimpse at road fatalities in 2004 (unless where stated) gives an indication of the problem throughout Europe. The data find that male road users are between three and six times more likely to be killed than female road users (SafetyNet, 2004a). The figures also indicate that Ireland had the highest female road fatality rate among the countries surveyed in 2002.
2.3 Road accident causality in the EU

The main cause of death on the roads is deemed to be irresponsible driver behaviour. The ETSC and the SWOV Institute for Road Safety have both attempted to offer a breakdown of the number of road fatalities in the EU attributable to different errant driver behaviours.

Research has estimated that speeding accounts for approximately 12,400 road fatalities in the EU25 every year. A further 7,300 road fatalities are attributable to drivers and passengers who fail to wear a seatbelt (Directorate General for Energy and Transport, 2005a). Pedestrians and cyclists are estimated to represent 4,800 road fatalities each year in the EU25. Other vulnerable road user groups such as motorcyclists and their passengers are thought to account for approximately 6,300 road fatalities every year in the EU25. The research also indicates that young and novice drivers represent approximately 4,100 road deaths in the EU25 each year (Directorate General for Energy and Transport, 2005a). The figures quoted above are the result of a mathematical model developed by the highly regarded SWOV Institute for Road Safety. Drivers with blood alcohol levels in excess of their national legal limit are estimated to cause at least 6,800 road deaths every year in the EU (ETSC, 2003).

Other research suggests higher fatality figures for different road users than the figures quoted above (Directorate General for Energy and Transport, 2003d). This is possibly due to the fact that this research has only tendered broad estimates which relate to accidents with a number of causal factors. Excessive and inappropriate speed is believed to kill approximately 15,000 people per annum, while drinking, drugs and fatigue claim 10,000 lives (Directorate General for Energy and Transport, 2003c). However more specifically (and less open to interpretation) this research suggests that approximately 10,000 young people (15 - 24 years olds) are killed on EU roads each year (Directorate General for Energy and Transport, 2003c).
2.3.1 Engineering - car design and road infrastructure in the EU

The EU car safety rating programme is known as EuroNCAP (Euro New Car Assessment Programme). Research finds that half of fatal and disabling injuries could be avoided if cars were designed to provide protection equivalent to that of the best car in its class. A five per cent annual reduction in road fatalities has been attributed to the EuroNCAP programme (Directorate General for Energy and Transport, 2005a p.96). Car design therefore plays a vital role in reducing road deaths. Roughly five hundred deaths per year in the EU are directly attributable to the lack of visibility from the blind spot\(^9\) in the rear of a car (Directorate General for Energy and Transport, 2003d). According to a study\(^10\) by the European Safety Rating Advisory Committee (SARAC) there is almost a ten per cent compound (not straight line) risk reduction in crash morbidity associated with each star that is awarded to a car. Consequently, cars awarded a five star rating are found to possess a 36% lower intrinsic fatality accident rating when compared with cars designed just to meet the legal safety standards (Directorate General for Energy and Transport, 2003b).

Improved car design married with passive safety features (seatbelts) and new active safety features such as Intelligent Transport Systems (ITS), In Vehicle Information Systems (IVIS) and Active Driver Assistance Systems (ADAS) will continue to augment driver safety. In the long term it is envisaged that these new technologies may reduce road fatalities by 50% (Directorate General for Energy and Transport, 2001b). In Sweden, plans are already afoot to leverage technological developments in the pursuit of road safety. By utilising a GPS (Global Positioning Satellite) based technology called ISA (Intelligent Speed Adaptation) it is hoped to improve road safety. The development of the “intelligent road” concept and the roll out of the Galileo European satellite positioning system in 2008 holds particular promise in that it will supply much more accurate information to drivers regarding the safety of roads. This will be a welcome addition to existing measures that already exist. Knowing the condition of a road could theoretically play a large role in reducing road deaths.

\(^9\) Blind spots are the areas of the road that cannot be seen while looking forward or through either the rear-view or side mirrors.

\(^10\) “Quality criteria for the safety assessment of cars based on real world crashes”.
According to the European Road Safety Action Programme Mid Term Review roughly 600 deaths and some 7,000 accidents could be prevented if improvements were made to the trans-European road network. These improvements in road infrastructure could reduce fatalities by between 12% - 16% and decrease road accidents by between 7% - 12% (Directorate General for Energy and Transport, 2006). Another report found that Ireland had the fourth worst roads in the EU\footnote{“Irish roads fourth most dangerous in Europe, says study” \url{http://www.breakingnews.ie/2006/08/04/story270752.html} [13/08/06]}.

The risk of fatal collisions on rural roads is estimated to be as high as 11.5 fatal crashes per billion vehicle kilometres. This is six times higher than the typical motorway collision rate (ETSC, 2005a). Motorways only represent three per cent of the road network in the Republic of Ireland (EuroRAP, 2005). In some European countries between 50% - 75% of all road accidents occur on rural roads. Research from the European Road Assessment Program (EuroRAP) indicates that rural roads represent 91% of the Irish road network. This finding, (quoted in the “Motor vehicle speed in the EU fact sheet”) suggests it is reasonable to conclude that Ireland’s road network is partially responsible for the high number of road deaths in Ireland (ETSC, 2005a). It is estimated that approximately 24,900 road accidents occur on rural roads in the EU (Directorate General for Energy and Transport, 2005a).
2.3.2 Time of the day as a function of crash probability in the EU

While many contributory factors are difficult to predict with regard to road safety, some however are strikingly apparent. Figure 2.12 conveys the massive implications that Friday and Saturday nights have for road safety across the EU. The data compiled by CARE\(^{12}\) illustrate the convergence of effects that result in “Saturday night fever”. Weekend nights are typically characterised by higher incidents of alcohol consumption and drug use, a larger number of risk-taking young drivers on the roads and a host of other extraneous factors that conspire to elevate road fatality figures during the weekend.

Figure 2.12 Number of 18 - 25 year olds killed in road accidents, by time/day

Source: *CM

Source: Directorate General for Energy and Transport, 2003a

\(^{12}\) Community Accident Research Database
This trend towards weekend carnage is consistent over time and is witnessed throughout the EU. The “Saturday night fever” phenomenon is also highly visible in domestic road fatality statistics. Figure 2.13 highlights the elevated number of fatal young driver accidents in Ireland during the weekend between 1996 and 2000.

Weekend driving appears to be particularly dangerous. In 2004, some 41% of all road fatalities occurred on Saturday and Sunday (NRA, 2004). Young people in particular appear to be over-represented in Irish road accidents during the weekend. In the “Young Drivers Accident Report 2000” it was found that young drivers (18 - 24 years) exhibited much higher fatality rates than that found among the general driving public. Young driver accidents are also generally more severe and resulted in more fatalities than any other driver cohort. Within this high risk group, the car driver fatality rate was roughly ten times higher for young male drivers than it was for young female drivers (NRA, 2000).
Table 2-6 Distribution of car occupant fatalities by day of week in 2002

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
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<td>21%</td>
</tr>
<tr>
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<td>11%</td>
<td>12%</td>
<td>13%</td>
<td>18%</td>
<td>17%</td>
<td>20%</td>
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<td>12%</td>
<td>16%</td>
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<td>18%</td>
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<tr>
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<td>10%</td>
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<td>13%</td>
<td>15%</td>
<td>25%</td>
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<tr>
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<td>13%</td>
<td>14%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
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<td>12%</td>
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<tr>
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<td>10%</td>
<td>12%</td>
<td>18%</td>
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<td>17%</td>
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<tr>
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<td>12%</td>
<td>18%</td>
<td>20%</td>
</tr>
<tr>
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<td>11%</td>
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<td>13%</td>
<td>12%</td>
<td>17%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Total</td>
<td>13%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>15%</td>
<td>18%</td>
<td>19%</td>
</tr>
</tbody>
</table>

* Data from 2001
** Data from 1998

Table 2-6 provides a breakdown of car occupant fatalities in the EU14 by the day of the week in 2002. The data mined from the CARE database demonstrate that Friday, Saturday and Sunday are consistently found to be the days of highest car occupant fatalities across Europe. Fatality rates range from 12% - 18% on Friday night, 17% - 29% on Saturday night and from 8% - 25% on Sunday night in 2002. Ireland was found to have the highest percentage of car occupant fatalities on Sundays among the countries analysed in 2002. The data analysis showed that in Ireland, 25% of car occupant fatalities occurred on Sundays during 2002 (SafetyNet, 2004a). This high fatality rate is likely to be a spill over effect from the "Saturday night fever" phenomena. Similarly, the high fatality rate on Mondays could also be explained as a spill over from Sunday night misadventures.

Between 2001 and 2002, some 14% of fatal road accidents in Ireland occurred between midnight and 3 a.m. despite the fact that only two per cent of the Irish road fleet is mobile during these hours (Department of Justice, Equality and Law Reform, 2005). The lowest volume of traffic is found on Irish roads at this time of the day and yet fatality rates are at their highest in Ireland during these hours (SafetyNet, 2004a). In 2000, it was found that 59% of all young driver fatalities occurred on Friday, Saturday or Sunday. Ireland had the highest percentage of road fatalities between midnight and 4 a.m. among all the countries analysed in 2002 (SafetyNet, 2004a).
Table 2-7 demonstrates the high risk of road fatalities across the EU between the hours of midnight and four a.m. in 2002.

<table>
<thead>
<tr>
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</tr>
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</tr>
<tr>
<td>Italy**</td>
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<td>16%</td>
<td>18%</td>
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<tr>
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<td>17%</td>
</tr>
</tbody>
</table>

* Data from 2001  
** Data from 1998  

Source: CARE Database / EC
Date of query: February 2005

Clarke et al (2002) and Ward et al (2005) found that a high number of young drivers were involved in loss of control crashes during night time hours. The authors concluded that young drivers (17 - 19 year old drivers in particular) were the most likely to be involved in a road accident at night time and on rural roads. Research by Laapotti and Keskinen (1998) also found that fatal, loss-of-control accidents among young drivers were most prevalent in the evening and at night. Ferguson (2003) however could find no evidence of fatigue being a causal factor in night time driving. The research by Clarke et al (2002) found high incidents of drink driving among 23 - 25 year old drivers. The study showed that incidents of speeding increased among young drivers at night. It was also observed that while certain crash types disappeared quickly with experience (e.g. right hand turns), crash figures for loss-of-control accidents during hours of darkness were particularly slow to improve. The authors concluded that darkness per se was not the reason for the higher crash rates but rather the purpose of the trip and mindset of the driver during these night time trips.
2.4 An Irish perspective on road safety

During the troubles in Northern Ireland, 3,523 people lost their lives between 1969 and 2001 (Sutton, 2001). Over four and a half times as many people (16,423) were killed on roads in the Republic of Ireland during that same period (An Garda Siochana, 2007). The population of the Republic of Ireland population grew by approximately 17% between 1996 and 2006 (RSA, 2007).

Statistically speaking, road safety has improved substantially in Ireland over the last thirty years as seen in figure 2.14. This is not to say that the present carnage on Irish roads is acceptable. However when put into a purely historical perspective and considering the increase in traffic volumes in recent years, the general downward trend in road deaths since 1972 is encouraging. That year was the blackest year for Irish road safety with 640 deaths on Irish roads (An Garda Siochana, 2007).

Taken from a global perspective, Ireland’s road safety record is impressive. Road fatality rates per head of population in the Middle East, Africa and Asia are generally much higher than in Ireland (World Health Organisation, 2002). However when compared to our European counterparts, Ireland’s lacklustre road safety performance becomes apparent. A popular statistical method used to gauge the road safety performance of member states is to calculate the number of road fatalities per 100,000 head of population. For many years Ireland’s road safety performance has been
mediocre. Typically, Ireland has resided in or around seventh place in the rank order of the original EU 15 member states. Ireland’s road fatality figures per 100,000 citizens are consistently higher than some other member states. In 2004, there were 9.3 road deaths per 100,000 persons in Ireland. This compared unfavourably with other member states; the Netherlands (4.9), Sweden (5.3) and the UK (5.6). In 2005, the Irish figure had risen to 10 fatalities per 100,000 persons. On average, thirty three people died on Irish roads every month in 2005. Ireland, like many of its European counterparts has enjoyed a general downward trend in road deaths since the 1970s. However this downward trend has, in recent years been very modest. Between the years 2001 – 2005, there was only a 3.65% decrease in the number of road deaths on Irish roads (An Garda Siochana, 2007). It also appears that attempts to curb young driver road deaths in Ireland are failing. In recent years, Ireland is one of the few OECD countries where young driver (18 - 24 years) fatalities continue to rise relative to population (see figure 2.15).

Figure 2.15 Trends in driver fatalities per million head of population aged between 18 - 24 year olds in various OECD and EU countries.

Source: Twisk and Colin, 2007
Table 2-8 Licence, vehicle and road fatality figures in Ireland

<table>
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<th>Year</th>
<th>Provisional licences</th>
<th>Full licences</th>
<th>Deaths</th>
<th>Monthly average</th>
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<td>2,352,540</td>
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</table>

\% Change 1998 - 2005

Source: National Safety Council (2006a) and annual Garda Siochana reports

Over the past forty years, the number of vehicles and drivers in Ireland has more than quadrupled. In 2004, there were 2,036,307 mechanically propelled vehicles under licence on Irish roads, of which cars and motorcycles accounted for 1,662,157 and 34,300 respectively. In 2005, the number of driving licence holders in Ireland stood at 2.35 million (Department of the Environment, Heritage, & Local Government, 2005). The increase in the number of drivers and vehicles on Irish roads has been exceptionally fast. In the last 10 years alone there has been a 68% increase in the number of licensed private cars on Irish roads (Department of the Environment, Heritage, and Local Government, 2005). In 2005, almost 17.2% (404,607 road users) of all licensed road users in Ireland were holders of a provisional driving licence (Department of the Environment, Heritage, and Local Government, 2005). In 2006, the number of people with provisional driving licences in Ireland was estimated to be in the region of 400,000 - 450,000 drivers. Under current legislation a provisional driver can fail the driving test and continue to drive on Irish roads. The responsibility rates for accidents (where Gardai estimated that the person was found to be to a “large extent responsible”) were higher for young male drivers with provisional licences (58%) than for young male drivers with full driving licences (54%) in 2000. Young male drivers were deemed to be to a “large extent responsible” in 60% of accidents where contributory factors were reported in 2000 (NRA, 2000). In general, young male driver responsibility rates seem to be skewed towards more severe crashes.
In 2004, there were 1,582,833 registered cars on Irish roads accounting for 77.73% of the registered vehicles in the state (Department of the Environment, Heritage, and Local Government, 2004). Research into car ownership levels across Europe are summarised in table 2-9. Ireland was found to have 385 passenger cars per 1000 inhabitants in 2004. This finding demonstrates that despite Ireland’s rapid car sales in recent years, car ownership levels are nevertheless relatively low. The Irish car ownership level is well under both the average car ownership level of the original EU15 (495 passenger cars per 1,000 inhabitants) and the average car ownership level found in the EU25 (465 passenger cars per 1000 inhabitants). This suggests Ireland’s road safety problem cannot be directly related to the number of cars on Irish roads. The UK for example boasts one of the best road safety records in Europe despite the fact that in 2004 there were 463 passenger cars per 1,000 inhabitants in the UK (Directorate General for Energy and Transport, 2005b).

Table 2-9 Number of passenger cars per 1,000 inhabitants in EU countries

<table>
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<tr>
<th></th>
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<tr>
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<td>72</td>
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<td>336</td>
<td>365</td>
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</tr>
</tbody>
</table>

Source: Directorate General for Energy and Transport, 2005b
In 1949, R. J. Smeed proposed a relationship between the number of traffic casualties per head of population and the car ownership levels in a country. The empirical rule known as Smeed's law finds traffic accident casualties to be the cube root of the car ownership level in a country (Smeed, 1949). Therefore increases in traffic volume lead to a decrease in the number of accidents per vehicle. Smeed’s research showed that this law held in 20 countries worldwide. In 1987, John Adams found that the law was consistent over time and correctly accounted for traffic accident casualties in the UK from 1909 - 1973. The research also indicated that Smeed’s law was consistent with the data reviewed in 62 countries worldwide (Adams, 1987). Smeed’s law has been shown to apply to the Irish transport model as seen in figure 2.16.

Smeed's formula is expressed as:

\[ D = 300(np^2)^{\frac{1}{3}} \]

Where \( D \) is annual road deaths, \( n \) is number of registered vehicles and \( p \) is population.

Figure 2.16 Smeed’s law within an Irish context

Source: Crowley, 2006
2.4.1 The economic cost of road accidents in Ireland

The Department of Transport’s Annual Report (2004) reveals that €1.23 billion was spent on the National Roads Development Programme in 2004; €1.179 billion on improvement work and €51 million on maintenance work. The total exchequer expenditure for the multi-annual National Road Funding Plan for the period 2004 - 2009 is estimated to be €8.396 billion (Department of Transport, 2004). In 2004, Goodbody Economic Consultants produced a report\textsuperscript{13} that estimated the economic cost of all road collisions reported to and recorded by An Garda Siochana in 2004. The cost of these road crashes was estimated to be €1.22 billion (Goodbody Economic Consultants, 2004). This sum of money is similar to the total amount of money spent on the National Development Programme for that whole year (€1.23 billion). According to the report, road fatalities and serious injuries cost the Irish state €852.72 million and €911.36 million respectively in 2004. It was found that there were clear economic advantages in addressing the issue of road safety. When scrutinised using a cost benefit analysis, it was established that for every €1 invested in road safety there is an estimated €8 return. In addition to the moral obligation to reduce the unquantifiable human cost accruing from road accidents, there also appears to be a compelling economic argument to do so. Economic cost savings are realised by maintaining tax revenues, reducing welfare payments due to death or incapacity, reducing insurance premiums and relieving pressure on A&E departments and acute hospitals (Goodbody Economic Consultants, 2004).

In 1997, the European Commission arrived at the figure of €1 million to quantify the socio-economic cost of a road fatality. The “Million Euro Test” became the default figure for computing the cost of road deaths in the EU (as discussed in Directorate General for Energy and Transport, 2005a). However the cost of road fatalities varies among the member states within the EU. Ireland’s first road safety strategy, “The Road to Safety” ran between 1998 and 2002. It achieved its primary goal of a 20% reduction in road fatalities (based on the road fatality figure for 1997) by 2002. The strategy has also been shown to be very cost effective. According to a Goodbody report the estimated cost of a road fatality to the Irish exchequer was €961,920.

\textsuperscript{13} Cost Benefit Parameters and Application Rules for Transport Project Appraisal
The report also estimated the cost of other accident types. Serious injury accidents, minor injury accidents and damage only accidents were each estimated to cost the state; €195,904, €21,145.60 €4,851.20 respectively (Goodbody Consultants, 1999). Taking into account the lives saved as well as the injuries avoided, the road safety plan was estimated to yield an economic benefit of €686.08 million. From 1997 - 2002 some two hundred and eighty seven lives were saved (Department of Transport, 2004) over the five year period. This represented a cost saving of €276,071,040. Goodbody Consultants re-evaluated the economic cost of road accidents in Ireland in 2002 (Goodbody Consultants, 2004). In 2002, it was calculated that, on average, a road fatality represented an economic loss of €2,280,000. A serious injury was found to cost the exchequer €304,600 while slight injuries and damage-only accidents cost the Irish economy, on average, €30,000 and €2,400 respectively.

In 2001, alcohol related road accidents on Irish roads were estimated to cost the country €315 million (Byrne, 2001). By 2003, the cost of alcohol related road accidents had increased to €322 million (Byrne, 2004). The rise in the cost of alcohol related road accidents appears to be following in line with the upward trend in alcohol consumption. A study funded by the Heath Promotion Unit found that 28% of A&E admissions in Ireland's six major acute hospitals were caused in some way by alcohol (Hope et al, 2005). Peak times for alcohol related injuries were found to be Saturday and Sunday morning between 3 a.m. and 4 a.m. An international study by Young et al (2004) also found that night time and weekends were the busiest times for alcohol related admissions to hospitals in other countries. The consumption of alcohol increases both the possibility of being admitted to hospital for drink-drive injuries, and the severity of those injuries (Borges et al, 1998). An Irish study of 2,500 A&E patients by Hope et al (2005) found that men who presented with alcohol related injuries had consumed an average of 15 drinks. Patients, who presented with injuries between midnight and 6 a.m., were sixteen times more likely to have sustained alcohol related injuries than other patients. The study found that 86% of the admissions to the six A&E departments between midnight and 6 a.m. were due to alcohol related accidents. Overall, road traffic accidents accounted for 8.9% of the total admissions to the six A&E departments (Hope et al, 2005).

Figures relating to sources Goodbody Consultants, 1999 and Department of Transport have been converted from Irish punts to euro (at the then exchange rate of 1.28) to aid transparency.
2.4.2 The human cost of road accidents in Ireland

Figure 2.17 Fatal collisions in Ireland 1972 - 2004

Source: National Roads Authority, 2004

Figure 2.17 highlights a general downward trend in fatal collisions in Ireland from the beginning of the early 1970s. However since 2003, road fatalities have generally begun to rise again. Ireland’s first ever road safety strategy, “Road to Safety” ran from 1998 to 2002. The target of the road safety strategy was a 20% reduction in road deaths and serious injuries by 2002 (in relation to 1997 fatality figures). In 1997, some 87% of all young drivers (17 - 24 year olds) killed on Irish roads were male. The primary target of Ireland’s first road safety strategy was achieved. Road fatalities fell from 472 road fatalities in 1997 to 376 road fatalities in 2002. This represented a road fatality reduction of 20.3% for the period. It is estimated that approximately 286 lives were saved during this period (Department of Transport, 2004).

In 2003, the Irish Government supported the Verona Declaration. The declaration, signed by the European Ministers for Transport in October 2003, pledged to fight the scourge of road deaths. The Irish Government in keeping with this commitment produced a second national road safety plan. Ireland’s second road safety strategy ran between 2004 and 2006. On average, between 1998 and 2003 approximately 401 people lost their lives on Irish roads each year. The goal of Ireland’s Road Safety Strategy 2004 - 2006 was to reduce road carnage to no more than three hundred road fatalities by 2006. This goal represented a 25% reduction in road fatalities based on the average number of road fatalities between 1998 and 2003. However, by the end of
2006 over three hundred and sixty five people had died on Irish roads (RSA, 2007). The primary goal of the Irish Road Safety Strategy 2004 - 2006 was not achieved. The failure of this second national road safety strategy represents a missed stepping stone in attaining the pan European goal of a 50% reduction in road fatalities between 2001 and 2010 (as outlined in the European Commission's Road Safety Action Plan).

Translating this EU objective into an Irish context by 2010 necessitates a 50% reduction in the 411 fatalities on Irish roads in 2001. Therefore if Ireland is to achieve this objective it should have no more than 206 road fatalities per annum by 2010. This objective represents a massive challenge for road safety authorities given the current rising trend in road fatalities in Ireland. The rate of road deaths per 100,000 persons in Ireland began an upward climb again from the forty year low in 2003. The fatality rate on Irish roads in 2003, (8.4 deaths per 100,000 people) rose to approximately 10 deaths per 100,000 people in 2005 (NSC, 2006a). Using 2003 as the base year seems logical for a number of reasons. Firstly, it marks the end of the successful Road Safety Strategy 1998 - 2002 and marked the beginning of the new Road Strategy 2004 - 2006. Furthermore, the penalty points system was introduced in 2003 which provided Ireland with its best road safety record in over forty years. In 2004, there was an 11.64% increase in road fatalities on the base year. In 2005, the figures rose once more with a 5.88% increase on the previous year (2004). This translates into an overall increase in road fatalities of 18.2% from 2003 - 2005 (based on the base year).

There were 368 road deaths in Ireland in 2006 (An Garda Siochana, 2007). This represents a welcome 7.07% drop in road fatalities on 2005 figures. Overall though, there has been a 9.85% increase in road fatalities in Ireland from 2003 - 2006. However, road fatality figures fell to 338 fatalities on Irish roads for 2007 15.

While fatality figures have been the primary focus of the media, many more people are injured on Irish roads. In 2006, there were 28,417 Garda-recorded traffic collisions resulting in 8,575 persons injured on Irish roads (R.S.A., 2007). If road statistics from 1961 - 2002 are examined it is found that, on average, for every life lost on Irish roads another 20 people are injured (see figure 2.18). Some of these injuries are severe, life altering injuries.

Chapter 3

Contributory factors to young male driver deaths and injuries
3.1 Primary contributory factors to young male driver deaths and injuries

3.1.1 Speeding

To demonstrate the escalating effects of speeding, an example is perhaps the clearest method of explanation. For car occupants in a collision with an impact speed of 80km/h (50mph) the likelihood of death is about 20 times higher than that found at an impact at 30km/h (20mph). A 50km/h (30mph) impact is equivalent to dropping a car from a two storey building. A 100km/h impact is equivalent to dropping that same car from an 11 storey building. Finally, a 150km/h (90mph) impact is equivalent to dropping the car almost 30 storeys. It should be noted that there is a well established link between speeding and fatalities (NSC, 2005a). If a pedestrian is knocked down by a vehicle travelling at 20mph, the person has a 95% chance of survival. The pedestrian’s chance of survival drops to 55% if struck at 30mph. However, if struck by a vehicle at 40mph, the person only has a 15% chance of survival (ETSC, 1995a). Drivers exceeding the speed limit cause about one third of all fatal and serious accidents (ETSC, 1995a). It is estimated that not adhering to speed limits could be responsible for 12,400 road fatalities a year in the EU25 (Directorate General for Energy and Transport, 2005a).

Research presented by the Transport Research Laboratory (TRL) at the "Killing Speeds, Saving Lives" seminar in Brussels in 2001 suggested that even a small decrease in vehicle speeds would have massive implications for road safety within the EU (Finch et al, 1994). The findings suggested that a three kilometre reduction in average speed would save 5,000 to 6,000 lives per annum in Europe. It would also eradicate 120,000 to 140,000 road accidents on EU roads each year. The positive knock on economic effect alone would be in the region of a €20 billion cost saving for European economies (Directorate General for Energy and Transport, 2003b).

Research in the UK found that the installation of automatic surveillance cameras reduced average traffic speeds by 9km/h. In 2003, following the introduction of a fixed safety camera scheme on French intercity motorways, there was a 34.5% reduction in road fatalities on those roads (ETSC, 2005a).
If these cameras were fitted everywhere throughout the EU and the results extrapolated, it would be possible to eradicate one third of all accidents and halve the number of people killed on roads within the EU (Directorate General for Energy and Transport, 2003b). The ROSEBUD project (Road Safety and Environmental Benefit-Cost and Cost-Effectiveness Analysis for Use in Decision-Making) found that increased speed enforcement tendered a 14% drop in road fatalities in Norway. If this reduction is extrapolated across the driving population in the EU25 approximately 7,000 lives could be saved. From an economic perspective, traffic cameras have also been shown to exhibit excellent cost-benefit ratios (Directorate General for Energy and Transport, 2003b).

Estimates by the National Safety Council indicate that speeding is the largest contributor to road deaths in Ireland. Excessive or inappropriate speed may account for over 40% of all fatal road accidents in Ireland each year (NSC, 2005a). Figure 3.1 highlights the general upward trend in fatal single vehicle collisions in Ireland between 1994 and 2004 (NRA, 2004). It was found that 36% of fatal collisions in Ireland in 2004 were single vehicle collisions. This accident type is strongly associated with excessive speed or drink driving.

**Figure 3.1 Percentage of fatal crashes involving a single vehicle 1994 - 2004**

Source: National Roads Authority, 2004
An online survey by the National Safety Council in April 2003 found that Irish drivers are prone to speeding. Male drivers were found to be particularly likely to engage in speeding (NSC, 2003b). The survey found 46% of respondents admitted to regularly breaking the speed limit in urban areas. Similarly, almost 50% of 17 - 24 year old drivers admitted to breaking the urban zone speed limit and the majority of these drivers did so regularly. On national roads, 27% respondents admitted to regularly breaking the speed limit. Again male drivers were found to be more likely to break the speed limit with 32% males regularly breaking the speed limit compared to 14% of female respondents. The same trend was also observed on motorways where 26% of male respondents admitted breaking the speed limit as opposed to only 13% of female drivers (NSC, 2003b). The most frequently occurring error among young male drivers involved in fatal, two vehicle collisions is excessive speed. Speed accounted for 41% of all contributing factors to young male driver crashes on Irish roads in 2000. Young drivers were also more likely to engage in “improper overtaking” than older drivers (NRA, 2000). This activity is especially hazardous on rural roads (where most fatal crashes occur).

Since male drivers and in particular young male drivers are over-represented in road accidents it seems reasonable to conclude that these drivers are prone to driver error. Inexperienced and inappropriate speed are considered major contributors to road collisions. Much of this dangerous driving takes place on rural roads which are particularly hazardous. Ireland still has a particularly high proportion of rural, regional and local roads. Other European countries have more extensive motorway networks and are less reliant on rural roads (EuroRAP, 2005).
Figure 3.2 permits a comparison of the percentage fatality rates on rural, urban and national roads in Ireland from 1994 - 2004. Rural roads are considered to be the most dangerous road type and exhibit consistently high fatality rates. It was found that 72% of fatal collisions occurred on rural roads in 2003. In 2004, the fatality figure remained high with 70% of road fatalities occurring on rural roads (NRA, 2004).

**Figure 3.2 Percentage of fatal accidents in rural, urban areas and national routes 1994 - 2004**

Source: National Roads Authority, 2004

According to the European Transport Safety Council the effects of speeding are influenced by the road type. The general rule of thumb is that a 1km reduction in travel speed results in a three per cent reduction in accident frequency (Finch et al, 1994). On busy, urban roads (characterised by high volumes of slow moving traffic) a 1km reduction in travel speed will typically result in a six per cent reduction in accident frequency. Rural roads are generally regarded as the most dangerous road type due to their design. A 1km reduction in travel speed on rural roads only tenders a two per cent reduction in accident frequency (ETSC, 1995a). Excessive and inappropriate speed causes about a third of fatal and serious injuries in the EU (Directorate General for Energy and Transport, 2003d).
Table 3-1 Fatal/injury collisions by road character in Ireland in 2004

<table>
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<th>Road Character</th>
<th>Fatal</th>
<th>Serious Injury</th>
<th>Minor Injury</th>
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<th>%</th>
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<td>1.5</td>
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<td>612</td>
<td>720</td>
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<td>334</td>
<td>662</td>
<td>4,785</td>
<td>5,781</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: National Roads Authority, 2004

Considering that 70% of fatal accidents on Irish roads occurred on rural roads in 2004 it would appear counter intuitive that 51.7% of all accidents occurred on straight roads (NRA, 2004). This finding seen in table 3-1 could suggest that drivers are prone to speeding on straight stretches of country roads where the speeds involved are not conducive to safe driving. It is believed that speeding is involved in 35% of all speed related fatal crashes and 30% of all injury related crashes on national roads. Urban roads which handle 10.4% of Ireland’s traffic volume, account for 9% of fatal, speed related crashes and 13.1% of speed related injury crashes. In contrast, motorways in Ireland account for just 3.3% of traffic volume and account for only 0.2% of speed related injury collisions in Ireland (An Garda Siochana, 2005).

The most recent research conducted into European driver attitudes and opinions was conducted in 2003. The third "Social Attitudes to Road Traffic Risk in Europe" (SARTRE 3) report investigated the varying levels of dangerous driver behaviours such as speeding and drink driving within different member states. The report also offered an insight into the varying levels of perceived traffic enforcement levels within the EU (INRETS, 2004). Enforcement levels in Ireland were generally found to be low when compared with enforcement levels in other EU countries. This fact is borne out in figure 3.3 which indicates that only 13.1% of Irish respondents were penalised for speeding on Irish roads from late 1999 to early 2003. This figure contrasts greatly with the Netherlands where 46.5% of respondents were penalised for speeding (INRETS, 2004). Overall Ireland has a low enforcement rate for speeding. The perceived risk of being penalised is also very low.
The expectation of being monitored for speeding on EU roads seems to vary greatly among the countries surveyed. The research indicates that only eight per cent of Irish people believed that their driving was under surveillance. In contrast, 41% of people surveyed in Cyprus believed that their speed was being monitored. The perceived threat of enforcement in Ireland is half that of the European average which finds 16% of Europeans maintaining their driving is being monitored. It is widely believed that in order for an enforcement system to be effective, the system should not be based on the severity of sanctions imposed on transgressors but rather on the high perceived certainty of being caught in violation of the offence. If this criterion is applied to Ireland then the enforcement system is found to be ineffective.

Source: Institut National de Recherché sur les Transports et leur Sécurité, 2004
The subjective level of threat of being penalised for speeding is said to be high if the individual personally believes that there is a high risk of being caught breaking the law. The actual levels of enforcement should impact on the subjective level of threat felt by people. Theoretically, advertising campaigns used in tandem with enforcement efforts to hammer home this raised threat of prosecution will be more effective than enforcement alone. Figure 3.3 also indicates that in some countries the enforcement system seems to boast a high perceived threat despite the actual threat of penalisation being relatively small. This is most clearly seen in the UK where the actual threat of being penalised is found to be only 9% while the perceived threat of being checked for speeding is as high as 38% among those surveyed. It should be noted that the UK is one of the countries leading a successful charge against road deaths (INRETS, 2004). In the Netherlands, Germany, Austria, and Sweden the opposite is true whereby the perceived threat of being penalised for speeding is low in comparison with the actual quantifiable enforcement threat. Again these countries are found to be among the better performers in the EU in terms of road safety suggesting that enforcement levels are still very important. Sweden is world renowned for having an exemplary road safety record. This has been achieved despite the fact that the perceived threat of being monitored for speeding is the lowest among the surveyed countries at just three per cent. The actual enforcement rates in Sweden also appear low. Only nine per cent of respondents were penalised for speeding. This suggests that perhaps there is some other mechanism, be it social or psychological at work in keeping road deaths down (INRETS, 2004).

David Watson, a safety campaign manager for the British Department of Transport contends that speeding is still a “live debate”, whereas the moral debate has been won in relation to drink driving and seatbelt wearing. Therefore, while drink driving and non seatbelt compliance are now considered shameful activities, speeding still remains reasonably acceptable. During a workshop at the Speed 2006 conference in London some of the reasons behind the enduring nature of this “live debate” were discussed. One of the problems identified with speeding is that quite often it is an unconscious act, unlike drink driving and not wearing a seatbelt, which are chiefly a question of choice. Psychologist Steve Stradling believes “..they (people) are lulled by the cocoon effect... cars are getting more and more comfortable, more and more relaxing” (Faith, 1997).
3.1.2 Seatbelts

Seatbelts have a large role to play in saving lives on European roads. Research suggests approximately 10,000 of the 22,500 car occupants killed in the EU every year could survive if they were wearing their seatbelts (ETSC, 1999). In 2003, a study found that universal seatbelt use in the original EU15 member states could prevent 6,000 deaths and 380,000 injuries each year (ICF Consulting, 2003). Other research estimates suggest that approximately 7,000 lives could be saved each year if seatbelt wearing rates could be increased to the best international rate. Research indicates that half of the people killed in road accidents within the EU were not wearing seatbelts (Directorate General for Energy and Transport, 2003d). Past research into non seatbelt compliance has indicated that young drivers and particularly young male drivers display low seatbelt compliance rates (Beirness and Simpson, 1997; Waxweiller et al, 1993; Preusser et al, 1991). Research carried out in the US found that those who chose not to wear seatbelts tended to have low academic qualifications, engaged in other dangerous driving behaviours and were more likely to have previous traffic convictions (Preusser et al, 1991; Jonah, 1986).

According to the European Transport Safety Council (ETSC) seatbelt wearing rates in the EU vary dramatically. The range is found to be between 59% (Hungary) and 97% (France) for front seat passengers and between 21% (Estonia) and 90% (Germany) for rear seat passengers. Combining the two categories, Germany has the highest seatbelt wearing rates (94% for drivers and 90% for rear seat passengers) followed by the UK (93% for drivers and 83% for rear seat passengers) (ETSC, 2006a). Table 3-2 provides a breakdown of seatbelt compliance rates among the twenty five EU member states. The moral argument relating to seatbelts appears to have been won. In many countries across Europe safety campaigns have stressed the dangers and selfishness of not wearing a seatbelt. Australian research results from Vulcan and Corben (1998) found that further reductions in road fatalities of up to three per cent are achievable if enforcement levels and safety promotion levels are maintained all year round. Other research from the US suggests that road safety campaigns that target seatbelt wearing as an issue can reduce fatality rates by 15% in some cases (NHTSA, 1998).
Table 3-2 Seatbelt wearing rates in the EU in 2004

<table>
<thead>
<tr>
<th>Country</th>
<th>Wearing rate, front seats (%)</th>
<th>Wearing rate, rear seats (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>77</td>
<td>56 (adults)</td>
</tr>
<tr>
<td>Belgium</td>
<td>66</td>
<td>n/a</td>
</tr>
<tr>
<td>Cyprus</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>75 (driver)</td>
<td>n/a</td>
</tr>
<tr>
<td>Denmark</td>
<td>84</td>
<td>63</td>
</tr>
<tr>
<td>Estonia</td>
<td>75</td>
<td>21</td>
</tr>
<tr>
<td>Finland</td>
<td>89</td>
<td>80</td>
</tr>
<tr>
<td>France</td>
<td>97</td>
<td>68</td>
</tr>
<tr>
<td>Germany</td>
<td>94 (driver)</td>
<td>90 (adults)</td>
</tr>
<tr>
<td>Italy</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Latvia</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Lithuania</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>88 (driver)</td>
<td>72</td>
</tr>
<tr>
<td>Malta</td>
<td>95 (driver)</td>
<td>43</td>
</tr>
<tr>
<td>Poland</td>
<td>71</td>
<td>49</td>
</tr>
<tr>
<td>Portugal</td>
<td>88 (driver)</td>
<td>25</td>
</tr>
<tr>
<td>Slovakia</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Slovenia</td>
<td>81</td>
<td>40</td>
</tr>
<tr>
<td>Sweden</td>
<td>92 (driver)</td>
<td>79</td>
</tr>
<tr>
<td>UK</td>
<td>93 (driver)</td>
<td>83</td>
</tr>
</tbody>
</table>

Source: European Transport Safety Council, 2006a
Figure 3.4 Percentage of European drivers fined or otherwise punished for not wearing a seatbelt between 2000 - 2003

United Kingdom
Ireland
Sweden
Poland
Finland
Denmark
Belgium
Hungary
Portugal
Spain
France
Netherlands
Austria
Germany
Italy
Greece
Czech
Switzerland
Estonia
Slovenia
Slovakia
Croatia
Cyprus

Note: "Don't know" and "no seat belts fitted/not asked" answers were excluded from the analyses.

Source: Institut National de Recherché sur les Transports et leur Sécurité, 2004

Figure 3.4 indicates that Ireland is second only to the UK for the lowest level of drivers who have been penalised for the non-compliance of seatbelt wearing laws. This may suggest that Ireland now has begun to achieve high front seatbelt compliance rates and the focus of enforcement is now moving to other areas. The Swedish, who have high seatbelt wearing rates, have the third lowest level of penalties enforced upon them for non seatbelt wearing.
The penalty points system was rolled out in Ireland in 2003. A driver attitude survey conducted by the National Safety Council found that 90% of male drivers and 93% of female drivers supported the introduction of the penalty points system. The survey found that 86% of respondents agreed with the suggestion that the penalty points system would reduce road deaths. Young drivers (17 - 24 year olds) were slightly more cautious with 77% of these survey respondents believing the penalty points system would reduce road deaths (NSC, 2003b). Four traffic violations were punishable under the penalty points system and non-compliance with the law regarding seatbelt wearing was among the punishable offences. This again has possibly helped the upward trend in compliance rates in Ireland as observed in table 3-3. Eighty two per cent of male drivers and front passengers wore seatbelts in 2005. Ninety two per cent of female drivers and front passengers were found to be wearing seatbelts in 2005 (NRA, 2005a).

Table 3-3 documents seatbelt compliance rates by gender and road class in Ireland. It shows an accelerating upward spiral in compliance rates since 1991. Caution is needed in fully interpreting these figures. Due to the small sample sizes some of these estimates are not statistically significant. Nevertheless there are no other data sources available in this area so tentative observations must be made. Male driver seatbelt compliance rates are improving in tandem with their female counterparts. However, male drivers still consistently exhibit lower compliance levels than female drivers. This gap is beginning to close but at present there is a nine per cent differential between the sexes in terms of front seatbelt wearing rates. It is also noticeable that the second lowest driver seatbelt compliance rate is to be seen on country roads. Country roads are the most dangerous roads by design. However the second lowest seatbelt compliance rates are seen on these roads. This finding applies to both male and female drivers (NRA, 2005a).

European Transport Safety Council (ETSC) experts estimate that audible seatbelt reminders for front seats could raise seatbelt wearing compliance rates to 97% among front seat occupants. Having conducted a cost-benefit analysis on audible seatbelt reminders it was established that the benefits of the device outweighed the installation costs by a ratio of 6 to 1 (ETSC, 2003).
Table 3-3 Driver wearing rates (%) by gender and road class

<table>
<thead>
<tr>
<th>Road class</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Overall (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban National Primary Roads</td>
<td>93</td>
<td>95</td>
<td>94</td>
</tr>
<tr>
<td>Urban National Secondary Roads</td>
<td>71</td>
<td>85</td>
<td>78</td>
</tr>
<tr>
<td>Rural National Primary Roads</td>
<td>82</td>
<td>93</td>
<td>86</td>
</tr>
<tr>
<td>Rural National Secondary Roads</td>
<td>86</td>
<td>93</td>
<td>89</td>
</tr>
<tr>
<td>Cork (Urban)</td>
<td>84</td>
<td>94</td>
<td>87</td>
</tr>
<tr>
<td>Dublin (Urban)</td>
<td>92</td>
<td>95</td>
<td>93</td>
</tr>
<tr>
<td>Dun Laoighaire (Urban)</td>
<td>87</td>
<td>94</td>
<td>91</td>
</tr>
<tr>
<td>Limerick (Urban)</td>
<td>84</td>
<td>91</td>
<td>87</td>
</tr>
<tr>
<td>Small Urban Areas</td>
<td>81</td>
<td>91</td>
<td>86</td>
</tr>
<tr>
<td>Regional Roads</td>
<td>81</td>
<td>91</td>
<td>85</td>
</tr>
<tr>
<td>County Roads</td>
<td>74</td>
<td>87</td>
<td>79</td>
</tr>
<tr>
<td><strong>Driver Total 2005</strong></td>
<td><strong>83</strong></td>
<td><strong>92</strong></td>
<td><strong>86</strong></td>
</tr>
<tr>
<td>Driver Total 2003</td>
<td>82</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>Driver Total 2002</td>
<td>66</td>
<td>80</td>
<td>71</td>
</tr>
<tr>
<td>Driver Total 1999</td>
<td>48</td>
<td>68</td>
<td>55</td>
</tr>
<tr>
<td>Driver Total 1991</td>
<td>49</td>
<td>60</td>
<td>52</td>
</tr>
</tbody>
</table>

**Overall Wearing Rate**

<table>
<thead>
<tr>
<th>(Driver + Front Passenger) 2005</th>
<th>82</th>
<th>92</th>
<th>86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Wearing Rate</td>
<td>81</td>
<td>89</td>
<td>84</td>
</tr>
<tr>
<td>(Driver + Front Passenger) 2003</td>
<td>65</td>
<td>81</td>
<td>72</td>
</tr>
<tr>
<td>Overall Wearing Rate</td>
<td>-</td>
<td>-</td>
<td>57</td>
</tr>
<tr>
<td>(Driver + Front Passenger) 1999</td>
<td>-</td>
<td>-</td>
<td>53</td>
</tr>
</tbody>
</table>

Source: National Roads Authority, 2005a

Within Ireland, rear seatbelt compliance rates trail far behind those of driver and front passenger seatbelt wearing rates. According to a survey conducted by the National Roads Authority in 2003, rear seatbelt wearing rates were estimated to be 46% for adult back seat passengers (NRA, 2003). The breakdown of compliance rates for the two sexes was found to be 49% for female back seat passengers and 41% for male back seat passengers. There has been only been a nominal change in these compliance figures in recent years. A small survey of rear seatbelt compliance rates among adults in 2005 found that 50% of female back seat passengers used a rear seatbelt while 40% of adult male back seat passengers used a rear seatbelt (NRA, 2005a). Male passengers seem to be more resistant to change than female drivers. The low rear seatbelt compliance rates have serious implications for road safety.
Without a seatbelt three out of 4 people will be killed or seriously injured in a 50km/h head-on collision (An Garda Siochana, 2005). While the risk of injury to rear seat passengers is less than that of front seat passengers, Evans (1991) found that even using a rear seat lap belt can reduce the risk of a fatality by around 20% in a crash. This reduction in risk is achieved primarily by preventing the passenger from being ejected from the vehicle.

3.1.3 Drink driving

It is estimated that almost 10,000 road users (pedestrians, passengers or non-drinking drivers) are killed by drink drivers each year in the EU (Anderson, and Baumberg, 2006). However more conservative estimates suggest between 5,000 and 7,500 road fatalities are attributable to drink driving every year in the EU25 (Directorate General for Energy and Transport, 2005a). In any case, alcohol continues to be a significant contributing factor in road crashes worldwide. The extent of alcohol involvement in road accidents varies among countries. In low income countries, alcohol was found to be involved in between 33% - 69% of accidents that resulted in a driver fatality (Odero and Zwi, 1995). The research also found that in many high income countries approximately 20% of fatally injured drivers had a blood alcohol level (BAC) that exceeded the legal limit. The Garda estimate that alcohol is the primary causal factor in 25% of all road collisions and accounts for roughly 33% of fatal collisions in Ireland (An Garda Siochana, 2005). However the National Safety Council estimate that alcohol accounts for 40% of road deaths and at least 30% of all road accidents in Ireland each year (DOHC, 2004). A review of surveys from various EU countries concluded that at any given time, between 1% and 3% of drivers are under the influence of alcohol while driving on EU roads (ETSC, 1995b). These drink drivers account for 40% of all road fatalities in the EU. The research also suggests that in countries where anti-drink driving enforcement is low, a reduction of up to 15% in road fatalities is achievable through increased anti-drink driving enforcement activities. If Random Breath Testing levels were increased throughout the EU to the current EU average (1 breath test per 16 inhabitants) between 2000 and 2,500 lives could be saved per year (ETSC, 1995b).
The Global Burden of Disease study in 2000 found that alcohol ranked as the third largest contributing factor to European ill-health and death. The report, found that alcohol related deaths and disabilities accounted for 9.2% of all the burden of diseases worldwide (Murray, and Lopez, 1996a). The report also concluded that one in four deaths among young men (15 - 29 years) in Europe were alcohol related. Nearly half of alcohol related fatalities among young males were the result of a motor vehicle accident (Rehm et al, 2004). Seventy three per cent of road deaths worldwide were male road users in 2002 (Murray, and Lopez, 1996a).

Based on a review of existing studies, the total tangible cost of alcohol within the EU in 2003 was estimated to be €125 billion. This is equivalent to 1.3% of the Gross Domestic Product of the EU. The cost of alcohol related traffic accidents in terms of property damage alone was estimated to be €10 billion within the EU in 2003 (Anderson and Baumberg, 2006).

Ireland has a well established drink culture. However in recent years the level of alcohol consumption in Ireland has increased dramatically. From 1989 – 1999 there has been a 41% increase in the consumption of alcohol in Ireland. The average alcohol consumption in the EU was 9.1 litres of pure alcohol per capita in 2000. Ireland’s average alcohol consumption in 2002 was 14.2 litres of pure alcohol per capita (DOHC, 2002). Ramstedt and Hope (2003) found that 58% of drinking occasions among Irish men evolved into binge drinking sessions. Irish men were found to be the most prolific binge drinkers in Europe. The study defined binge drinking as (75/80 grams of pure alcohol ingested per drinking session) which corresponds to at least one bottle of wine, seven measures of spirits or four pints of beer. Binge drinking is particularly pronounced among young Irish men between the ages of 18 - 29 years. The data suggest that Irish male teenagers carry on the learned habits of binge drinking even as they grow to driving age. The average number of drinks consumed before injury was sustained was found to be 15 drinks for males and 11 drinks for females (Hope et al, 2005). These data have grave implications for road safety in Ireland as a new generation of binge drinking adolescents come of driving age.
Table 3-4 Drivers of different age groups who drive after drinking, one or more days a week (in percentage)

<table>
<thead>
<tr>
<th>Country</th>
<th>Age ≤24</th>
<th>Age 25 - 39</th>
<th>Age 40 - 54</th>
<th>Age ≥ 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>10</td>
<td>14</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Belgium</td>
<td>16</td>
<td>12</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Cyprus</td>
<td>33</td>
<td>42</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td>Czech Rep.</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Denmark</td>
<td>14</td>
<td>14</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Estonia</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Finland</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>10</td>
<td>19</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Germany</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Greece</td>
<td>22</td>
<td>22</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>Hungary</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ireland</td>
<td>3</td>
<td>11</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Italy</td>
<td>42</td>
<td>33</td>
<td>28</td>
<td>33</td>
</tr>
<tr>
<td>Netherlands</td>
<td>11</td>
<td>8</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>21</td>
<td>29</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Slovakia</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Slovenia</td>
<td>17</td>
<td>21</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>Spain</td>
<td>35</td>
<td>31</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Croatia</td>
<td>16</td>
<td>17</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>Switzerland</td>
<td>18</td>
<td>20</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Average</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Institut National de Recherché sur les Transports et leur Sécurité, 2004
Table 3-4 displays self reported drink driving rates in the EU. Mediterranean countries (where alcohol and in particular wine plays a large part in everyday life) are found to have the highest incidence of drink driving. In contrast, Nordic countries such as Sweden and Finland have very low rates of drink driving; one and two per cent respectively for drivers under 24 years of age. Low rates are exhibited across all driver demographics in both these countries. Nordic countries generally have excellent road safety records while road safety statistics from Mediterranean countries are often less impressive. When respondents were asked if they had driven after driving one or more days in a week, drivers under the age of 24 years of age in countries such as Italy, Spain, Cyprus and Greece responded with drink driving rates of 42%, 35%, 33% and 22% respectively. These countries displayed high drink driving rates across all driver demographics suggesting that drink driving is particularly prevalent in Mediterranean countries (INRETS, 2004).

Research conducted by Lansdowne Market research for the National Safety Council in 2005 found comparable levels of drink driving in Ireland. The survey revealed that 37% of the 500 Irish drivers questioned admitted to have driven after drinking alcohol (NSC, 2005b). However these results contrast sharply with a more recent NSC survey. In 2006, a National Safety Council survey revealed that significant progress had been made on changing Irish attitudes towards drink driving from 2000 - 2006. During this period there was a 63% increase in respondents saying that drivers should never drink and drive. It also found that 87%of respondents considered drink driving to be an extremely shameful behaviour. Seventy seven per cent of respondents wanted to see more severe penalties for drink driving offences (NSC, 2006b).

Table 3-5 details the different legal blood alcohol levels in European countries and the level of alcohol involvement in road accidents. It is worth noting that many countries don’t have any way of accurately assessing the level of alcohol involvement in motor vehicle crashes. The scale of this information gap becomes apparent from table 3-5.
<table>
<thead>
<tr>
<th>Year</th>
<th>0-9y</th>
<th>10-29y</th>
<th>30-64y</th>
<th>65+</th>
<th>VA</th>
<th>TN</th>
<th>TX</th>
<th>CA</th>
<th>CO</th>
<th>UT</th>
<th>WA</th>
<th>OR</th>
<th>NV</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>2006</td>
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Table 3-5: Statistics for alcohol involvement in road accidents within the EU.
The risk involved in drink driving increases with both the amount of alcohol consumed and the frequency of high volume drinking occasions (Midanik et al, 1996). The risk also rises in tandem with blood alcohol concentration levels (Hingson and Winter, 2003). The legal blood alcohol concentration (BAC) for drivers in Ireland is 80mg/100ml. However at a fraction of this (BAC) level, driver impairment is found to result. The Grand Rapids study by Borkenstein et al (1964) laid the foundation for the widely adopted 0.08g/dl (80mg/100ml) BAC seen in many countries including Ireland. However new research findings (as seen in figure 3.5) suggest that the risk of an accident is much higher than previously estimated (Compton et al, 2002; Moskowitz et al, 2002). Research has found that male and female drivers of all ages who had BACs’ of between 20mg/100ml and 49mg/100ml were at least three times more likely to be involved in a fatal single vehicle crash than sober drivers. This risk was found to increase to at least six times with BACs’ between 50mg/100ml and 79mg/100ml and eleven times with BACs’ between 80mg/100ml and 99mg/100ml (Zador et al, 2000)\(^{16}\). Even relatively low BAC’s (20mg/100ml of alcohol) can impair driving if the driver is suffering from sleep deprivation (Anderson and Baumberg, 2006 p. 146).

\(^{16}\) Blood alcohol levels converted from original notation to mg/ml notation used in Ireland.
3.1.3.1 The effects of alcohol on driving performance

At one eighth of the legal Irish BAC limit (10mg/100ml) a driver’s ability to divide their attention between two or more tasks is reduced according to National Safety Council literature. At one quarter of the legal Irish BAC (20mg/100ml) the driver can experience drowsiness and retardation in cognitive skills such as sign reading. Psychomotor skills such as body balance and body movement which dictate the driver’s perceptual ability to control the car are also compromised (Moskowitz and Fiorentino, 2000). A study by Borkenstein et al (1964) found that in high volume traffic, where elevated levels of attention and concentration are required, a BAC of between 10mg/100ml and 40mg/100ml is associated with an increased risk of an accident.

The research by Moskowitz and Fiorentino (2000) suggests that at a BAC of between 20mg/100ml - 50mg/100ml, judgement levels are already impaired. Rudimentary decisions such as gauging distance and the speed of oncoming vehicles is affected. As a result the driver is more likely to engage in risky overtaking manoeuvres. At a 50mg/100ml BAC level there is twice the chance of a road traffic collision occurring in relation to the crash risk associated with a zero BAC level. The research found that reaction times are slower among drivers with BAC’s of between 50mg/100ml and 80mg/100ml. Driver perception is also impaired as are the vigilance levels of the driver. At roughly three quarters of the Irish legal BAC (50mg/100ml) the driver’s tracking ability (includes the ability to negotiate the vehicle within the driver’s lane) is adversely affected. Having reviewed 112 studies Moskowitz and Fiorentino found that 80mg/100ml was the BAC level at which 50% of behavioural tests indicated consistent driver impairment. The review provided strong evidence to indicate that driver impairment results with any departure from a zero blood alcohol concentration level (Moskowitz and Fiorentino, 2000).

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17 "Impairment and blood alcohol concentration by behavioural area” fact sheet.
An interim report published in May 2002 by the government appointed Strategic Task Force on Alcohol recommended that the legal BAC for Irish drivers be reduced from 80mg/100ml to 50mg/100ml. It also proposed the implementation of random breath testing and the immediate licence suspension for drink drivers which it stated had proved highly effective in other countries (DOHC, 2002). The task force also recommended that a zero BAC level be enforced on provisional drivers considering the greater effects alcohol has on these typically younger drivers (Zador et al, 2000). However Ireland was among the few EU countries who opposed the introduction of a pan European legal BAC of 50mg/100ml as proposed by EU Transport Commissioner Loyola de Palacio in 2000. Despite the decision by the Irish government not to endorse this proposal, a survey in 2002 later revealed that 68% of Irish people surveyed supported the proposal (NSC, 2002). The survey also found that 84% of respondents considered drink driving to be the biggest threat to Irish road safety. Figure 3.6 clearly illustrates that the majority of drunk drivers detected on Irish roads have very high blood alcohol levels. This trend has been shown to be consistent over time.

**Figure 3.6 Blood alcohol levels found in Irish drivers 1997 - 2003**

Source: Medical Bureau of Road Safety, 2003
3.1.3.2 The effects of alcohol on young drivers

Crash risk and mortality rates can be measured in risk curves. Risk curves are generally steeper for serious and fatal crashes, for single-vehicle crashes, for drink drivers and for young people (Zador, 1991; Jonah, 1986; Mayhew et al, 1981). Figure 3.7 demonstrates the relationship between age and the corresponding risks associated with varying BAC levels. Young people are most at risk after the consumption of alcohol due to their susceptibility to its intoxicating effects (see figure 3.7). This is chiefly due to biochemical considerations which find young people possessing a lower alcohol tolerance than older drivers. A variety of other factors such as muscle mass, speed of alcohol consumption, if the person has eaten prior to drinking, etc also dictate the level of intoxication. According to research by Zador et al (2000) cited by Bedford et al (2006), drivers over 35 years of age are 11.4 times more likely to be fatally injured in a crash when their blood alcohol levels ranged from 80mg/100ml (Irish legal limit) to 100mg/100ml. However for young drivers aged between 16 - 20 years, the relative risk of a fatal crash increases by 51.9 times when their BAC level is within the 80mg/100ml to 100mg/100ml BAC range.
Bedford et al (2006) published a report for the Health Service Executive in late 2006 providing the first detailed national data relating to alcohol involvement in road collisions within the Republic of Ireland. The report entitled “Alcohol in Fatal Road Crashes in Ireland” analysed data gathered on road fatalities in 2003. The report represents a vast improvement on the previous crude estimates of alcohol related crashes in Ireland. Previous estimates were arrived at by categorising all collisions between 9 p.m. and 3 a.m. as alcohol related crashes (Bedford et al, 2006). For the purposes of the report an alcohol related crash was defined as any collision where the driver involved in a crash had a blood alcohol concentration (BAC) of over 20mg/100ml (or the equivalent result in urine or breath tests). Research has found that any increase in alcohol consumption above this level impairs driving (Desapriya et al, 2003; Perrine et al, 1989).

There were 301 fatal crashes resulting in some 335 road fatalities in the Republic of Ireland in 2003. Of these 301 fatal road crashes, the study found that 110 (36.5%) of these crashes were alcohol related (Bedford et al, 2006). The study also found that 64 (34%) of the drivers killed in 2003 were over the legal alcohol limit. Furthermore, the research indicated that 76 (40.3%) of the drivers killed had blood alcohol levels in excess of 20mg/100ml. The results of the study indicated that 89.7% of the drivers who were involved in fatal, alcohol related collisions were male drivers (Bedford et al, 2006). Male drivers between the ages of 19 - 34 years were found to be the most likely to be killed on Irish roads whilst under the influence of alcohol. The report also found that young male passengers between 15 - 24 years of age exhibited the highest mortality rates of all passengers. The data established that 46% of male passengers were killed in crashes where a driver’s alcohol level was a contributory factor in the crash. In 2003, approximately one in five of all road fatalities were passengers (20.9%). Male passengers represented 55.7% of all passengers killed in 2003 (Bedford et al, 2006).
3.1.3.3 Public perception of drink driving law enforcement

Figure 3.8 taken from the SARTRE 3 (Social Attitudes to Road Traffic Risk in Europe) survey neatly illustrates a number of driver perceptions in the EU. The survey took place from September 2002 - April 2003. Across the EU the average perceived likelihood of being checked for speeding and drink driving was found to be 18% and 9% respectively. In contrast, Irish driver perceptions of the likelihood of being checked for speeding and drink driving were found to be 8% and 0.9% respectively. These levels are dramatically lower than the average EU levels. The ratios for the expectation of being checked for both offences varied widely across Europe. The ratios indicate that Irish people believe they are nearly nine times more likely to be checked for speeding than for drink driving (8.0:0.9 = 8.88). In Sweden the ratio was as low as (2.9:2.4 = 1.2) while in the UK it was as high as (38.0:1.6 = 24) (INRETS, 2004).

Figure 3.9 displays the percentage of drivers in each surveyed country who have been checked either “once only” or “more than once” for drink driving in the three years preceding the study. The graph seems to suggest that Irish perceptions of low enforcement levels are correct. Ireland is second only to Italy in terms of low enforcement levels for drink driving. The findings from the SARTRE 3 report highlight the fact that there are low levels of actual enforcement in Ireland regarding drink driving. The subjective threat of the enforcement of anti drink driving laws within Ireland was also low. However this survey took place before the adoption of Mandatory Alcohol Testing (MAT) in Ireland. As such, caution is needed in interpreting these qualitative data. Detection levels for drink driving offences in Ireland has increased since the implementation of Random Breath Testing. In the first six months of 2006, some 7,863 drink driving offences were reported by the Gardai. This represents a 23% increase in drink driving offences when compared to the same period in 2005 (Bedford et al, 2006). Despite the elevated levels of enforcement it appears people are still willing to drink and drive. However the initial dip in road fatalities following its roll out is promising. Research into the effectiveness of Random Breath Testing has documented reductions in alcohol related road fatalities of up to 71% in some cases (Peek-Asa, 1999).
Figure 3.8 European driver perceptions relating to the likelihood of being checked for drink driving and speeding on a typical journey

Source: Institut National de Recherche sur les Transports et leur Sécurité, 2004

Figure 3.9 Drivers checked for drink driving in the last 3 years (once or more) %

Source: Institut National de Recherche sur les Transports et leur Sécurité, 2004
3.2 Secondary contributory factors to young male driver deaths and injuries

3.2.1 Dangerous driving

There are a variety of dangerous driving behaviours that can be perpetrated by a driver. Some of these dangerous behaviours are more prevalent among young drivers. The SARTRE 3 study profiled the most dangerous drivers on European roads. The study found the most dangerous drivers on European roads were 18 - 24 year old drivers. It found that, on average, ten per cent of young drivers (18 - 24 year olds) believed they are dangerous drivers. This is over twice the perceived rate found among any other age profile. These drivers were usually single students who had a secondary education and drove cars with an engine capacity of between 1300cc - 1900cc (INRETS, 2004). Young male and female drivers were found to drive vehicles that were between 6 - 10 years old. The age of the vehicles is speculated to contribute to the elevated fatality rates among younger drivers given that older cars typically offer the occupants less protection than newer cars. While young drivers shared many personal characteristics, gender specific differences did manifest themselves in the data.

It was found that young male drivers were more likely to admit to driving in a dangerous manner than their female counterparts. There was also a marked contrast in the levels of driving experience between the two sexes. High risk female drivers were generally found to have driven less than 5,000km a year while high risk young male drivers usually drove in excess of 30,000km per year. Therefore it has been suggested that there are different reasons why both sexes consider themselves to be dangerous drivers. In the case of female drivers the most probable reason is a lack of confidence which stems from their perceived lack of driving experience. Therefore female drivers may feel that they are dangerous drivers due to a general underestimating of their driving ability. The same cannot be said for young male drivers who often drive over six times the distance of female drivers. Young men who contend that they are dangerous drivers are more likely to base this opinion on their driving style rather than any deficiency in driving experience. Therefore young male drivers, in contrast to young female drivers are more likely to overestimate their driving skills. This often results in dangerous driving behaviours.
Figure 3.10 highlights the fact that Irish drivers believe themselves to be safer drivers than their fellow Europeans. The bar chart indicates that 74% of Irish drivers believe that they are less dangerous drivers than other drivers on the road. This high level of confidence in driving ability may suggest that Irish people are overconfident in their own driving skills. This in turn would lead a driver to believe that road accidents are the fault of lesser drivers than themselves. In contrast, Nordic countries such as Sweden and Finland display much lower driver confidence levels and are observed with rates of 53% and 45% respectively. Both these countries however have excellent road safety records. Young male drivers are often characterised by high levels of confidence in their driving ability. They are also generally found to exhibit a greater risk-taking propensity in terms of driving style than usually observed among the general driving public. Within an Irish context young male drivers therefore exhibit very high levels of driver confidence given the fact that the confidence base of the driver population is already quite high. The survey also revealed that young drivers in Ireland share joint first place with young UK drivers for their contention that they are in fact relatively safe drivers. Only five per cent of young drivers in both countries believed that they were dangerous drivers despite overwhelming evidence to the contrary (INRETS, 2004).

**Figure 3.10 Percentage of European drivers who “Think their own driving is less dangerous compared to other drivers, a bit or a lot”**

Source: Institut National de Recherché sur les Transports et leur Sécurité, 2004
3.2.2 The effects of using a mobile phone while driving

Research by the National Highway Traffic Safety Administration (NHTSA) suggests that driver distraction and inattention could play a role in 20% - 30% of all road crashes (Wang, Knipling and Goodman, 1996). A survey of 1,000 drivers in the UK found that 30% of drivers used a mobile phone while driving and one third of these drivers often did so. The study found that young male drivers and high mileage drivers were most likely to use a phone while driving (Green Flag, 2000). Observational studies in the US, Australia and the UK found that there are typically between 1% - 4% of drivers using a mobile phone while driving at any given time of the day (TRL, 2002; Horberry et al, 2001; Utter, 2001). These studies consistently showed that male drivers and young drivers (younger than 30 years of age) tended to use their mobile phones more frequently while driving than any other drivers. Drivers under 30 years of age were almost twice as likely to use a mobile phone while driving when compared to older drivers (TRL, 2004).

An extensive three year study of 223,137 road crashes in the state of Oklahoma between 1992 and 1995 found that both the presence of, or use of a mobile phone in a car, statistically increased the risk of a traffic fatality. The study determined that drivers who used their mobile phones while driving were roughly nine times more likely to be involved in a fatal crash than drivers who refrained from using their phones (Violanti, 1998). There are five readily identifiable effects of mobile phone use on driving performance. The five most commonly occurring effects in the data are; slower reaction times to traffic signals and signs, decreased general and situational awareness, risky decision making, slower reaction times in braking situations, and risk compensating behaviours (Dragutinovic and Twisk, 2005).

An online survey of 1,998 people was conducted by W5 Marketing Intelligence for the National Safety Council (NSC) in 2003. The survey, run in partnership with carbuyersguide.ie found that 22% of respondents were involved in a collision or had a near miss due to driving too close to the vehicle in front of them. This activity, known as tailgating, was found to be more prevalent among drivers who used their mobile phones while driving (NSC, 2003a). Research has shown that slower reaction times and missing traffic light signals are more likely when driving while using a phone.
Slower braking times are also a symptom of phone use while driving (Hancock, Lesch and Simmons, 2003). Research collected in a SWOV literature review found that reaction times in braking situations were retarded by between 0.3 - 0.7 seconds when using a mobile phone. Research also finds that situational awareness (perception, comprehension and projection) is impaired when using a mobile phone while driving. Some research has drawn parallels between the impairment levels seen among drivers using a mobile phone and those observed among drink drivers. According to Redelmeier and Tibshirani (1997a) "the relative risk of being in a road crash while using a mobile phone is similar to the hazard associated with driving with a blood alcohol level at the legal limit" (Dragutinovic and Twisk, 2005 p.35). However in a subsequent article the researchers conceded that the cumulative impairment effects of alcohol exceed those of mobile phones. This is due to the relative brevity of phone calls when compared to the longer lasting effects of alcohol. However their research did still indicate the risk of a collision when using a mobile phone was four times higher than the risk found among drivers who refrained from using their mobile phones (Redelmeier and Tibshirani, 1997b).

Riskier decision making is another detected outcome of driving while using a mobile phone. These risky driver behaviours typically manifested themselves as shorter following distances, a failure to adjust to dangerous driving conditions and less speed adjustments (Cooper et al, 2003). Research has also found that drivers engage in risk compensating behaviours such as driving more slowly when using a mobile phone. It is hypothesised that this behaviour is used to reduce the performance goals in driving and consequently decrease the driving task demand and cognitive load placed on the driver (Tornros and Bolling, 2005). While the physical distractions associated with using a phone are minimised with hands free devices (e.g. dialling, holding, reaching for the phone, and steering the vehicle with one hand) the distracting cognitive component relating to phone calls is still present (Dragutinovic and Twisk, 2005). A number of studies have found that hands-free devices do not exhibit any risk reduction effects (Strayer, Drews and Crouch, 2004; Consiglio et al, 2003). There is a worry among road safety experts that drivers will place too much confidence in hands-free phones which they may consider to be safer.
Numerous studies have established a link between fatigue and road accidents (Mahowald, 2000; Philip et al, 1999). Some estimates suggest that up to approximately 20% of crashes can be linked to fatigue (Horne et al, 2003; Garbarino et al, 2001; Sagberg, 1999; Horne and Reyner, 1995a). However a research review by Connor et al (2001) takes issue with some of these estimates and points to the questionable causality of the reported collisions. While there may be some dispute as to the extent of the problem there is little doubt among road safety experts that there is a strong relationship between sleepiness and crash involvement (Connor et al, 2002).

Having reviewed a number of studies, the SWOV Institute of Road Safety Research suggests that conservative methodologies estimate sleep deprivation to account for between 10% - 15% of all severe crashes (SWOV, 2004). An earlier study in the US found that as many as 7% - 10% of all car accidents may be caused by drivers who fell asleep at the wheel (Hoback, 1959). The Irish Road Safety Authority found that the highest number of road fatalities occur on Irish roads around 6.00pm in the evening. It has suggested that fatigue may be a major contributory factor to road accidents during this time of the day as people are driving home after a tiring day at work (R.S.A., 2007). Research has established a statistically significant relationship between the reaction times of drivers and their state of tiredness (Corfitsen, 1999; Bohlin and Kjellberg, 1973).

Research has established that young drivers are particularly susceptible to fatigue related road accidents (McConnell et al, 2003; Lyznicki et al, 1998). Male drivers have been found to be more frequently involved in night-time car accidents (Lyznicki et al, 1998; Horne and Reyner, 1995b). This is possibly due to young male drivers being the largest driver group on the roads during the early morning hours (Horne and Reyner, 1995b). While truck drivers are a high risk group in terms of sleep related accidents, research by Lyznicki et al (1998) found that young drivers represent a much larger risk group among night-time drivers. Studies suggest that young drivers are four times more likely to be involved in a crash where the driver falls asleep at the wheel than other drivers. The research also found that young drivers account for nearly two-thirds of all sleep related crashes (Maycock, 1996; Horne and Reyner, 1995b; Pack et al, 1995).
Data from a range of studies suggest that young male drivers under 30 years of age are predisposed to early morning sleep related crashes (McConnell et al, 2003; Lyznicki et al, 1998; Horne and Reyner, 1995b). Young drivers (18 - 24 years of age) are 5 - 10 times more likely to crash at night than during the afternoon (Akerstedt and Kecklund, 2001). Research suggests that fatigue related crashes are likely to be more severe and display higher mortality rates than other accident types (Akerstedt and Haraldsson, 2001; Akerstedt, 2000; Pack et al, 1995). Summala and Mikkola (1994) suggest that young drivers’ inexperience and scant knowledge of fatigue coping strategies may account for the relative high fatigue related crashes among young drivers. However research indicates that when drivers become very tired it is impossible to counteract sleep and coping strategies become redundant (Dinges, 1992; Dinges and Kribbs, 1991).

Findings from Dinges (1995) demonstrated that young drivers do not consider fatigued driving to be a serious issue affecting road safety. However young drivers are not unique in this regard. Car drivers generally underestimate the probability of nodding off when sleepy (Reyner and Horne, 1998). Data gathered by Carskadon (2002) indicated that 67% of the 16 - 20 year old drivers questioned had driven while sleepy. Large proportions of the general driving public have also admitted to driving while feeling tired (Powell et al, 2002). Young drivers demonstrate a diminished ability to perceive risk in a variety of driving environments (Sivak et al, 1989) and are prone to overestimating their vehicle handling skills (Gregersen and Bjurulf, 1996).

Some studies have demonstrated that drivers can become aware of their weakened driving performance (Fairclough and Graham, 1999) and can identify when they are feeling sleepy (Reyner and Horne, 1998; Horne and Reyner, 1995b). However in the case of the later driving simulator study, drivers continued to drive until they crashed (Reyner and Horne, 1998). Among the high risk driver types identified by Connor et al (2002) were drivers who had less than five hours sleep in the last 24 hours and drivers who drove between 2 a.m. and 5 a.m. in the morning. Young drivers are likely to fall into one or both of these driver categories. Additional factors such as age, medical condition, drug use and alcohol consumption are all believed to influence the probability of a sleep related crash (SWOV, 2004).
3.2.4 Drug driving in Ireland

Since the 1961 Road Traffic Act, driving under the influence of drugs has been a statutory offence under Irish statute law. The Irish government's first road safety strategy, introduced in 1998, identified the need for research into the area of drug driving. Accordingly the Medical Bureau of Road Safety (MBRS) was commissioned by the Department of Environment and Local Government to carry out a nationwide survey on drug driving in Ireland in 2000. The Road Safety Action plan of the European Union, adopted in June 2003, stated that: “special attention should be accorded to the increasing problem of driving under the influence of drugs” (Cusack et al, 2003 p.3).

From 2000 – 2001 the MBRS conducted a nationwide study on drug driving. The survey tested 1,000 samples that were found to have an alcohol level over the Irish legal limit and 1,000 samples found to be under the Irish legal limit. Both groups were tested for the presence of drugs so as to facilitate a comparative analysis. The survey found that 60% of those samples with essentially zero alcohol levels (less than 10mg/100ml) tested positive for one or more drugs. Ninety per cent of the samples in the study were taken from male drivers whom the Gardai had stopped. This high representation of male drivers in the survey suggests that the Gardai are focusing their detection efforts on male drivers whom they consider to be a high risk group (Cusack et al, 2003).

As the levels of alcohol increased in the tested samples a general downward trend in drug taking was observed in driver samples (Cusack et al, 2003). Only 11.1% of drivers with a blood alcohol level of greater than 200mg/100ml tested positive for other drugs.

Figure 3.11 highlights the high trend in drug taking among young Irish drivers when compared to older Irish driver demographics. Young drivers (under 24 years of age) were found to represent 24.9% of all drug taking drivers (Cusack et al, 2003).
Figure 3.11 Prevalence of drug taking by age in Irish drivers

![Graph showing prevalence of drug taking by age in Irish drivers.](image)

Source: Cusack et al, 2003

Figure 3.12 Prevalence of drug taking by age and BAC level in Irish drivers

![Graph showing prevalence of drug taking by age and BAC level in Irish drivers.](image)

Source: Cusack et al, 2003
Figure 3.12 again examines the relationship between age and drug driving. The likelihood of drug taking appears to be closely linked to age. Young drivers (under 24 years) are the most prolific drug users. Drink drivers are found to exhibit lower drug usage rates than sober drivers. Owing to the high inclusion rate of male drivers in the survey samples (90.3% males in those under the limit and 93.1% of those over the limit), the findings clearly indicate that young male drivers are a high risk group on Irish roads. Young (predominantly male) drivers were found to represent the highest drug driving demographic among both drink drivers and sober drivers. Young drivers represented 48.7% of drug taking drivers who abstained from alcohol (Cusack et al, 2003).

Figure 3.13 permits a comparison of drug driving as a function of gender. While male drivers are over represented in the survey there is little difference between the sexes when the detection figures are weighted and expressed as a percentage of the overall tested samples. The only significant difference appears to be among drivers who are under the legal alcohol limit. In this category, 33.8% of male drivers were found to be drug drivers as opposed to the 26.8% of female drivers (Cusack et al, 2003). Of all the driver samples in the survey it was determined that 15.8% of the samples from male drivers tested positive for the presence of drugs.

Figure 3.14 highlights the fact that young drivers are again found to be the most prevalent drug impaired drivers on Irish roads. The tests indicated that six out of every ten of these drug drivers tested positive for the presence of cannabinoids (cannabis). Young drivers were found to be the highest users of cannabis, amphetamines and m-amphetamines. Cannabis was found to be the most popular drug used among drug drivers. The results indicated that 20.9% of drivers under the legal alcohol limit were found to be using cannabis (Cusack et al, 2003). Among young drivers, the usage rate is similar with almost 20% of young drivers using the drug. Undoubtedly harder illicit drugs have a role to play in Irish road accidents and their impairing effects may well be more pronounced than cannabis. However due to the high usage of cannabis among drivers and in the absence of more recent drug driving data, cannabis must be considered the most dangerous illicit drug in terms of Irish road safety.
Figure 3.13 Prevalence of drug taking by gender/BAC level in Irish drivers

Source: Cusack et al, 2003

Figure 3.14 Prevalence of different drug usage among Irish driver age groups

Source: Cusack et al, 2003
In 2002, the National Advisory Committee on Drugs conducted a large cross sectional population study of drug use in Ireland. Four thousand nine hundred people between 15 - 65 years of age were interviewed (NACD, 2005). The findings of the study found that approximately 17% of the respondents reported some cannabis use. Male respondents were found to be twice as likely to report cannabis use. The research determined that young adults (less than 35 years old) were roughly 4 - 5 times more likely to be recent cannabis users when compared to older adults. It was established that 24% of young adults (15 - 34 years olds) reported a lifetime exposure to cannabis. These findings are supported by earlier research which also found young people to be the most prolific cannabis users in Irish society (Bryan et al, 2000).

According to the MBRS, the typical drug driver is a young, sober, urban, male driver out driving between the hours of 6 a.m. - 9 a.m. (Cusack et al, 2003). This national drug driving survey by the MBRS has shone a light on the escalating problem of drug driving on Irish roads. As is so often the case in road safety issues, young male drivers are again at the heart of the problem. Despite the fact that some studies have not established a link between drug use and crash severity (Smink et al, 2005) there is a strong link between drug use and road accidents (Movig et al, 2004; Marquet et al, 1998; Honkanen et al, 1980).

3.2.5 The effects of music on driving behaviour

Research has suggested a link between loud music and impaired driving (Beh and Hirst, 1997). Their research involved evaluating 60 subjects between the ages of 20 - 28 years. The subjects were asked to perform simulated driving tests in a driving simulator under three different noise conditions; silence, rock music played at 55 decibels (quiet music) and the same rock music played at 85 decibels (loud music). The results showed that when listening to quiet and loud music the test subjects stopped 50 milliseconds quicker at red lights than when driving in silence. The experiment also found that drivers listening to quiet music responded to objects in their central field of vision 50 milliseconds faster than those driving in silence. However those who drove while listening to loud music were found to be 100 milliseconds slower than those listening to quiet music and 50 milliseconds slower
than drivers who drove in silence. When the drivers were tested for their reaction times to objects entering their periphery vision, the subjects showed a delayed reaction time of 100 milliseconds when listening to loud music. The overall results suggest that quiet music has a beneficial arousal effect which translates into faster reaction times. By contrast, loud music acts as a distraction and retards reaction times especially in difficult driving situations where there is a high mental load on the driver.

There has also been research to suggest that high tempo music promotes dangerous driving (Brodsky, 2002). It was found that drivers listening to high tempo music (up to 120 beats per minute) were more likely to engage in risky driver behaviour and were twice as likely to run red lights. Accidents were also more prevalent among the subjects who listened to faster tempo music. The experiment also found that drivers listening to music did not experience the same fluctuation in heart rate as those drivers who drove without music. It was concluded that music makes drivers less alert to driving hazards and as a result their heart rate remained low throughout the simulated journey (Brodsky, 2002). Due to the limited nature of the experiment (driving simulator) and the small sample size (28 subjects) the findings must be treated with caution.
Chapter 4

Psychological profile of young male drivers
4.1 Profile of young male drivers

Young drivers are generally regarded to be a high risk road user group. They are more frequently involved in traffic accidents when compared to older drivers (Laapotti et al, 2001; Bjørnskau, 2000). Drivers under 25 years of age account for 27% of driver fatalities in the OECD\(^\text{18}\), despite representing only ten per cent of the population in these 30 countries (JTRC, 2006). Young drivers’ high involvement in road accidents can be attributed to a host of factors. These factors stem from social, physiological, psychological, cognitive and behavioural components which predispose young drivers to high road accident rates.

4.2 Age and driver experience

Research has found that the probability of a crash is six per cent lower for 18 year old drivers when compared to 17 year old drivers (Maycock et al, 1991). The research also established that there was a 30% reduction in the probability of a crash after the first year of driving. Research has found that (even when mileage variations were taken into account) young drivers were substantially less likely to have a car crash in the second six month period after passing their driving test when compared to the first six months immediately after passing their test (Maycock, 2002; West and Hall, 1998;). Further evidence of the positive effects of driving experience has also been found by Waller et al (2000) who observed an eight per cent reduction in serious driving offences per year after a driving licence had been obtained. Cooper et al (1995) determined that driver experience/inexperience was a better predictor than age when accessing the likelihood of a crash. The study found that drivers with only one year of driving experience (usually, but not always the youngest drivers) have the highest crash rates. Driving experience is often strongly related to driver age. In essence, the research suggests that it is driving inexperience and not driver age that determines the level of risk associated with the driver. Furthermore, research by Shope et al (1996) suggests that inexperience and risk taking are two factors that are strongly associated with young driver collisions.

\(^{18}\) Organisation for Economic Co-Operation and Development.
According to Jonah and Dawson (1987) young drivers frequently engage in risky driving. However their research indicated that young age and inexperience are more important than driver risk taking propensity when determining the driver's risk of a crash. Similarly, Vernick et al (1999) found that the most important factor when evaluating driver risk is not driving skill but rather driver judgement. Driver judgement is often associated with age and experience. Benda and Hoyos (1983) investigated hazard perception among drivers. They found that inexperienced drivers utilised simple models which focused on individual variables. Inexperienced drivers typically only considered individual factors such as the weather and road layout etc when appraising risk. However more experienced drivers demonstrated a greater appreciation of the real risks present by taking a more holistic view of a driving situation. Young drivers' tended to compartmentalise the risks and generally failed to appreciate the dangers involved. Male drivers have been found to be more likely to engage in risky driving behaviour than female drivers (Forsyth, 1992a; Forsyth 1992b Elliot, 1987). This may be due to different systems of evaluating risks between the genders. Research has found that risk perception is not as acute among male drivers. Studies have shown that male drivers perceive the risk involved in different driving situations as being much lower than their female counterparts (DeJoy, 1992; Mundt et al, 1992; Brown and Copeman, 1975).

Research conducted by Begg and Langley (2001) indicates that young drivers tend to "mature out" of risky driver behaviours at around 24 years of age. This trend could possibly be attributed to improved hazard recognition and better driver skills gained through driving experience. This "maturing out" effect has also been documented by other studies. Young drivers less than 25 years of age were found to exhibit a much higher risk of being involved in a motor vehicle crash than older drivers (Land Transport Safety Authority, 2002; Williams and Carsten, 1989). However, Cooper (1987) and Jonah and Dawson (1987) actually found that risky driving increased in prevalence over time among young drivers. The authors found 16 - 18 year old drivers were less likely to engage in risky driving than 18 - 24 year old drivers. This finding can be interpreted in a number of ways but may suggest that risky driving is a learned phenomenon. Another interpretation is that risky driving may be the result of increased driving experience which elevates driver confidence levels to such an extent as to promote risky driving.
4.3 Personality

While women’s role in society is rapidly evolving there still remains the societal view that women’s traditional gender-role is non-competitive, passive and risk averse. This contrasts starkly with the traditional role theory ascribed to men who are expected to demonstrate aggression, competitiveness and risk taking characteristics (Simon and Corbett, 1996). Society is in itself a product of the culture in which it resides. Studies that examined the masculine and feminine orientation of different cultures found that countries such as the US were found to have a strong masculine orientation which promoted gender role expectation (Hofstede, 1998; Hofstede, 1991). Ireland is also considered to exhibit a masculine orientation. Nordic countries in contrast were found to have a more feminine orientation. Road safety records in Nordic countries are generally very impressive. Henley (2004) asserts that popular culture seeks to reinforce risky driving and speeding in particular. It appears young male driver crashes are a symptom of the roles, interests, lifestyle, and motives society has come to expect from young men (Schultz, 1994).

Some cultures have a very liberal approach to the portrayal of dangerous driving in the mass media. Greenberg and Atkin (1983) conducted a five year content study of driving scenes in television programmes in the US. It was found that 20% of all driving scenes in the study depicted a chase scene where dangerous driving behaviours were being portrayed. The content analysis of television programming also found that nine out of ten drivers portrayed in these television shows were male and three quarters of these drivers were in their twenties and thirties. Other countries however are much more cognisant of the effects of the mass media. New Zealand is among the few countries that has set specific codes of advertising for car advertisements. New Zealand does not permit adverts that are found to be “glorifying excessive speed.” Similarly in the UK, the Independent Television Commission (ITC) sets stringent standards in relation to automobile advertising. The ITC stipulate that “speed is not an acceptable platform for automotive advertising nor may advertising present driving at high speeds as exciting or exhilarating, nor portray driving as if it were a competitive sport... conversely, there may be no suggestion that driving safely or cautiously is staid, dull, or boring”. Any infringement in this code can result in the advertisers being asked to drop the advert.
The personality of a driver strongly influences how an individual operates their vehicle. Burgess (2000) concluded that the personality of an individual not only influences the person's driving behaviour but it also influences how the person responds to social pressures designed to curtail their dangerous driving. Research indicates that locus of control, sensation seeking, normlessness and driver anger are factors which moderate risky driving behaviour (Deffenbacher et al, 2001; Burns and Wilde, 1995; Montag, 1992).

Normlessness relates to an individual's perception of the need to obey rules. A scale for normlessness was developed by Kohn and Schooler (1983) which permitted a person's level of normlessness to be measured. At one end of the scale was the belief that "it was acceptable to do anything (one) could get away with", while the opposite end of the scale found a person "holding responsible moral standards".

The locus of control of an individual can be said to be either "internal" or "external". A person with an internal locus of control generally looks internally (at personal factors) for a reason as to why an event occurred. A person with an external locus of control is more likely to blame "external" (environmental) factors for an event.

Montag and Comrey (1987) showed that drivers who were found to possess driver internality (DI) traits were likely to be emotionally stable, conforming, compulsive, cautious in their behaviour and unlikely to be involved in an accident. In contrast, subjects possessing driver externality (DE) traits demonstrated lower levels of conformity, low emotion stability, were egotistical and were more likely to be involved in a collision.

West et al (1993) focused on social deviance which the authors considered to be the root cause of the risky driver behaviour. Some of the most commonly cited personality characteristics for risky drivers include sensation seeking, mild social deviance, and anxiety. These character traits have been shown to be associated with risky driver behaviour and accident involvement (Ulleberg and Rundmo, 2003; Jonah, 1997; West and Hall, 1997; Wilson and Jonah, 1988).
4.4 Sensation seeking

The sensation seeking scale, first developed by Zuckerman (1979), has been used extensively in road safety research. Sensation seeking is seen as a personality trait of individuals who indulge in thrill seeking. According to Zuckerman (1994), sensation seeking is a trait that sees people accepting a variety of different possible risks in order to seek out and experience exciting and intense new sensations and events. The term “sensation seeking” refers to individual differences in optimal levels of arousal and stimulation, manifested as a character dimension (Zuckerman, 1994). It also has a biological component. It is regulated by neuroregulators such as dopamine and norepinephrine (Zuckerman, 1999). This biological dimension highlights the fact that sensation seeking is a more complicated concept than a purely psychological predisposition. Thrill seeking behaviour in a car manifests itself as risky driving behaviour. It was posited by Burns and Wilde (1995) that sensation seeking could be used as a predictor for repeat road safety offenders. However the research failed to find any link between sensation seeking and traffic violators. However, of the 38 studies reviewed by Jonah (1997), only four studies failed to yield a positive link between sensation seeking and risky driving. Risk taking in young people is used as a means of experiencing strong or exciting sensations (Green et al, 2000).

High sensation seekers have been found to be able to maintain normal performance levels in a primary task, despite distractions by their own spontaneous thoughts (Shaw and Giambra, 1993). Research suggests that high sensation seekers display higher levels of concentration on selective and divided attention tasks than low sensation seekers. However they do not have the same ability as low sensation seekers to sustain their attention (Zuckerman, 1979). These findings were later supported by research from Martin (1985) and Ball and Zuckerman (1992) who found that high sensation seekers had superior focus and performed better on primary attention tasks than low sensation seekers. Other research has demonstrated that high sensation seekers were faster and more accurate than low sensation seekers in response to more complicated tasks (Zuckerman, 1994). The results of Zuckerman’s study also showed that high sensation seekers appeared to learn faster when they regarded a task as a challenge (Zuckerman, 1994).
High sensation seekers were also found to process information quickly and could generally drive aggressively without involvement in a road accident. The inflated self-belief of sensation seekers is found to be dangerous as it can lead to traffic violations. This is deemed to be a major causal factor in collisions (Reason et al, 1990). However, a study by Furnham and Saipe (1993) found that there was a much stronger link between risky driving and convictions rather than between risky driving and road accidents. The research established that high sensation seekers were more likely to commit a higher number of traffic violations than low sensation seekers. This suggests that even when penalised, high sensation seeking drivers are compelled by their sensation seeking proclivities to continue their risky driving behaviour. High sensation seekers gravitate towards options that allow them to maintain a high level of arousal. In the absence of other outlets, risky driving is an obvious source of stimulation for such individuals (Furnham and Saipe, 1993). Low sensation seekers tend to concentrate more on their driving than high sensation seekers and their risk perception tends to be more acute (Heino et al, 1992). Jonah (1997) found that while high sensation seekers drove faster and were more daring in their driving style, they still hit fewer obstacles than lower sensation seekers. McMillen et al (1989) also found high sensation seekers had better vehicle handling skills than low sensation seekers.

Jonah et al (2001) conducted a study to explore the relationship between sensation seeking and risky or aggressive driving. High sensation seekers were found to be more prone to aggressive driving than low sensation seekers. Seatbelt wearing rates were lower among high sensation seekers than low sensation seekers. Crash involvement and traffic violations were found to be higher for high sensation seekers than for low sensation seekers. High sensation seekers were also found to be more likely to drink and drive in a number of situations. These results concurred with earlier work done by Jonah (1997) which explored the personality traits of risky drivers. This research had found a strong correlation between individuals who displayed sensation seeking tendencies and those who were prone to risky driving.

Aggressive driving can take on a number of forms. These may include weaving in between traffic, tailgating or frequent and risky overtaking manoeuvres. By contrast, hostile actions such as swearing, using rude gestures and honking the horn, while components of aggressive driving, do not directly increase the risk of a collision.
Horvath and Zuckerman (1993) suggest that high sensation seekers place a greater value on the rewards of risky driving than low sensation seekers. The authors proposed that the rewards of elevated arousal levels accruing from risky driving were one of the chief motives presiding over the behaviour of high sensation seekers. Wilde (1994) explored the area of driver behaviour adaptation and observed that it is not very visible among the general driving public. He believed that the adaptation of driver behaviour was primarily a trait associated with those drivers who were trying to find an equilibrium point between risk and reward on the road. This process is thereby thought to optimise the level of risk in driving.

Any technological innovations to reduce the risk of crashes such as an anti-lock braking system (ABS) etc would be leveraged by sensation seekers to raise the equilibrium point and therefore increase the speed. Any marginal gains in safety would not be “banked” to increase safety. Instead, sensation seekers adapt their behaviour to maintain the level of risk needed to sustain the sensations associated with risky driving. Thus, those who would most profit from the benefits of new safety technologies are choosing instead to erode their effect.

Numerous studies have attempted to track down the origins of the sensation seeking trait. Researchers such as Green et al (2000) have suggested that it is a symptom of individuals who display cognitive egocentrism and possess feelings of invulnerability. Results from research studies suggest that sensation seeking is closely linked to the development process of adolescents (Zuckermann, 1994; Yu and Williford, 1993; Levitt et al, 1991). Other research however finds that sensation seeking is reliant on an individual’s inability to properly assess risk (Moore and Parson, 2000; Parsons et al, 1997; Moore and Gullone, 1996; Benthin et al, 1993).
4.5 Risk taking and risky driving

"They want to find and explore the envelope, or else to assume they know where it is and to operate on its edges. They talk and behave as if this envelope, the dividing line between accident free driving and collision, is visible, precise and stable. But they are prancing on the edge of a cliff, not a hard edge. If it gives way, it will do so without warning, without apparent cause and without the chance for recovery... The only skill is to keep well away from the edge (of the envelope)". Source: Clarke et al, 2002 p.30

Many young male driver accidents occur due to risky driver behaviours such as speeding or drink driving (Jonah, 1986). According to Karttunen et al (1982) speeding and drink driving are often causal factors in single vehicle accidents. Storie (1977) and Williams et al (1995) found that both sexes had the same proportion of single vehicle accidents. However research undertaken by Laapotti (1991) found that male drivers were more likely to be involved in single vehicle accidents. These accident types are strongly associated with speeding. Risky driving has been shown to be widespread among young drivers. Dangerous overtaking, tailgating and a failure to yield to pedestrians are just some of the risky driver behaviours identified by a number of studies on young drivers (Gullone and Moore, 2000; Williams, 1998; West et al, 1993). These studies also concluded that young drivers were more likely to engage in these dangerous driving manoeuvres than older drivers.

Research by Jessor (1987) suggests that many young drivers actively make the decision to drive recklessly in order to derive a thrill from driving. Other researchers such as Tsuang et al (1985) have taken a different view in relation to the rationale behind risky driving behaviours. Tsuang et al (1985) contend that risky driving behaviour is instead a defence mechanism which permits the driver to exceed their personal value by jousting with death.
Figure 4.1 High risk drivers in Ireland

Figure 4.1 serves to demonstrate the very narrow safety margin that high risk drivers find permissible. The safety margin is derived as the difference between the level of task demand placed on the driver to achieve their elected driving style and the person’s actual driving capabilities. Figure 4.1 also illustrates the misplaced confidence these young drivers exhibit in relation to their technical ability as drivers. Over-confidence in driving ability leads to an increase in driving speed. This in turn narrows the normal safety margin afforded by compliance with speed regulations. The vast majority of high risk drivers are young males who use their cars as a means of self expression. Research by Fuller (2005) indicated that these young male drivers enjoy the thrill of driving fast and testing their driving skills. The driving experience is used as a means of thrill seeking rather than a necessity of mobility.

According to Fuller (2005) high risk drivers represent 14% of the Irish driving population. Ninety per cent of drivers within this subgroup are young male drivers. The mean age of these high risk drivers was found to be 26 years of age. From a road safety perspective the “high risk driver” group pose a number of problems for Irish road safety. High risk drivers are problematic because their driving behaviour is derived from their attitude.
Unlike emotions, which are transitory in nature, attitudes prove more difficult to alter. Even if a change in attitude is achieved, behavioural change is by no means assured. Research has shown that behavioural change is notoriously difficult to achieve (Rotfeld, 1999).

Research has identified a number of possible reasons why young drivers are over represented in road collisions (Williams and Carsten, 1989; Jonah, 1986). Many of these reasons are directly related to the young driver’s propensity for risky driving. These reasons include driving at excessive speed, dangerous overtaking, close following, driving after drinking or driving after using drugs. The authors also catalogued a variety of psychometric features that help to account for the elevated collision rates among young drivers. These include inexperience, inattention, poor risk/hazard perception, impulsivity, a propensity for thrill-seeking, sensation seeking, over confidence and risky driving behaviours (Williams and Carsten, 1989; Jonah, 1986).

Over confidence is also a well documented trait among many young drivers. Egocentrism has been linked to sensation seeking and specifically to drink driving behaviour (Arnett, 1989). Research has found that young drivers consistently regarded themselves as having a lower risk of crashing than their peers (Finn and Bragg, 1986; Mathews and Moran, 1986). Speeding is seen as a way of demonstrating courage, control ability and driving skills. It is used as a means for young men to affirm themselves and their identity (Cattelino et al, 2000). Research suggests that risky driving is a mechanism for raising a person’s self esteem (Tauban Ben Ari et al, 2000). Maggs et al (1997) suggests that risky driving becomes a bonding experience for young men. The research indicated that risky driving is a shared experience which allows the driver to show off and gain attention from the peer group.
4.6 Peer pressure and passengers

The social support network afforded by a peer group plays an integral part in the development of an adolescent. However, the detrimental effects of peer pressure can have massive implications for road safety. Social pressure induced by the presence of peers in the car increases the young driver’s motivation to use the vehicle as a form of self expression. This self expression often takes the form of risky driving behaviour in order for the young driver to impress their peers with their driving skills (Näätänen and Summala, 1976). An increase in self worth may be attained through an elevated sense of driving competency, improved social prestige and the facilitation of impression management tactics (Tauban Ben Ari et al, 1999). Risky driving behaviour is thought to be strongly linked to peer pressure. Research has demonstrated that peer pressure and role conformity within a peer group are strong forces which often diminish the passenger’s resolve to change the driver’s behaviour (Harrison et al, 1992). A number of studies have offered new insights into adolescent risk taking behaviours resulting from peer influence (Jaccard et al, 2005; Simons-Morton et al, 2005; Ennett and Bauman, 1994). Williams et al (1995) found that single vehicle accidents were often associated with a high number of car occupants. Research has shown single vehicle accidents are closely correlated with incidents of inappropriate or excessive speed and drink driving (Kartunnen et al, 1982).

A Norwegian study by Ulleberg (2002) indicated that female passengers were more likely to make their feelings known to the driver when they felt unsafe while being a passenger in a car. The study found that male passengers generally perceived less risk of injury and were more likely to accept risk than female passengers. Male passengers were also found to be less confident in their ability to influence a driver. Male passengers were found to suffer high social costs as a result of addressing a person’s risky driving style. This finding suggests that the social cost of expressing concern at the person’s driving style is so high that it often outweighs the perceived risk of an accident.
The number of passengers in a car appears to influence the risk of a collision among young drivers. Baxter et al (1990) found that male drivers who carry male passengers tended to increase their driving speed. The study also found that young drivers who were accompanied by older passengers, especially female passengers, drove more slowly than young drivers who travelled alone or with young passengers of either sex. A study by Regan and Mistopoulos (2002) also explored the interactive effects of passengers on driving performance. Their work found that male passengers were more likely to encourage rather than discourage a driver to take risks. Chen et al (2000) found that male passengers aged between 16 - 24 years of age were more likely to tell a driver to take risks than any other passenger type. Regan and Mistopoulos (2002) concluded that 16 and 17 year old drivers were more likely to die in traffic accidents when accompanied by passengers aged 16 - 29 years than when carrying passengers over 30 years of age. The data also suggested that the risk of being killed was further doubled when the young passenger was male.

McKenna et al (1998) conducted a set of observational studies to evaluate the effect of young passengers (peers) on young driver behaviour. Evaluations were made by assessing variations in speed, following distance and the gap acceptance between cars. The findings showed that the mean speed of the car increased for both male and female drivers when a male passenger was present. Safety margins were also eroded in relation to gap distances when a male passenger was in the car. Gap distances were found to be shorter for both young male and female drivers when a young male passenger was present. However the gap distances for both male and female drivers increased when a young female passenger was present. Female passengers appear to have a moderating effect on driver behaviour by somehow promoting more conservative following distances.

Simons-Morton et al (2005) estimated that the rate of risky driving among young drivers is one third higher than the rate observed among the general driving public. This risky driver behaviour manifested itself in shorter headways and higher speeds than those observed in general traffic. The presence of a male passenger was found to reduce following distances in both male and female drivers relative to those observed while driving alone or with a female passenger.
The results also indicated that speed increased by at least 15mph among one in four teenage drivers when they were accompanied by a male passenger. The study highlighted that when young people travel together in a car, the driver is likely to demonstrate elevated levels of risk taking. However, the most dangerous situation arose when a young male driver was accompanied by one or more male passengers. When a teenage male driver/male passenger situation arose the calculated rate of risky driving behaviour was found to be twice that of the rate found in general traffic. McKenna et al (1998) and Simons-Morton et al (2005) observed little or no difference in driver behaviour when a young female driver was accompanied by a young female passenger.

Figure 4.2 Irish mortality rates (per 100,000 citizens) for passengers in 2003

Source: Bedford et al, 2003

Figure 4.2 demonstrates the disproportionate number of young passengers killed in Ireland in 2003. This passenger fatality trend is longitudinal in nature and appears not only in Ireland but in road safety statistics worldwide. However, peer pressure can also be positive in nature. Research indicates that drivers were more likely to abstain from drink driving when they believed that their friends would disapprove (Åberg, 1993; Brown, 1998). It was also established that positive pressure can be exerted by partners, boyfriends or girlfriends (Parker et al, 1992). Drivers who believed that their partner would disapprove of them committing traffic violations and who felt motivated to comply with the law, reported less intention to commit violations while driving (Parker et al, 1992).
Chapter 5

Application of social marketing in road safety
5.1 Introduction to social marketing

Kotler and Zaltman (1971) define social marketing as follows: “social marketing is the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research”. They consider social marketing to represent a particularly challenging field of marketing given that the communicator often has to challenge the belief and value systems of the target market. Kotler and Zaltman (1971) expressed the opinion that belief and value systems are reinforced over time making them more difficult to alter than the transient preferences of a consumerist society. The authors suggest that perceptual barriers may also exist towards PSAs\(^\text{19}\). They maintain there will always be those who reject any message that promotes moral duty or social responsibility on the grounds that it represents an unwelcome and particularly manipulative addition to the “promotional noise” already in society.

5.2 Best practice and recommendations for running road safety campaigns

“The best safety lies in fear”.

The Tragedy of Hamlet, Prince of Denmark, Act 1, Scene 3, Line 46

Having evaluated the pros and cons of various channels of communication, Cameron and Harrison (1998) concluded that television is widely considered by experts to be the most persuasive medium for road safety campaigns. Television was found to be the most effective medium for conveying emotion. Elliott (1993) also found television to be the most effective channel of communication when running road safety campaigns. However, Dejong and Atkins (1995) contend that radio is an under utilised medium. They recommend campaign organisers look beyond stand-alone, television based campaigns. Dejong (1991) asserted that radio advertising provided short, uncomplicated messages which could provoke reaction and stimulate behaviour change among the in-car target audience.

\(^{19}\) Public Service Announcements
Research by Anderson (1978), Griep (1970) and Robertson et al (1972) has provided evidence to suggest that generic road safety campaigns are of limited benefit. Despite possibly increasing awareness levels, these type of road safety campaigns have proved an inefficient means of instigating behaviour change. Donovan et al (1995) contend that the specific demographics of the target audience should determine the campaign style and execution. Research suggests that carefully tailored segmentation strategies are necessary to maximise the effectiveness of fear appeals among different road users groups (Burnett and Wilkes, 1980; Ray and Wilkie, 1970). Ray and Wilkie (1970) conducted a survey of 1600 randomly chosen residents who were posted one of four health insurance pamphlets. Three different versions of the pamphlets contained low, medium and high fear appeals. The fourth version did not contain a fear appeal. The results of the study indicated that high fear appeals were most effective. However, the study concluded that high threat appeals did not perform consistently well across all segments. The authors concluded that a “one size fits all” approach to fear appeals is ineffective if not counter productive (Ray and Wilkie, 1970).

Cameron and Harrison (1998) suggested that the content of a publicity campaign must be dictated by research based data. These data should identify both the specific characteristics of the target group and the effect the descriptors have on the target behaviour. The authors recommend educative style adverts when addressing unsafe driving actions. In contrast, the authors suggest that strong fear appeals should be utilised to address those activities which may result in dangerous driving such as drinking. Egger et al (1993 p.79) summoned up the two tasks of effective advertising as the process of “getting the right message and getting the message right”. The content of a road safety commercial must serve to maximise its persuasive potency while minimising the possibility of provoking defensive or avoidance actions among viewers.

Donovan et al (1995) suggested that targeting the core motives of the intended audience is vital when producing an effective road safety advert. The authors suggest that the level of threat in an advert is a secondary issue. The authors concluded that an advert is persuasive if the emotions portrayed in the advert are perceived as credible by the target group.
Hewgill and Miller (1965) explored the area of communicator credibility and its influence on the persuasion process. The authors posited that high credibility sources of information are more difficult to dismiss via cognitive defence mechanisms than sources of more dubious authority.

Donovan et al (1995) found serious road safety adverts were more persuasive than those which tried to incorporate humour into their design. Furthermore, while an optimum level of threat could not be determined, the research did indicate that drama based adverts were more effective than lecture-style adverts (Donovan et al, 1995). Following a review of PSAs, Dejong and Atkins (1995) concluded that PSAs targeting young people should portray adolescents of their own age (peers) in the advert. The PSA should also avoid any didactic undertones and instead focus on the social consequences of non-compliance in safe driving.

A meta-analysis of 48 publicity campaigns by Snyder and Hamilton (2002) found that longer campaigns permitted people a longer period to initiate behaviour change. This was deemed important owing to the fact that different people displayed different rates of behaviour change. Research suggests that campaign intensity must reach a certain threshold before an audience notices it and goes on to process it cognitively (Cameron and Harrison, 1998). However, long running campaigns did demonstrate a higher likelihood of witnessing a regression to old habits among road users. It was observed that campaigns that ran for less than a year performed better than longer running campaigns in this regard (Snyder and Hamilton, 2002).

A review by Delhomme (1999) evaluated some 265 road safety media campaigns in 17 countries between 1980 and 1997. The review found that roughly 34% of evaluated campaigns were bolstered by more than one supporting activity. Delhomme (1999) estimated the average effect of a road safety publicity campaign on personal injury crashes both during and after a campaign. The average reduction in personal injury crashes during and after a campaign was found to be 6.8% and 14.3% respectively. It was estimated that fatal crashes dropped by 19.3% during the average campaign.
The research by Delhomme (1999) also indicated that road safety campaigns performed best when married with enforcement activities and undertaken in the presence of strong legislation. Under such conditions major reductions in both the number of collisions and the crash severity of accidents were found to materialise. While the effects of legislation alone could not be measured, the data did suggest that its impact was nominal unless supported by credible levels of enforcement.

Delaney et al (2004) also found that legislation acting as the sole support for a media campaign is of little benefit. However, in its absence, road safety campaigns have been found to be ineffective. Publicity campaigns in the U.S. were found to be of little benefit in promoting seatbelt use until legislation made seatbelt wearing legally compulsory (Foss, 1989; Williams et al, 1987).

Research has established that campaigns based on a theoretical framework outperform (reduce crashes) those campaigns that are not based on theoretical models (Delhomme, 1999). However Delhomme’s research indicated that only 11.7% of the 265 road safety campaigns studied were based on an explicit theoretical framework.

Delaney et al (2004) concluded that the Protection Motivation Theory and the Extended Parallel Process Model are two theoretical models that are particularly suitable for blueprinting a successful road safety campaign. However the research also suggested that Attribution theory, General and Special Deterrence Theory, the Organisational Behaviour Model or the Structural Model of Compliance may also provide suitable foundations for a successful road safety campaign (Delaney et al, 2004).
5.3 The fear factor: An overview of fear appeals

“To suffering there is a limit; to fearing, none”.

Francis Bacon

Over the last 50 years researchers have relentlessly hunted for conclusive answers relating to the effectiveness of fear in advertising. However despite a deepening in the reservoir of knowledge and a more expansive understanding of the processes involved, the vexed question remains. What is the most effective type of fear appeal? Research results remain mixed, expert opinion divided and despite theoretical developments continuing apace, many questions remain unanswered. The massive variance in findings and the incongruous nature of research results illustrate the complex and divisive nature of this area of psychological research (Chapman, 1992; LaTour and Zahra, 1989; Rotfeld, 1988).

The term “threat appeal” was coined by McGuire (1985) who concluded that the severity of a threat appeal determined the persuasiveness of the advert. While slightly different fear appeal definitions appear throughout related literature, the description by Spence and Moinpour (1972) does seem to adequately sum up their role.

“Communications using fear appeals are designed to stimulate anxiety in an audience with the expectation that the audience will attempt to reduce this anxiety by adopting, continuing, discontinuing, or avoiding a specified course of thought or action”.

Nunnally and Bobren (1959) as cited by Rotfeld, (1988, p.28) made a distinction between high and low threat appeals to aid the classification of adverts. The authors concluded that an advert has a “relatively high anxiety if it pictures people in physical danger, pain, fear and embarrassment...it is said to have relatively low anxiety if it does not picture people in physical danger, pain, fear and embarrassment”. In effect, the viewer represents the fulcrum on which this psychological conflict between risk and reward is balanced out.
Early research by Avery (1973) suggested that the continual discussion of road deaths in the media only serves to desensitise the target audience. The shock and gore tactics employed by the news media in dealing with road accidents is found to be counter productive because people "inoculate" themselves from these news reports by reinforcing their defence mechanisms.

Social marketing campaigns aimed at road users have a history of utilising threat appeals (King and Reid, 1990). Denial, rationalization, repression and distancing are psychological defence mechanisms that have been suggested as possible reasons why some graphic social marketing campaigns fail (Weilbacher, 1984). LaTour and Zahra (1989) state that threat appeals essentially follow a three step process. Step one sees the advert trying to frighten the viewer thereby increasing vulnerability and suggestibility. The second stage of a fear appeal sees the advert attempting to convince the viewer that the threat involved is real and necessitates action. Finally the third stage of a fear appeal involves providing a risk reduction strategy or recommendation to neutralise the threat.

Threat and fear are distinct concepts and should not be confused. Threat relates to the message while fear is one possible psychological outcome of the message. It has been found that recommended actions contained in fear appeals are more likely to be adopted if the viewer considers the recommendations to be clear and effective.

Research by Leventhal et al (1965) and Job (1988) indicates that adverts which specified a particular set of instructions to reduce a threat boasted higher behaviour change rates than those adverts which offered only generic advice. A similar finding by Rogers and Mewborn (1976) indicated that if the recommended adaptive response is perceived as having a high efficacy, then the intentions to adopt this action are found to be higher. This effect was evidenced among smokers who were convinced that refraining from smoking would be effective in reducing the risk of lung cancer (Rogers and Mewborn, 1976).
In their meta-analysis of fear appeals, Witte and Allen (2000) also suggested that providing specific information on recommended actions helps maximise behaviour change and minimise defensive or avoidance behaviours. Dejong and Atkins (1995) found that the PSA's sponsored by Mothers Against Drink Driving (MADD) were of limited effectiveness due to the absence of a recommended action in the advert. Avery (1973) found that adverts must draw clear conclusions for the audience in order for them to be effective.

Hass and Linder (1972) demonstrated that taking a balanced approach to the presentation of an argument leads to greater persuasion. They recommended presentations (adverts) should acknowledge both sides of an argument and initially present a balanced commentary on the problem. Having done this, the advert is then free to advance one particular view without the fear of being perceived as biased. This approach disengages the initial defensive mindset of an audience and inhibits the generation of a robust counter-argument (Hass and Linder, 1972).

5.4 The elusive “optimum level of fear” and other theoretical pitfalls

Some research suggests that individuals will moderate their behaviour to achieve an optimal level of fear (Zuckerman 1983; Zuckerman 1979). However according to Rotfeld (1988) the much touted notion of an “optimal level of fear” is an unhelpful “red herring” in psychology theory. The author contends that threat appeals are too general and asserts that no fear appeal will evoke the same response even within a narrowly defined group of people. Different people fear different things. The challenge therefore lies in identifying the threat that is most effective given the large range of possible responses from different people. The personal relevance of the threat needs to be high to instigate attitude change (Rotfeld, 1999). Rotfeld (1999) suggests road safety campaigns that target young drivers and which use graphic car crash scenes in their adverts do not comply with this rationale.
Despite numerous literature reviews that have attempted to pinpoint the optimum level of fear, (Wheatley and Oshikawa, 1970), inconsistent results continue to undermine its conceptual credibility. Rotfeld (1999) argues that marketers and psychologists alike have become besotted with this “institutionalised myth” and would-be Holy Grail of marketing despite the distinct lack of evidence to support it.

Janis (1967) suggests a non-monotonic relationship between fear and persuasion. The theory was postulated to explain research results which found moderate fear appeals outperforming both high and low threat fear appeals in terms of their persuasive power. The hypothesis suggested that weak fear appeals created too little tension and therefore did not create enough drive to motivate an individual into action. Conversely, the theory posited that strong appeals created too much tension which inhibited an individual’s ability to correctly process the message in the advert. This was found to be due to defensive or avoidance mechanisms being initiated by the viewer. The results can be graphically illustrated as a “curvilinear” or “inverted U” shaped trajectory when persuasion is graphed as a function of fear.

The oft mentioned inverted U shaped relationship is a hypothesis based on the notion that one can optimise the best fear-persuasion mix in adverts. The optimal level of persuasion was found to be achieved at moderate levels of fear arousal (apex of the persuasion curve) while high threat and low threat appeals were found to be less effective (ends of the persuasion curve).

Another hypothesis accruing from this research is the notion that the “inverted U shaped curve” is not a single entity but rather just one of many curves. The author suggests that these fear-persuasion curves are moderated by a host of personal and message factors that interact and consequently alter the shape of the resulting fear persuasion curve. Research suggests that moderate levels of threat elevate interest in a message by permitting an increase in the drive for solution seeking (Ray and Wilkie, 1970). Research by Loo (1984) found evidence to suggest that utilising moderate threat appeals increased the level of seatbelt wearing among participants.
5.5 High threat fear appeals

A variety of studies have found that the more pronounced the fear evoked by an advert, the bigger the persuasive effect yielded (Sutton 1992; Rotfeld, 1988; Boster and Mongeau, 1984; Sutton, 1982). The results of a meta-analysis by Sutton (1982) were briefly discussed in a later paper by the author. The author found that "increases in fear are consistently (have a very high probability of being) associated with increases in acceptance of the recommended action" (Sutton, 1992 p.517). The research concluded that there was a generally discernable linear relationship between the level of fear arousal and the level of message acceptance.

The inclusion of a recommended action in a high threat advert was found to help reduce the perceived threat while facilitating behaviour change (Sutton, 1982). Sutton (1992) concluded that "arousing fear is unlikely to be counterproductive… particularly if the message includes a reassuring statement that adopting the recommended action is effective in averting the threat and if it provides clear advice on what to do" (p.519).

Goldstein (1959) identified different personality types which moderated the impact of a threat appeal on an individual. Those identified as "copers" were well equipped to process both high threat and low threat appeals. "Avoiders" however were found to be less well equipped to deal with high threat communications and were therefore more suited to low threat appeals. Research by Thayer (1967) suggests that if the level of threat in a fear appeal remained below a person’s arousal threshold then the viewer was likely to be responsive to the advert. However when the level of threat in a fear appeal exceeded the viewer’s threshold the person was unable to rationally adapt to the threat due to the excess tension created. The arousal threshold posited by Henthome et al (1993) was heavily influenced by Thayer’s previous research (Thayer, 1978; Thayer, 1967). However recent research by LaTour and Rotfeld (1997) and LaTour and Tanner (2003) tested how participants reacted to strong fear appeals in short films/adverts. Neither study was able to find evidence of the hypothesised "fear appeal overdose" as prescribed by Henthome’s arousal threshold (LaTour, 2006 p.410).
Many research studies have found that participants report high threat advertising to be highly motivating and therefore effective (Job, 1988). Earlier research by Haefner (1956) has indicated that high threat fear appeals are more effective in stimulating longer term attitude change than low threat communications. However some research suggests that strong fear appeals often produce only transitory changes in attitude. Capon and Hulbert (1973) and Gillig and Greenwald (1974) found that there is no difference in the persuasion effect of high and low threat advertising when the post study attitude test was postponed for a later date. Their research indicated that high threat appeals often boast more immediate persuasive effects than low threat appeals. However they observed that quite often the initially large attitude change produced by high threat adverts was more quickly eroded than the more modest attitude change produced by low threat adverts. The research suggested that perhaps there is an inverse relationship between the initial aptitude of the attitude change and the longevity of these changes.

Tay (2002) found that high threat appeals are the most effective fear appeals in inducing adaptive behaviour change among audience members who initially had not perceived the problem behaviour as being relevant to them. Similarly, Ray and Wilkie (1970) found strong fear appeals were very persuasive among individuals with low anxiety levels and among those who found the topic to be of low personal relevance.

Research by Wheatley (1971) suggests that an inverse relationship exists between topic relevance and the optimal level of fear. However, Rotfeld, (1988) suggests that strong fear appeals are more effective if they address a topic that is perceived as relevant to the audience. Keller (1999) found evidence to suggest that strong fear appeals are very effective among drivers who have previously adopted the safety recommendations suggested by these advert types.

McGuire (1968) is one of the few meta-analysis studies that has found high threat fear appeals to be inefficient. The author proposed a fear drive model which asserted that fear possesses both “cue” and “drive” functions. When fear is found to be acting as a drive it is found to promote “yielding”. “Yielding” (moving towards message acceptance) has been shown to increase in tandem with the level of fear generated. However when fear is found to be acting as a cue then defence and avoidance
strategies have been shown to grow in prevalence, resulting in a reduced likelihood of behaviour change. As the level of fear increases beyond a moderate level, drive responses are overtaken by cue responses. In effect, as the level of evoked fear rises, the rate of “yielding” slows and the accelerating detrimental effects of fear on message acceptance rise rapidly. This fear-persuasion mechanism appears to explain the non-monotonic relationship (“the inverted U” relationship) between fear and persuasion. However, the study only provided statistically weak support for the curvilinear hypothesis. McGuire’s research also indicated that message complexity influences the relationship between fear and persuasion.

The decision to use fear appeals should not be taken lightly despite strong evidence that they can be effective. There is evidence to suggest that fear appeals can be ineffective if not counterproductive in influencing driver behaviour. King and Reid (1990) found there was no drop in self reported intentions to drink drive even after watching films of varying threat and threat focus (injury to self vs injury to others).

Some research into strong fear appeals has found that presenting a high threat appeal to viewers is counterproductive and actually accentuates dangerous driving behaviours (Dejong, 1991; Kohn et al, 1982). Research by Kohn et al (1982) utilised high threat appeals in outlining the dangers of drink driving to Canadian high school students. The research indicated that the strong fear appeals upset the students and induced high levels of anxiety. However, these fear appeals seemed to produce counterproductive attitudinal effects in viewers whereby students were actually more willing to drink and drive after viewing the adverts.

Boyle (1984) also found that high threat appeals were ineffective in promoting behaviour change in car drivers. Previous research findings suggest that high threat appeals promote defensive reactions which ultimately impede behaviour change (Gronhaug and Rostvig, 1978; Griffith and Rogers, 1976; Rogers and Mewborn, 1976).
5.6 Social threat

Spence and Moinpour (1972) and Stuteville (1970) discussed the use of social threats in fear appeals. Social threat appeals are popular in commercial advertising because people often adopt a coping strategy that facilitates the most socially acceptable outcome rather than the most effective strategy for threat minimisation. Stuteville (1970, p.41) noted the "heavy and continuous reliance on fear appeals in the sale of personal products..." indicating marketers still have massive confidence in the ability of social threats to sell products within some market segments. The author concluded that in order for a social threat to be effective three conditions are necessary. Firstly, the social threat should appear real to the viewer. Secondly, the product being sold must prevent the threat. Lastly, Stuteville suggests there should be no psychological barriers accompanied with using the product that mitigates the threat.

Powell and Miller (1967) investigated the effectiveness of social threat appeals in coercing subjects to donate blood to the Red Cross. The results indicated that messages which contained an element of social approval or social disapproval were more likely to alter a participant's attitude than messages that did not include a social threat. However the study revealed that adverts which implied social disapproval by not donating blood were significantly more effective than those adverts that relied on bolstering peoples' self worth through social approval. Source credibility was also found to be important in terms of message delivery. The greatest persuasion was achieved by highly credible social threats. Social approval or disapproval threats using low credibility sources were found to be equally ineffective in promoting attitude change. Both social approval and social disapproval threats that used low credibility sources were found to be even less effective than the impartial information supplied to the control group (Powell and Miller, 1967). Dejong and Atkins (1995) argue that road safety publicity campaigns need to focus on shifting the social norms of road users rather than exhaustively labouring driver behaviour messages. The authors recommend a continuation of the research by Goffman (1963) into social stigma suggesting that it may prove a vital component in producing a more compliant, road user community. Other researchers have also advocated the use of social threats as a feasible option in promoting a safer society (Yanovitzky and Bennett, 1999; Wallack, 1984).
5.7 Personal characteristics of the target market

5.7.1 Coping style of the viewer

Stuteville (1970) discussed the psychological harm and detrimental effects of fear appeals on audience members. The psychodynamics of maladaptive responses are explored by the author who identified three common defence mechanisms to fear appeals. Individuals seeking to reduce the stress associated with strong fear appeals often try to deny or attenuate the threat. Another technique used to reduce viewer stress is often achieved on a subconscious level. The "I am the exception to the rule" mentality permits the person peace of mind because they convince themselves that they are somehow exempt or impervious to the threat. The third and final mechanism cited, is the act of symbolically reducing the threat in stature. This may mean laughing or demeaning the nature of the threat in order to reduce the stress it would otherwise cause.

Tanner et al (1991) found that an individual’s past experiences and behaviours influenced their coping strategies. This occurs because people often store up "coping response repertoires" from prior experiences and behaviours that have proved successful in the past. The research concluded these stored coping responses were more important in determining how someone responded to a fear appeal than the level of threat used in the advert.

Ray and Wilkie (1970) posited that strong fear appeals were most persuasive among individuals who were found to possess strong coping behaviours and high self-esteem. Tanner et al (1991) also stressed the importance of emotional engagement in the threat appeal. However Schoenbachler and Whittler (1996) found no evidence of attitude and behaviour change being dependent on emotion.
5.7.2 Intension verses behaviour change in young male drivers

Taubman Ben-Ari et al (2000) conducted two studies of young male drivers (18 - 21 year olds) to measure both their self reported intentions of reckless driving and their subsequent driving performance in a driving simulator. The researchers hypothesised that those drivers who perceived driving as being linked to their self esteem were more likely to engage in risky driving behaviour even after watching a road trauma film. In the first study, a questionnaire was used to guage what effect a road safety film had on viewer’s reckless driving intentions. In the second study, a driver simulator was used to assess what effect the film actually had on participants’ driving behaviour.

The threat appeal (road trauma film) was found to have made a substantial impact on both self-reported intentions to drive recklessly and actual behaviour (driving speed in a driving simulator). Those who viewed the road trauma film reported fewer self-reported intentions to drive recklessly. However they nevertheless demonstrated more dangerous driving speeds on the driving simulator than those in the control group (having not viewed the road trauma film). The high threat appeal appeared to positively change driver attitudes to hypothetical driving situations but negatively affected the person’s actual driving behaviour. These effects were only demonstrated by drivers who perceived driving to be closely linked to their self esteem. The researchers suggested the observed increase in driving speed was a by-product of a process which saw these drivers establishing their self worth. Despite “paying lip service” to the merits of safe driving and having viewed the road trauma film, the resulting driver behaviour did not match the reported driving intentions. The authors suggested that the participants were too preoccupied with the task of driving to let the perceived dangers of speeding infringe on their driving behaviour. Reactance theory offers an alternative explanation for the subsequent risky driver behaviour adopted by some of those who had viewed the road trauma film (Brehm and Brehm, 1981; Brehm, 1966). The theory suggests that individuals will react to efforts that seek to curb their perceived freedom of behaviour. The increased speed demonstrated by these drivers in the simulator may be a reaction to what they consider their threatened freedom. If this is true, then targeting young male drivers with high threat adverts may be counter productive.
Sjöberg (2003) found that over-confidence undermines the motivation of an individual to comply with the risk avoidance behaviours being suggested in high threat appeals. Young male drivers are particularly prone to overconfidence in their driving ability (Finn and Bragg, 1986). Leventhal and Perloe (1962) also established that subjects who possess high levels of self esteem were less likely to be persuaded by high threat appeals. However, subjects with low self esteem were found to be more susceptible to the persuasive effects of fear appeals.

5.7.3 Age specific psychological barriers to fear appeals

“\text{I will show you fear in a handful of dust}”. 

T.S. Elliot

Elkind (1967) posited two cognitive constructs to which adolescents are prone. “The imaginary audience” and “the personal fable” represent psychological barriers to fear appeals. The imaginary audience is an individual specific, assumption based construct which is characterised by the person displaying acute self consciousness. This condition is also characterised by the person believing that other people share their opinions of themselves, be these positive or negative. This egotism has been demonstrated in research by Looft (1971) who found that teenagers are self obsessed and feel that those around them are constantly observing and judging their actions.

The personal fable construct on the other hand suggests that adolescents believe themselves to be immortal. This heightened sense of self importance (imaginary audience) and immortality (personal fable) ultimately leads to the young person believing that they are so important as to be impervious to any form of misfortune (Elkind, 1967).
Recent research has found evidence of the "personal fable" construct being prevalent among young drivers (LARSOA, 2007). However research by Henley and Donovan (2003) could not find any evidence to support their similar hypothesis that young people felt immortal. Schoenbachler and Whittler (1996) could find no evidence to prove that these two cognitive constructs serve to provide additional strength to the traditional coping responses in adolescents.

Research by Rogus, Palmgreen, and Everett (1990) found that high sensation seekers prefer adverts that leave them "hanging" at the end of the advert. Conversely, low sensation seekers were found to favour adverts that provided a definite ending with a sense of closure. Research into anti-drug PSAs discovered that both high and low sensation seekers preferred PSAs that had a motivation element in the message at the beginning of the advert (Donohew, 1988). However the groups differed in that high sensation seekers were more persuaded by high threat adverts while low sensation seekers were more persuaded by low threat adverts.

5.8 Road safety campaigns worldwide

5.8.1 The Australian model - Transport Accident Commission

Australia's Transport Accident Commission (TAC) has become world renowned for producing hard hitting road safety adverts. November 1989, marked the beginning of a cultural shift in road safety advertising in the state of Victoria. The Grey Advertising agency was given the task of raising the profile of road safety in the minds of the general public. Historically, Australian road safety publicity campaigns had been characterised by a lack of market research which had resulted in ineffective campaigns (Murray et al, 1993; Salmon, 1989). However Australia's Transport Accident Commission (TAC) in Victoria spent A$70 million on road safety campaigns between 1990 and 1995 in a renewed effort to attack the soaring road death figures (Healy and Forsyth, 1996).
Despite much debate over the high costs of TAC road safety campaigns, they still compare favourably when measured against the huge social costs of car accidents in Australia every year. The socioeconomic cost of the fatalities (1,970) and serious injuries (21,989) resulting from traffic accidents in Australia during 1996 alone was estimated to be A$15 billion (Bureau of Transport Economics, 2000).

The TAC ran a large scale road safety publicity campaign from late 1989 to late 1990. The campaign was designed to support and accentuate the effect of elevated levels of Random Breath Testing and speed camera enforcement. The campaign focussed in particular on drink driving ("If you drink, then drive, you're a bloody idiot" campaign) and speeding ("Don't fool yourself, speed kills" campaign). The high threat adverts boasted a 92% unaided recall rate among those surveyed in Victoria (Henderson, 1991). Furthermore, impressive reductions in road fatalities were achieved which saw a reversal of the upward spiral in road deaths. In 1990, there was a 29% reduction in road deaths recorded in Victoria when compared with the previous year. This figure represented a drop of 22% on the average road fatalities for the previous five years. Furthermore, it represented a 28% drop in fatalities below the projected road fatality figures for 1990 (Drummond et al, 1991).

Cameron et al (1992) investigated the campaign’s impact on road safety figures during “low alcohol hours”20. It concluded there were statistically significant reductions in casualty crashes (24%) and injury severity (29%) achieved in Melbourne relative to crash figures in the neighbouring territory of New South Wales. Casualty crashes in rural towns in Victoria had dropped by 21% after travel trends and seasonal patterns were factored into the analysis.

Tay (2005) makes the point that it is essentially very difficult to accurately measure the effects of road safety efforts. The 3 E’s of road safety – Enforcement, Education and Engineering all have huge roles to play in stemming road deaths. However, accurately mapping the interdependencies and interactions of all the variables in an integrated road safety campaign is impossible. Consequently, accurately measuring

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20 The "low alcohol hours" of the week (i.e. Monday-Thursday 6 am to 6 pm, Friday 6 am to 4 pm, Saturday 8 am to 2 pm, Sunday 10 am to 4 pm)
the effects of different activities is problematic. Educated estimates are therefore the only option available to road safety experts when trying to efficiently allocate resources in a road safety campaign.

Research by Newstead et al (1995) modelled some of the major factors influencing road trauma trends in Victoria between 1989 and 1993. The study estimated that the publicity campaign which supported the speed camera programme tendered a reduction in serious casualty crashes of between 6.2% and 8.7% from 1990 - 1993. The anti drink driving campaign which was supported by Random Breath Testing was found to have reduced serious casualty crashes by between 6.7% and 7.5% during the period.

Newstead et al (1998) followed up this study with another study which modelled the major factors influencing road trauma trends in Victoria between 1990 and 1996. Largely consistent with the findings of the previous study, the data indicated that the anti speeding publicity campaign was responsible for a reduction of between 5% and 7.1% in crashes resulting in serious casualties. The anti drink driving campaign for that period was estimated to have achieved a reduction of between 8.9% and 10.2% in crashes resulting in serious casualties. Overall, road fatalities plummeted by 53% between 1989 and 1994 (Macpherson and Lewis, 1997).

Subsequent research by White et al (2000) has disputed the accuracy of the models used by Cameron et al (1993) and Newstead et al (1995) in evaluating the effectiveness of the TAC campaigns. It was found that minor modifications to the models produced results that varied widely from the original results. The model used by White et al (2000) found no evidence to suggest that the graphic TAC road safety campaigns made any contribution to the reduction of road fatalities in crashes during high alcohol hours\textsuperscript{21}. Research by Tay (2005) however disputes this finding.

\textsuperscript{21} The "high alcohol hours" of the week (i.e. Monday-Thursday 6pm to 6am, Friday 4pm to 6 am, Saturday; 2 pm to 8 am; Sunday 4 pm to 10am)
Other studies investigating the effects of the TAC adverts have contributed to the ongoing debate regarding high threat advertising (Mackay, 1994; Lewis, 1993; Miller, 1992). Research by MUARC\textsuperscript{22} has analysed the success of some of the TAC campaigns. The studies found that high levels of enforcement and publicity produced a substantial drop in serious speed related and drink related crashes (Newstead et al, 1995; Harper and L’Huiller, 1992).

Harrison and Senserrick (1999) investigated audience perceptions of TAC adverts by asking participants to evaluate their emotional, cognitive and behavioural responses to the adverts viewed. The findings suggested that people appreciated the gravity of the issues involved and as such found the hard hitting advertising a justifiable means to an end. The research also indicated that the originality of the adverts creative execution and its capacity to shock the audience were linked to its behaviour changing potential.

The results also indicated that self reported behaviour change was found more likely to be stimulated by highly charged, emotional fear appeals than with adverts focusing on enforcement. Fear appeals were also perceived to be more credible and relevant than adverts which focussed on enforcement. The research found that the emotive/instructive style of TAC adverts was highly effective. The authors concluded that TAC commercials struck the right note in terms of emotion and information supply and recommended that the TAC continue with their use of high threat adverts.

\textsuperscript{22} Monash University Accident Research Centre
Table 5.1 Road safety campaigns in Australia

<table>
<thead>
<tr>
<th>Authors</th>
<th>Target Group</th>
<th>Measure</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Seat belts advertising</td>
<td></td>
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<tr>
<td>Johnston and Cameron (1979)</td>
<td>Drivers and passengers (Australia)</td>
<td>Television campaign</td>
<td>Good change in behaviour</td>
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<td>Anti-drink driving advertising</td>
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<tr>
<td>Freedman and Rottman (1979)</td>
<td>Drinking drivers (New South Wales)</td>
<td>Advertising in mass media</td>
<td>Knowledge improved, small attitude change</td>
</tr>
<tr>
<td>Elliott and South (1983)</td>
<td>Drinkers (Australia)</td>
<td>Mass media campaign</td>
<td>Small changes in drinking behaviour</td>
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<tr>
<td>Job (1993)</td>
<td>Drinking drivers and RBT* laws (New South Wales)</td>
<td>Advertising and media coverage</td>
<td>Increased knowledge, especially on legal limit</td>
</tr>
<tr>
<td>Cashmore (1989) (review)</td>
<td>Drinking drivers and RBT* law</td>
<td>Advertising and media coverage</td>
<td>Heavy publicity resulted in high awareness levels</td>
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<tr>
<td>Elliott (1993) (review)</td>
<td>Drinking drivers and RBT* laws (Australia)</td>
<td>Advertising and media coverage</td>
<td>High level awareness, strong recall of advertisements</td>
</tr>
<tr>
<td>Harrison (1998)</td>
<td>Males aged 16-30 (Victoria)</td>
<td>Television advertisements</td>
<td>Raised perceived risk detection</td>
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<tr>
<td>Anti speeding advertising</td>
<td></td>
<td></td>
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<tr>
<td>Manners (1983)</td>
<td>Drivers' perception of radar detection (Victoria)</td>
<td>Mass media campaign</td>
<td>No significant effect on speed</td>
</tr>
<tr>
<td>Croft (1990)</td>
<td>Speeding drivers (New South Wales)</td>
<td>Mass media campaign</td>
<td>Increased awareness of speed as hazard; but no reduction in reported speeds</td>
</tr>
</tbody>
</table>

Note: * Random Breath Testing

Source: Henderson, 1991

Delaney et al (2004) state that while some publicity campaigns achieve high awareness levels, most do not achieve high behaviour change levels. Table 5.1 appears to substantiate this finding (Henderson, 1991). The table provides a brief overview of a variety of seatbelt, anti drink and anti speeding road safety publicity campaigns in Australia. From the results, it appears that while raising awareness levels among the public is reasonably easily achieved, the same cannot be said for behaviour change. Increasing awareness levels is deemed to be a modest achievement. Behaviour change is ultimately the goal of all road safety publicity campaigns. Increasing public awareness is but the first step in a complex process of social engineering (Elliott, 1993). However, statistical research does suggest that media campaigns can prove effective in positively influencing young male drivers (Lastovicka et al, 1990; Lastovicka et al, 1987).
5.8.2 The New Zealand model - Land Transport Safety Authority

Gregg (1996) estimated the social costs of traffic accidents in New Zealand to be approximately NZ$3.4 billion per annum. From 1995 – 1999, it is believed over NZ$50 million was spent on road safety publicity campaigns by the New Zealand Land Transport Safety Authority (LTSA, 1998). The campaigns attempted to emulate the significant fatality reductions achieved by the TAC road safety campaigns. Following the TAC road safety campaigns road fatalities plummeted by 53% between 1989 and 1994. However, the same success was not replicated in New Zealand despite using similar, high threat adverts (Macpherson and Lewis, 1997). Like the Australian road safety campaigns, the New Zealand road safety campaigns also warned of the high risk of prosecution. However, enforcement levels were too low in New Zealand to give the adverts the necessary credibility. The publicity campaigns run by New Zealand Land Transport Safety Authority were not supported by booze buses and hidden safety cameras as was the case with the TAC campaigns.

Macpherson and Lewis (1997) examined the LTSA claim that the reduction in road fatalities in New Zealand from October 1995 to mid 1996 was predominantly due to their television advertising campaign running during that period. While there was a recorded drop in road fatalities up to March 1996, the number of road accidents actually increased by 14% when compared to the previous year (Vasil, 1996). Macpherson and Lewis (1997) disagreed with the findings of Falconer (1996) and Gregg (1996) who attributed the interim fall in road fatalities to the intensive publicity campaign. Macpherson and Lewis (1997) noted that road fatalities were already following a downward trend and concluded that the expensive publicity campaigns did not significantly contribute to the recorded drop in road fatalities. Rotfeld (1999) posits that the New Zealand campaigns did not have the desired effect because they displayed two popular flaws. These were, a lack of understanding of the target audience and the coordinators' biased notion of there being an optimal level of fear. These acted as major contributing factors to the suboptimal performance of the campaigns.

Booze buses are bus size vehicles operated by the police which can be parked at any roadside location. They support Random Breath Testing activities by providing a purpose built facility for testing possible drink drivers.
5.9 The Irish model - National Safety Council and the Road Safety Council

Ireland's first comprehensive road safety strategy focused on the two primary contributing factors in road traffic accidents; inappropriate speed and drink driving. It also promoted the use of seatbelt wearing. The National Safety Council initiated three major publicity campaigns between 1998 – 2003, designed to change both attitudes and behaviour in these three key areas. Lyle Bailie International is the advertising agency responsible for producing Ireland's high threat road safety adverts. The following pages provide a breakdown of the results achieved by these Irish road safety adverts.

5.9.1 "Crush" advert

The “Crush” television advert marked the beginning of the North/South co-operation programme which went on to produce the “Shame” and “Thump” adverts. The “Crush” advert began airing in August/September of 1999. The advert, which was sponsored by Shell, was designed to highlight the vulnerability of road users. Over its three year lifespan, awareness of the “Crush” campaign grew from 53% to 68% among adults surveyed and from 58% to 72% among the drivers surveyed. The survey highlighted that the respondents' feelings of personal vulnerability as road users had increased from 76% to 90% among the adults who were aware of the advert. Personal vulnerability was reported to have increased from 80% to 91% among the drivers surveyed who were aware of the advert (NSC, 2000).

5.9.2 "Thump" advert

The anti-speeding television commercial “Thump” was launched on the 8th June 1999 by then Minister of State Mr. Bobby Molloy. The advert, which targeted young drivers, was produced in partnership with the Department of the Environment in Northern Ireland and with the sponsorship of AXA Insurance (NSC, 2000). Awareness figures for the “Thump” advert rose from 82% in July 2000 to 83% in May 2001 and subsequently soared to 99% in October 2001 among 17 - 24 year old drivers (Lyle Bailie International, 2004).
The "Thump" advert proved influential with the Irish public. A survey by Lyle Bailie International in August 2001 found that the advert influenced 91% of all respondents. A survey of drivers in May 2002 found the advert still influenced 91% of drivers. However, behaviour change figures were much lower. The advert was found to have prompted 56% of adults surveyed and 48% of the target group (17 - 24 year olds) to drive more carefully in 2000 (NSC, 2000). Reported behaviour change figures were stagnant at 56% among drivers in May 2001 and only rose by a modest three per cent to 59% by October 2001 (Lyle Bailie International, 2004).

5.9.3 "Shame" advert

"Shame" was a high threat, anti drink driving advert which was aimed at young drivers. It was launched by Minister Noel Dempsey TD and Minister Sam Foster of Northern Ireland on 29th November 2000. The advert, sponsored by AXA Insurance went on to win the Hollywood Radio and Television award for the World’s Best TV Live Action Commercial. The award winning advert achieved a recall rate of 85% among its 17 – 24 year old target market. According to National Safety Council 94% of the young drivers questioned said that the advert had provoked them into thinking about the implications of drinking after one or two pints (NSC, 2000). Awareness levels recorded for "Shame" were high among drivers in general and also among those drivers who drank alcohol. In January 2001 awareness levels of 86% were recorded for both groups. A year later in January 2002, both groups registered a 93% awareness level. By May 2002, the awareness level had climbed further still to 96% in both target groups. By September 2003, it was found that 93% of drivers were aware of the "Shame" commercial while 94% of drivers who drink were aware of the advert (Lyle Bailie International, 2004).

In January 2001, "Shame" was found to shock 96% of those drivers who had seen the advert into thinking about the dangers of drink driving. In August 2001, the "Shame" advert was found to influence 91% of people surveyed. By May 2002, influence levels remained high at 89% among those surveyed. The high production quality and style of the advert ensured advertising wearout was slow. The advert was effective in provoking cognitive processes leading to elevated levels of awareness, cognition and
influence. However, significant attitude change did not materialise. In August 2000, approximately 56% of drivers who drink thought that having one drink was acceptable (22% of respondents thought it was very acceptable and 34% of respondents who drink thought it was fairly acceptable). Despite initial promising results, by September 2003, only 55% of those surveyed still thought one drink was acceptable (29% of respondents thought that one drink was very acceptable while 26% of respondents thought that having one drink was fairly acceptable (Lyle Bailie International, 2004).

5.9.4 “Damage” advert

Seatbelts are the most effective countermeasure in reducing the severity of injuries in collisions. Launched in June 2001, the “Damage” advert was used to promote seatbelt wearing in Ireland. It has been running intermittently on Irish television ever since (Gormley and Fuller, 2006). Seatbelt wearing rates in Ireland have improved dramatically in recent years. This relatively recent improvement in seatbelt compliance rates is possibly due, at least in part, to the “Damage” road safety publicity campaign.

The “Damage” advert boasted consistently high awareness levels among drivers and among its 15 - 34 year old target audience. In June 2001, “Damage” was the highest spontaneously recalled advert in the Irish Marketing Journal Adwatch top ten. In September 2001, awareness levels stood at 92% for both drivers and the 15 - 34 year old target audience. By May 2003, awareness levels remained high with 92% of drivers and 91% of the target group being aware of the road safety commercial (Lyle Bailie International, 2004). In September 2001, the “Damage” advert was found to influence 94% of the respondents interviewed (75% were influenced a lot and 19% were influenced a little). By May 2003, influence levels were still found to be high at 90% among those surveyed (66% influenced a lot and 24% influenced a little) (Lyle Bailie International, 2004).
The "Damage" advert appears to have been successful in winning the moral argument on seatbelt wearing. A survey of 15 - 34 year olds found that the perceived moral inexcusability of not wearing a seatbelt increased from 78% to 92% from May 2001 to May 2003. The adverts central message "No Seatbelt, No Excuse" effectively undermined the perception that seatbelt wearing was a personal choice. When asked if "not wearing a seatbelt was selfish", 74% of all the respondents agreed with this statement in a pre May 2001 survey (39% strongly agreeing and 35% agreeing with the statement). A survey in May 2003 revealed that 82% of respondents agreed with the statement (53% strongly agreeing and 29% agreeing with the statement) (Lyle Bailie International, 2004). However behaviour change is notoriously difficult to achieve even when awareness levels of a road safety advert are very high. High personal change costs were also found to be barriers to behaviour change (Dejong and Atkins, 1995). Following the introduction of the "Damage" advert, 86% of the 15 - 34 year olds surveyed reported they wore a seatbelt more often when travelling in the front seat. By May 2003, this figure had slipped slightly to 84% for this target group (Lyle Bailie International, 2004). There were no changes in rear seatbelt wearing rates among 15 - 34 year olds.

5.9.5 “Home” and “Texting” adverts

"Home" and "Texting" were high threat adverts used to highlight the vulnerability of pedestrians as road users. The adverts were aimed at both pedestrians and drivers. In February 2004, the awareness levels of the "Home" advert was found to be 88% among all respondents, 92% among drivers and 82% among non drivers. The commercials were found to be highly effective in promoting behaviour change between January 2003 and February 2004.

Among the most impressive behaviour improvements reported was the increase in encouraging someone to pay more attention to pedestrians while driving. There was a reported 34% increase in this behaviour for the period. Furthermore, there was a 48% increase in drivers encouraging someone to pay more attention to pedestrians for the period January 2003 - February 2004 (Lyle Bailie International, 2004).
5.9.6 Conclusion

An efficient media campaign must ensure that the "moral context" is properly communicated because the context serves to determine the perceptions of the individual. Mr. Lyle (CEO of Lyle Bailie International) stresses the need for "a focus on integrating enforcement and education efforts" to support mass media campaigns. Mr. Lyle maintains that "continuous (or revolving) interventions are essential to winning the moral argument (including rebuttals)" (Lyle Bailie International 2004, p.112). Continuous interventions are needed to "disrupt the road user's psychological self deception" (Lyle Bailie International 2004, p.112). Mr Lyle also makes the point that due to driving being a daily behaviour the road user is conditioned to being over confident. In order to prevent a counter argument being fostered by the general public via negative public relations, a keen eye must be kept on public opinion. Commercials should work to "humanise the problem" (Lyle Bailie International, 2004, p.81).

Lyle Bailie International conducted a survey in November 2003 to assess what factors people personally perceived as being most influential in moderating their driving style. The survey revealed that the introduction of penalty points influenced 72% of those surveyed while the National Safety Council adverts were found to influence 56% of respondents. Other factors that were found to influence people was Gardai enforcement (40%), penalty points imposed by the courts (39%), news coverage (38%) and appeals from public figures (17%).

A similar but slightly larger survey was conducted by market research agency Millward Brown. According to this survey of 500 people, new road traffic laws were found to influence 74% of those surveyed. The National Safety Council adverts were found to influence 63% of respondents. Other factors that merited inclusion in this survey was Gardai enforcement (45%), penalty points imposed by the courts (41%), news coverage (39%) education in school (25%), road engineering (24%) and car design and safety features (19%). The striking similarity between the two surveys lends weight to their respective findings.
It can be concluded that in November 2003, between 56% - 63% of the Irish population perceived the National Safety Council adverts to be influential in saving lives in Ireland (Lyle Bailie International, 2004). The goal of social marketing is primarily behavioural change and yet this is often not achieved (Rotfeld, 1999). Social marketing activities that only increase public awareness without provoking actual behaviour change are a suboptimal use of allocated resources given that road safety budgets are finite. However caution is needed in interpreting statistics. Sutton (1982) suggests that results in social marketing may be slower to reveal themselves than commercially orientated marketing efforts. Sutton suggests that the benefits of social marketing are most likely to be the result of the cumulative effects of different marketing activities over a number of years.
Chapter 6

Methodology
6.1 Introduction

This chapter serves to outline and justify the research process utilised for this thesis. Reliable and valid data form the cornerstone of any credible study. As such, the author seeks to offer a transparent account of the objective and systematic research methodology employed in this research. As is the nature of research, certain findings along the way have shaped the course of the study but sound research methodology has been maintained throughout.

6.2 Problem definition

Problem definition represents the first stage of the research process. Unless a problem is correctly defined from the outset, subsequent expenditures of time, money and effort are for nought (Butler, 1994). The problem definition process provides a researcher with "a broad statement of the general problem and identification of the specific components of the marketing research problem" (Malhotra and Birks, 2006 p.30). The problem definition stage can be further subdivided into four interlinked stages; problem identification, problem clarification, problem formulation and objectives or hypothesis (Domegan and Fleming, 2003).

For the purposes of this research the problem was defined as exploring "the application of social marketing in reducing road traffic accidents among young male drivers". Having defined the research problem allows the researcher to logically map out the information gaps that need to be addressed. It also serves to crystallise the aim of the study in the mind of the author. The aim of this research study is grounded in the application of social marketing. A definition of social marketing is provided by Kotler and Zaltman (1971):

"Social marketing is the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research".

Kotler and Zaltman (1971 p.5)
6.3 Research objectives

"The culmination of the problem/opportunity formulation process is a statement of the research objectives".

McDaniel and Gates (1993 p.38)

Defining the research objectives is necessary to steer the research towards a solution. The research objectives of this thesis are:

- To investigate the reasons behind the high representation of young male drivers in Irish road fatality figures.
- To investigate the effect on young male drivers of fear appeals that focus on death and disability as a consequence of bad driver behaviour.
- To investigate the effect of high physical fear advertisements on young male driver attitudes.

Research objectives are statements of intent and act as an intellectual compass bearing for researchers swamped in a sea of data. How these statements of intent are realised is plotted through proper research design. Varadarajan (1996) suggests that the value of research is related to its contribution to knowledge. Clearly defined research objectives help to counter the tendency towards academic drift whereby the researcher explores tangential avenues of research which, while interesting, are of limited use in addressing the stated research objectives.

Additionally this thesis also asks two main questions:

- What should road safety advertisements contain in order to reduce young male road deaths and injuries?
- What level of fear should be used in advertising to change young male driver behaviour?
6.4 Research design

"Knowing what you want to find out leads inexorably to the question of how you will get that information".

Miles and Huberman (1984 p.18)

Research design is "a framework or blueprint for conducting the market research project...it specifies the details of the procedures necessary for obtaining the information needed to structure or solve marketing research problems" (Malhotra and Birks, 2006, p.58). High-quality research design ensures the collection of sufficient, current, relevant and accurate data in a timely and economic manner. Data can be classified as "primary" or "secondary" data.

Secondary data are data which has been previously collected by other parties for some purpose other than the researcher’s problem. While often of questionable relevance and objectivity, this data, gleamed from desk research, is easy and inexpensive to source. For this reason, secondary data sources should be exhausted before primary research is undertaken.

Primary data relate to data that are collected by the researcher specifically for the particular purpose of the study. By its nature, it is usually complete and highly relevant data. However it is expensive in terms of time and associated costs. Data are said to be either "internal" or "external". Internal data relate to data sourced within an organisation while external data are contained in published and commercial sources outside an organisation. Internal primary sources usually relate to the opinions of workers inside an organisation. In contrast, external primary data usually relate to the opinions and attitudes of individuals outside an organisation. It is typically gathered by employing research activities such as surveys, interviews, (and/or projective techniques), observation, simulations, experiments and focus groups.
6.5 Data collection method

As compliant with standard data collection methodology, secondary data sources were first interrogated before primary research was undertaken. An extensive trawl through reports from national, international and European bodies offered vast quantities of secondary data. Academic journals from online databases such as Science Direct were sourced via electronic means. A high proportion of the secondary data analysed was procured digitally which aided in the expedient gathering and subsequent extraction of pertinent data. Library books from Cork Institute of Technology, University College Cork, Cork City library as well as inter library loans supplemented any data deficiencies.

Market research is said to be either “qualitative” or “quantitative”. Quantitative research relates to research which utilises a mathematical model to derive research results. This positivist research methodology is suited to comparative studies where numerical models can be utilised. Conversely, qualitative research lends itself to in-depth, investigative research which goes beyond the scope of numerical models.

"Qualitative research can be defined as the collection of data which is open to interpretation, for instance on attitudes and opinions, and which may not be validated statistically”.

Domegan and Fleming (2003 p.141)

Qualitative research consists of “an array of interpretive techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world” (Van Maanen, 1979 p.520). Qualitative research produces “soft data” (non numerical data) in the form of opinions, attitudes etc. Focus groups have become synonymous with qualitative research (Moran, 1986).
Focus groups usually consist of eight to twelve participants who are led by a moderator in an in-depth discussion on a particular topic or concept (Domegan and Fleming, 2003 p.143). Originating as a tool employed by psychiatrists in group therapy, focus groups have since grown to become a popular qualitative research technique in social science research (Merton et al, 1956). The distinguishing characteristic of focus groups is the group interaction it facilitates. This feature of focus groups has been identified as “synergy” by (Keown, 1983) and later as “group effect” by (Carey, 1994). According to Morgan (1988) this unique feature of focus groups permits researchers to gain a greater understanding of the origins of the data gathered and the cognitive processes at work among the participants.

The homogeneity of participants within focus groups permits a lively group dynamic even when individuals do not know each other personally. Participants will share certain characteristics which make them suitable for the research problem being explored. These characteristics may be based on physical, behavioural or psychological factors. In this study young male drivers between the ages of 17 - 24 years were the target profile. Consequently, only persons who fitted this description were permitted to participate in the focus groups. Domegan and Fleming (2003) assert that focus groups are normally employed to generate ideas, deepen the understanding of the customer segment and unearth customer needs, attitudes, perceptions and motives. The qualitative data gained from focus groups may also be used to explain quantitative results from previous research.

Stewart and Shamdasani (1990) suggest that the optimum number of people in a focus group is typically six to twelve persons. This allows for the inter-stimulation or “snowball effect” which sees a group gain conversational momentum as more people share opinions and extend lines of inquiry. However, if too many participants are present, stronger personalities tend to dominate the input, shape the emergent mentality of the group and consequently suppress the views of less vocal participants (Morgan, 1988). Other researchers give only slightly different ranges for the optimum number of participants in a focus group. Few advocate the assertion by Hess (1968) that up to 20 people can partake in an effective focus group.
According to Calder (1977), focus groups can be classified into three groups; exploratory, clinical and experiencing. Exploratory focus groups are used for “fishing” which involves defining problems, generating hypotheses, exploring ideas and preparing for quantitative research (Krueger, 1988). Clinical focus groups use moderators with a background in psychology in order to gleam information from participants that may consciously or subconsciously withhold their true feelings. Clinical focus groups represent the purest form of qualitative research because their underlying premise suggests that individuals do not properly understand their own true motivations and feelings. Experiencing focus groups investigate the experiential process of buying, using, reusing and disposing of a product through the customers’ eyes.

Due to the complexity of the road safety issues associated with young male drivers, exploratory focus groups were utilised for the purpose of this research. These type of focus groups are typically used to flesh out the issues involved when large information gaps are present. Theoretical research in the area of road safety campaign management has strongly advocated the use of qualitative research over quantitative research when researching the topic (Elliott, 1993). The use of focus groups in this research study on young male drivers appears appropriate given the complexity of the cognitive and behavioural processes associated with this driver profile.

Focus groups are run by a person called a moderator. The role of the moderator is one of catalyst, coordinator and facilitator. They are “the instrument” of the focus group. Katcher (1997) and Chase (1973) identified some of the qualities necessary to be an effective moderator. The moderator needs to be sensitive, observant, encouraging, flexible in their approach and yet assertive enough to effectively coordinate the group. A careful, measured approach is needed when conducting focus groups. Agar and MacDonnald (1995) suggest that moderators may adversely affect the group dynamic of a focus group by their very presence. Both the structure and context of the focus group are dictated by the moderator who is charged with the responsibility of optimising the descriptive data flow. The author of this work moderated the focus groups with the assistance of a trained moderator who joined in on the initial focus group discussions.
Seven focus groups were conducted between the 30th of April and the 17th of May 2007. The focus groups were held in a lecture hall called IT1 in Cork Institute of Technology. This location facilitated the use of a large projector system which was used to screen the films shown in this study. The focus groups were recorded on audio tape to facilitate data collection and analysis. The semi-structured nature of the focus groups is outlined in the interview schedule included in Appendix 2. The focus groups typically lasted between 1.5 - 2 hours.

Participants were firstly briefed on the purpose and research objectives of the study. From the outset participants were assured of their anonymity and encouraged to contribute their opinions without prejudice. Having introduced the topic, a 10 - 15 minute preliminary discussion was conducted to gather data on the driving history and driving behaviours of the participants. This preliminary discussion also helped in establishing rapport between the moderator and the participants. Having completed this discussion, participants were shown films and adverts relating to speeding, drink driving, and seatbelt wearing.

The research problem for this research was defined as:

"to research the application of social marketing in reducing road traffic accidents among young male drivers".

Having established the research problem at the problem definition stage of the research, considerations move on to the correct sample frame to use. "A sampling frame is a list of all the units (and elements) of a defined population, where no member is excluded and all members are mentioned once, and once only" (Domegan and Fleming, 2003 p.357). Unlike larger scale surveys where the congruence between the population and the sample frame is vital, the same emphasis on a highly representative sample is not necessary for focus groups (Stewart and Shamdasani, 1990). This is primarily due to the fact that exploratory research (such as focus groups) is not concerned with generalizability which is primarily the preserve of descriptive and causal studies. While mindful of this, every effort has been made to use a representative group of participants in the focus groups.
All participants were young male drivers aged between 17 and 24 years of age (the target profile of the study). The focus groups consisted of between eight to ten participants. Focus group participants were full time students taking classes in the Automotive Department of Cork Institute of Technology. These students were chosen as it was judged that:

a. They would possess a car.

b. They fitted the profile of the study in terms of age and gender.

c. They would have a high interest in cars and the transport sector in general.

While convenience sampling was employed for this research it must be noted that this non-probability sampling technique still provides a theoretically valid research platform for exploratory research of this nature. According to Greenbaum (1997), focus groups boast a variety of advantages over other research methodologies.

- The synergetic effect associated with group interaction provides the in-depth detail necessary for exploratory and descriptive research.

- The “dynamo” or “snowball” effect of the creative interaction between participants permits a greater range of ideas to be generated. This occurs as the discussion develops from an initially tentative dialogue to a more fully fledged discussion as participant confidence levels grow.

- Focus groups offer the security of numbers to participants who would be too intimidated to venture an opinion within a direct interview setting.

- The spontaneity of interaction in focus groups encourages independent thought as opposed to scripted responses tendered by participants involved in other research methods.

- The semi-structured nature of focus groups allows for a flexibility which is not achievable in other research methodologies. New areas of interest can be investigated as they arise.

- The expedient nature of data collection and data analysis arising from focus groups makes them desirable when time is a critical factor.

- Unlike some research methodologies, the physical cues and body language of participants can be interpreted.
Greenbaum (1997) and Stewart and Shamdasani (1990) have however identified a number of disadvantages associated with focus groups.

- There is a higher risk of bias when interpreting data gained from focus groups than other data collection methods. This susceptibility to bias is due to the non-numeric nature of the data and the possibility of prejudice on the part of the researchers.
- The small number of participants in focus groups means that generalising results is not viable due to the inherent statistical weakness of the data and the interconnected nature of participant responses.
- Unless a moderator can foster the right atmosphere and build rapport among the participants, the scope of the research will be limited. An untrained moderator may also prejudice the research with conscious or unconscious cues which could influence the responses of participants.
- The unstructured data gained from focus groups can prove problematic in terms of coding and analysing the data. Consequently, objectively interpreting the results may be difficult. Summarising the results can also prove troublesome due to the unstructured data yielded from open ended questions.
- The psychological profile of a person motivated to partake in a focus group may differ somewhat from the profile of the target group.

The documentaries

The schedule of each focus group can be divided into a number of sections. Subjects were firstly shown two films from a Road Safety dvd produced by Radio Telefís Eireann (RTE). The two short films (12 minutes each) were shown to participants. The first film entitled “Left behind”, contains candid interviews with parents, children and close friends of those who have been killed in road accidents. The film clearly illustrates the heartbreak experienced by those “left behind”.

124
The second documentary, entitled “Shattered Lives” deals with the serious injuries suffered by young male drivers who have been in car crashes. The documentary contains a number of interviews with young, paralysed drivers by RTE’s chief news correspondent, Charlie Bird. This short film explores the stark realities of being paralysed and the resulting life changing consequences for both friends and family. Participants were then asked to discuss both films and identify which film they found most persuasive. They were also asked to explain the rationale behind their evaluation of the films and the cognitive processes used to appraise the films.

**Anti speeding adverts**

“Wipe off 5” is an Australian anti speeding advert which highlights the consequences of speeding. The advert shows two identical cars travelling alongside each other at 60mph and 65mph. The host, Professor Ian Johnston of Monash University Accident Research Centre, talks the viewers through the consequences of this 5mph speed difference. The advert shows both drivers slamming on the brakes simultaneously and depicts the resulting skids in slow motion. The car travelling at 60mph is shown to barely impact a truck at 5km per hour. However the car that was travelling at 65mph is seen crashing into the truck at 32km per hour. The Professor ends by informing the audience that in the last 5 meters of braking you “wipe off” half your speed.

“Haunted” is an advert that depicts the emotional aftermath of a fatal road accident. The advert depicts the ghost of a young child haunting the errant driver who killed him in a road accident. The advert portrays the impact of the guilt on the driver as he is continually haunted by the memory of the dead child throughout his life.

The Australian “Scarface” advert shows only the forehead of a man against a black backdrop. In the background the sound of a car accelerating quickly up through its gears is heard. As the pitch of the revs (associated with the speed of the car) increase, a gash spreads across the whole forehead to expose the person’s skull. The message at the end of the advert is “Speed kills...slow down”.

125
“High rise” is an advert that depicts the escalating effects of speed. The advert shows a number of different cars suspended on the outside of an apartment block. The advert tells the audience that a crash at 90km per hour is equivalent to that car falling from the first floor of the apartment block. The camera then pans upwards to reveal a car three stories up (representing a 110km per hour crash) and yet another car suspended nine stories up (representing a 125km per hour crash). The advert ends with the car suspended from the ninth story plummeting to the ground. The advert cuts off before the car smashes to the ground to deliver the message “the faster you go the bigger the mess”.

“Zombie Girl” is a British advert which depicts a young girl slumped dead against a tree having just been hit by a car. As the young girl’s voiceover explains, if you hit her at 40mph there’s an 80% chance she will die. However, as the advert progresses, the dead girl begins a zombie-like transformation back to life as her bones snap back into place and blood seeps back into her ear. The girl is dragged by an imaginary force back to the point of impact where upon she awakes with a gasp. The girl’s voiceover finishes by explaining that if you hit her at 30mph, there’s around an 80% chance she will live. The advert ends with the tagline “It’s 30 for a reason”.

Anti drink driving adverts

Three drink driving adverts were shown to participants. The first advert shown “Don’t do it” is an Australian advert that depicts a drink driver who is just about to get into his car. As he searches for his keys, the empty car park fills up with different acquaintances and possible road victims who walk up to him and ask him to reconsider his decision to drink drive. The advert ends as the driver shrugs off his imagination and drives off into the darkness. The advert ends with the tagline “they keep drinking, we keep dying”.

126
The second advert, "Crash", is a British advert which depicts a number of young men sitting in a pub drinking. The driver of the group is offered a pint and after some mild hesitation, accepts it. Having made eye contact with a girl across the bar he is encouraged by his friends to "give her the look" to attract her attention. As he does the girl is flung wildly across the bar, while the protagonist and his friends are slammed face first into their table. As the girl lies dead and the would-be drink driver sits bloodied and bruised, the voiceover states "it takes less than you might think to become a drink driver".

The third advert, "Fireman" depicts a young man getting violently sick in front of the headlights of a car at night. After getting sick the man stoops down to pick up, what is revealed to be, his fireman’s helmet. The advert ends as he puts his helmet back on and walks back to the scene of the crash where crash victims are being cut out of a vehicle.

**Seatbelt adverts**

Two seatbelt adverts were shown to participants. "Pinball" is an Australian advert which firstly shows a seemingly minor car crash at normal speed. However, the advert then plays back the accident in slow motion from inside the car to show how the unbelted passenger is thrown about inside the car. The film is voiced over by a doctor who describes the injuries being sustained and the advert cuts to the hospital ward where incapacitated and mentally impaired drivers are milling about. The doctor concludes by asking viewers "Why would anyone get into a car without a seatbelt on?"

"Heaven can wait" shows the car occupants inside a car just after a crash. The advert then shows the souls of the dead occupants leaving their bodies and drifting skyward. However one driver is wearing his seatbelt and the soul cannot break free from its grasp. The advert ends as the passenger awakes to realise that he is alive because of his seatbelt.
6.6 Analysis of data

"Data analysis can be defined as a set of methods and techniques that can be used to obtain information and insights from the data".

Aaker and Day (1990 p.431)

Data analysis is a four step process of editing, coding, tabulating and summarising the data. Editing the data involves addressing such issues as ambiguity, inconsistency, incompleteness and inaccuracies in the data. Coding is the process of allotting numbers to different descriptive variables in the data so that it can be entered into statistical software packages such as MINITAB and SPSS. Both editing and coding serve to ameliorate the completeness and accuracy of the raw data by removing errors. Tabulation involves the sorting, counting and summarising of data into information.

6.7 Presentation of results and findings

Having processed the data, the findings are presented to the college. This may often take the form of visual devices such as charts and tables to summarise detailed data. The final chapter of this thesis will present the results of this research which explores the role of social marketing in reducing road deaths in Ireland. The standard technique used to present the qualitative data gathered in focus groups is the use of direct quotes from participants. This presentation style has been used in this study.

6.8 Limitations of the research

- The author read extensively on how to correctly moderate focus groups. As the qualitative research progressed the author became more professional in the efficient running of the focus groups. Every effort was made to standardise the focus groups in terms of the initial questions asked and the sequencing of these questions. However this was not always possible. Therefore due to time constraints some questions had to be shortened or omitted. The documentaries and adverts were then shown. These were show to all the focus groups.
• Moderator inexperience may manifest itself as a source of bias. Bias may also arise as a result of the interaction among focus group participants. Kahn and Cannell (1957) developed the interviewer – interviewee interaction model which identified the background, psychological and behavioural factors which influence both interviewer and interviewee perceptions. A carefully standardised approach to the running of the focus groups was employed for this study in an attempt to minimise bias. However the level of bias in the study is unknown.

• Time constraints have limited the scope of the research. Only seven focus groups were undertaken. However McQuarrie (1989) makes the point that many experts believe four focus groups to be sufficient to satisfy the criteria for credible exploratory research.

• Silverman (2005) discusses the assumption that no data can be “untouched by human hands”. The sheer act of working with the data presents its own problems. No data are intrinsically unsatisfactory but rather their usefulness is derived from their ability to answer questions. Measuring error is the variation in the information sought by the researcher and the information generated by the measurement process utilised (Malhotra and Birks, 2006).

• Focus group participants only viewed the documentaries and adverts once. Therefore their reactions must be viewed within this context. Under normal circumstances, participants would be repeatedly exposed to these documentaries and adverts thereby facilitating greater persuasion effects.

• The human need for social acceptance which is facilitated by the innate tendency to gravitate towards group norms means that focus groups are particularly susceptible to measuring effects. Every effort was made to minimise these effects by assuring participants of their anonymity and reinforcing the message that there is no such thing as a right or wrong response. However, the measuring effects of the research remains an unquantifiable component.
Chapter 7

Results and findings
7.1 Results in relation to objective 1 - To investigate the reasons behind the high representation of young male drivers in Irish road fatality figures.

7.1.1 Driving history of participants

Data gained from the focus groups appear to support statistical information which identifies young male drivers as a high risk road user group in Ireland (NRA, 2000). Over half (23) of the 45 participants who took part in the focus groups have been in a car crash. Preliminary questioning also revealed that 60% of those asked knew someone who had died in a road accident. Some participants had lost close friends in road accidents. Participants were generally found to be aware that young male drivers (such as themselves) exhibit higher road fatality rates than other road users. Participants were asked to estimate what percentage of Irish road fatalities they thought young male driver deaths represented. Estimates varied from between 15% - 80% among participants. However, the majority of respondents offered estimates of between 40% - 60% which suggests that they appreciate the high risk group they find themselves in. Participants suggested a variety of causal factors for the high involvement of young male drivers in road accidents. Speeding was perceived to be a contributing factor to road crashes. However, participants were found to distinguish between speeding and dangerous driving. Reckless driving, driver inexperience and over confidence were also identified as other likely causal factors of young male driver crashes. These findings concur with research carried out by Shope et al (1996) and Cooper et al (1995) who found that driver inexperience was linked to crash frequency. Fatigue also emerged as a major contributory factor to young male driver road deaths in the focus groups.

“Anyone can really speed on the road and not crash ...it’s the messing that goes on with two or three people speeding at the same time.”

“Most of it is not speeding, its just reckless driving.”

“I’d say tiredness would be the biggest one (causal factor).”

“It’s probably speeding and lack of experience.”
7.1.2 Factors affecting road accidents among focus group participants

Participants were asked why young drivers were so likely to engage in risky driving behaviours. Age was identified as a dependent variable on risky driving behaviour by a number of participants. The opinions expressed also hinted at the “maturing out effect” described by Williams and Carsten (1989) which has since been statistically validated by crash data from the Land Transport Safety Authority (2002). The “maturing out effect” discussed by Williams and Carsten (1989) could possibly be due to a lessening sensitivity to cultural stimuli after adolescence has passed. Evidence from the focus groups suggests that the influence of popular culture aides in the formation of attitudes relating to speeding.

“The way I look at it anyway is that when you’re 18 to 25 you’re a lunatic...then from 25 on till around maybe 55 (yrs) you’ve kind of coped on a small bit and then from 55 (yrs) on it (driving style) goes backwards (regresses) again.”

“It’s a phase at the start when you’re young...you’re watching films and you’re influenced by all these things and you just want to get out and burn (drive fast)”. 

This cultural influence may well have contributed to the underground culture of racing cars in forested areas among young male drivers living in rural areas. The vast majority of focus group participants reside in rural areas. Of the 31 drivers asked if they had ever “drove in the forestry” 21 (67%) admitted to having taken part in risky driving behaviours in forested areas in the past. Participants generally began driving in these locations from the ages of 12 and 13 years. Scrap cars were purchased at a nominal cost for the specific purpose of engaging in thrill seeking activities. Some participants indicated that they still engage in this activity. Over-confidence was also identified by participants as a major contributor to road crashes. This finding supports other studies which also find sensation seeking and over-confidence contribute to young driver crashes (Williams and Carsten, 1989; Jonah, 1986).

“They (young drivers) just don’t have a clue.”

“They (young drivers) are over confident on the road. That’s the main thing really. They hop into the car and they think they know it all.”
McMillen et al (1989) found that high sensation seekers possess better vehicle handling skills than low sensation seekers. However, the over-confidence exhibited by high sensation seekers has been found to be a major causal factor in collisions (Baxter et al, 1990). Furnham and Saipe (1993) suggest that risky driving is a source of stimulation for high sensation seeking individuals. The focus groups did find some evidence of people engaging in reckless driving behaviour for the "buzz". There was also slight evidence among participants of the mild "social deviance" referred to by West et al (1993). When asked why they did not comply with the speed limit one participant replied "rules are made to be broken".

"You do get a buzz throwing your car into a corner, especially at night time when you know there's not much traffic on the road."

One striking feature of the data from the focus groups is the lack of support for the passenger effects identified by McKenna et al (1998) and Simons-Morton et al (2005). Participants widely rejected the notion that they were more likely to drive recklessly when carrying male friends in their car. This finding, indicating that peer pressure is not a presiding factor over young male driver behaviour, runs contrary to the findings of previous studies (Simons-Morton et al, 2005; McKenna et al, 1998; Baxter et al, 1990). Participants who were asked if they believed passengers adversely affected their driving style were found to reject the proposition. All the drivers questioned contended they drove faster and took more risks when they drove alone. Participants appeared to feel a strong sense of moral duty in keeping their friends from harm. Participants also appeared to be fearful of having to live with the guilt arising from being involved in a fatal road accident. Some of the comments revealed that young men do not seem to value their own lives as highly as those of their friends. Research by the Local Authority Road Safety Officers Association has also found evidence to support this finding (LARSOA, 2007).

“If I crash with a car full of people and if you killed someone I think that would be an awful lot worse than if you killed yourself ..... if you were driving and you killed someone else, I think that would be very hard to live with.”

“It’s alright putting your own life at risk but not other people.”
Regan and Mistopoulos (2002) found that male passengers were more likely to encourage rather than discourage a driver to take risks. However, the focus group participants rejected the notion that peer pressure is a reason for high speed driving among young drivers. They generally believed that the decision to drive fast was ultimately the driver’s decision.

“Well at the end of the day it’s not them that’s driving...it’s you that’s driving. You make the decision to go (speeding) or not.”

Generally drivers were cognisant of the fact that the responsibility for their passengers safety rested with them. A few drivers did however concede that they had driven recklessly in the past to “show off” to their friends. This behaviour happened when they were younger. The practice of “showing off” to friends was also found to occur following the acquisition of a new car in order to “test the car out”.

“When you get the car first, when you bring the lads and you are obviously talking about what it’s like (the car) and how it goes...that only goes on for a week or so.”

“For the first couple of months maybe.” (showing off in a new car)

One self confessed boy racer discussed the impact his girlfriend has had on his driving behaviour. When he was younger he had consistently driven at very high speeds “off the clock” but was forced to stop this behaviour because of his girlfriend’s admonishments. This finding supports the findings of Parker et al (1992) who found that positive peer pressure can be exerted by partners, boyfriends and girlfriends.

“You wouldn’t go over 60mph with her (girlfriend) in the car or you’d definitely get a belt into the head...you get used to doing normal speed so you cop onto yourself then.”

Little research has been conducted in accessing the psychological effects of crashing on moderating driver behaviour. It emerged from the focus groups that crashing a car does alter a driver’s perceptions of their driving style. This, in turn, may lead to behaviour adaptation by the driver. The research found that crash involvement improved the hazard perception and risk assessment skills of some young drivers.
“I’d be more aware of other drivers... you’d have to watch them.”

“You think you have control ... no matter how fast you slam on top of the brakes it just isn’t quick enough.”

“You’d be more aware of road conditions... you can see that anything can happen anywhere.”

The participants also indicated that their adaptive responses to threat minimisation (seatbelt wearing) improved after having been involved in a crash. Participants who had been involved in a crash were also found to demonstrate a greater appreciation of the forces involved in a car crash.

“I think people don’t really realise (the forces involved in a crash), they think that they’d be able to hold on to the (steering) wheel or something”. (In a crash situation)

“I always wore a seatbelt after the crash.” (Major crash)

Participant responses, however, appear to indicate that the likelihood of behaviour adaptation is dependent on the severity of the crash. Those who had been involved in a serious crash were now more likely to drive safely than drivers who had only been involved in minor crashes. It appears that crash severity is a factor in predicting future driver behaviour. One participant took the view that proactive behaviour change among drivers is unlikely to occur unless a tragedy or accident scares the driver into adapting their driving style.

“It changed me for about a week but that was about it.” (Minor crash)

“I drove slow for a few days and then forgot about it.” (Minor crash)

“The only thing that will change your behaviour is when it happens (a crash)... basically when it’s too late.”
7.1.3 Drink driving among focus group participants

The focus groups revealed that young male drivers continue to drink and drive despite the ongoing anti drink driving campaigns in Ireland. Eighteen participants, (58% of the 31 participants asked) admitted to drink driving. One respondent admitted to once drinking 8 pints before driving home when he was 16 years old. Other participants related similar stories of drink driving.

"I often had a pint and drove."

"I woke up and the car was outside the door and I had no recollection of how it got there."

"Once I did (drive) after two (pints). It was not very far though…it was about a ten minutes drive."

"A couple of times I did it after only a few but one time I was very drunk but that was only on a road the size of a car…there would never be much traffic on it. I wouldn’t go on a main road that bad."

Most respondents contended that they would not drink and drive again. However some participants were sceptical that one pint could significantly impair their driving. This finding may possibly be due to the repertoire of coping responses that participants have built up as a result of previous drink driving experiences. Due to the fact that drivers were unharmed by their previous driving escapades they may now cast a jaundiced eye on anti drink driving adverts which appear to contradict their own experiences.

"You’d be safe with two or three (drinks) anyway surely."

"An awful lot of that (effects of alcohol) depends on the person too and what sort of form you’re in."

"Before sure you could nearly have four (pints)."

"A couple of pints does not affect anything."
One respondent suggested that young drivers do not intentionally set out to drink and drive. The point was made that the decision to drink drive was always made under the impairing influence of alcohol. However, six respondents indicated that they were likely to drink and drive again. This would suggest that some young drivers are predisposed to drink driving. The six respondents made the point that enforcement levels were low in rural areas.

“But you’d never say you’re going do it (drink drive) when you’re sober, you never say to yourself, I’m going have a couple of pints now and drive away home and I’ll be grand.”

I probably would (drink and drive) now to be honest with you... you know if I was going down to the local to have a few (pints).”

However, some young drivers were found to exhibit more mature attitudes regarding drink driving. These participants acknowledged that drinking even small volumes of alcohol does impair driving. They were also conscious that older drivers generally exhibit higher alcohol tolerances than younger drivers.

“Don’t drink and drive because one or two is not going do you any good anyway.”

“No (would not drink drive again) - it was pure stupid.”

“There’s an effect off it. I do know what it is.” (the effects of alcohol)

“It’s not the same (alcohol tolerance) as an old person driving.”

There was also some evidence from the focus groups to suggest that drink driving may be a learned behaviour. Parents who engage in drink driving may be influencing the mindset of their children who see them drink driving without incident. The MEAS (Mature Enjoyment of Alcohol Ltd) publicity campaign “Is your drinking affecting their thinking” may be raising an issue that has repercussions for road safety.

“I often saw the father and he’d be locked (drunk) getting into the car, and the whole way home go 30 or 40mph, and not a bother on him.”
The focus groups also revealed that young male drivers are quite willing to take a lift from a drink driver. The vast majority of focus group participants were from rural areas and their geographic isolation from transport links was found to contribute to the likelihood of them accepting a lift from a drink driver. Sixty three per cent (24 participants) of those asked had accepted a lift from a drink driver in the past. Some respondents stated that they were likely to take a lift from a drink driver again, especially during weekend nights when getting home was problematic.

“It’s alright saying now that I won’t take it (a lift), but when you’re full of drink and it’s raining outside, and some fella asks if you want a lift you’re not going to say no...you wouldn’t think twice.”

“There wouldn’t be too many lads who’d want to walk.”

“If you were stuck like you probably would.”

“I would chance it now and again.”

Participants seemed to rely on their own judgement when appraising if a driver was capable of safely controlling a vehicle after drink. This finding suggests that young male drivers are still of the belief that there is a distinction between drink driving and impaired driving. This distinction predisposes some young males to accepting lifts from drink drivers especially when their judgement is compromised by alcohol. One participant took the view that a person would have had to have suffered the loss of someone close to them in order to be able to resist the allure of a lift home.

“If he was absolutely drunk altogether, anything could happen like but if he was after one or two or three (pints) like then you might chance it if he was alright.”

“You’d want to have a brother after getting killed or something for someone with drink taken to actually say no, I’m not getting in the car with you.”
7.1.4 Speeding among focus group participants

Speeding represents the largest contributory factor to road death in Ireland (NRA, 2004). Over 80% of the participants who were asked if they speed indicated that they did so regularly. Participants generally acknowledged the dangers of speeding yet they were still found likely to engage in breaking the speed limit. A variety of reasons for speeding were offered by participants. Psychological factors appear to weigh on the propensity for speeding among young drivers. The research revealed that some drivers drive fast in order to “test their car out”. This type of high sensation seeking behaviour has already been explored by Professor Fuller of Trinity College who estimated that 14% of Irish drivers fall into this high sensation seeking category (Fuller, 2005). High sensation seekers tend to have a higher need for arousal.

“If you’re travelling away there at we’ll say 55 or 60mph you’re not going be paying much attention to what’s happening, whereas if you’re travelling away at 70mph or so you’d be paying more attention.”

“There is (a buzz), driving fast, rallying on the road a bit… im not saying every day (drive recklessly) but I would test the car out every now and then.”

“If you know your car can hold bends it makes you drive on harder.”

“There would be a bit of a buzz off it (speeding) alright.”

“There a big thrill out of it”, (speeding)

Other participants indicated that habitual driving practices and time pressures were the main reasons for breaking speed limits. It appears that speeding infractions are not always motivated by thrill seeking.

“You’re just trying to make up time.”

“I don’t know, it’s just kinda something I’ve done from the start.”

“You just don’t think about it.”
Situational factors were also found to moderate the propensity for speeding. Road type and the so called “cocoon effect” appear to influence the likelihood of speeding. Psychologist Steve Sterling suggests that modern cars have become so comfortable that they dupe drivers into driving faster than safety permits (Faith, 1997). However, the focus groups produced only tenuous evidence of this so called “cocoon effect”. The low incidence of this effect in the data could possibly be attributed to the fact that young drivers rarely possess new or luxury cars that provide this “cocoon effect”.

“You’re doing 60mph and feel like you’re going nowhere.”

The effects of road engineering and road design were also found to affect a young driver’s perception of speed and their subsequent intention to break the speed limit. Participants perceived some speed limits to be draconian and unnecessarily conservative given the high level of safety afforded by well engineered main roads. The research found that speed limits were less likely to be observed by young male drivers if they were perceived to be inappropriate for the driving situation. Some respondents indicated that they were more prone to breaking the speeding limits on main roads because of the higher safety margins afforded by these roads.

“In some places you’d be safe to speed...you know there are roads with stupid speed limits”.

“If you come onto a long straight on a road there’s the attraction to put your foot down a bit.”

However, some participants were found to favour speeding on country roads. These drivers were found to speed on country roads because of the thrill it gave them and the reduced risk of detection by the Gardai. This may offer an explanation for the high crash rate on the straight sections of rural roads as seen in (figure 3.2 and table 3-1). The level of familiarity with the roads was also found to affect travel speed.

“I never really drove hard on main roads but once you get on the back roads you just let it off”.

“You see a straight in front of you and you say to yourself, why not (speed)?”

“In certain situations, on roads that you know, you’d drive on (speed).”
The likelihood of speeding was also found to be moderated by in-car music. Research by Brodsky (2002) found that music can have a distracting influence which may adversely affect driving performance. Data from the focus groups indicate that the driving style of young male drivers is influenced by music. Seventy six per cent, (23) of the 30 participants questioned believed that music affected their driving behaviour. The participants indicated that music could have a relaxing or stimulating effect on them. The focus groups revealed that some participants were likely to drive faster when they had music on in the car.

“A lot of people drive faster like when music comes on.”

“It does affect you (music)...sitting down listening to lyric fm at 70mph is weird.” (the effects of dance music)

“For some people it does (affect their driving), they put on the radio and if they get a good song on then they just turn it up and they’d just be racing into bends.”

While more aggressive driving styles often manifest themselves in response to in-car music, the focus groups also revealed that music may have a relaxing effect on drivers. The results from the focus groups lend support to Brodsky’s findings which suggested that in-car music can relax some drivers. This relaxing effect is thought to compromise driver attention levels thereby making drivers less alert to driving hazards.

“You wouldn’t be paying much attention either to the speedometer....you’d be in cloud cuckoo land”. (when listening to music)

“It’s the same as when someone is listening to a radio, you’d be tipping away listening away to what is being said on the radio and then throw on a cd and you tune out altogether”.

“You’re more relaxed and you’re less alert...you could be tuned out.”
7.1.5 Seatbelt wearing among focus group participants

Seatbelt wearing rates are high in Ireland. The overall seatbelt wearing rate for drivers and front passengers was 86% in Ireland during 2005 (NRA, 2005a). The focus groups found that all participants questioned wore their front seatbelts. However rear seatbelt wearing rates were found to be lower. While some participants stated “I’d always put it on”, others ventured the opinion that the likelihood of them wearing a rear seatbelt “depends on the journey”. Rear seatbelts were more likely to be worn for long journeys. However, American car insurance data indicate that over half of car accidents occur within five miles of home24.

The majority of a person’s motoring takes place on roads in close proximity to their residence. The person’s familiarity with the road may also facilitate higher driving speeds. Other participants said that the hassle of fumbling for a rear seatbelt when there were three rear seat occupants sometimes prevented them from wearing a rear seatbelt.

“If there was two of us in the back I’d always throw it on but if there was a fella in the middle especially, I wouldn’t.”

24 [http://www.insurance.com/quotes/Article.aspx/artid/104](http://www.insurance.com/quotes/Article.aspx/artid/104) [15/06/07]
7.1.6 Drug driving among focus group participants

The Medical Bureau for Road Safety (MBRS) has identified drug driving as a clear and present danger to Irish road users. Research suggests that drug drivers are typically young, sober, urban male drivers. This Irish data also indicated that drink drivers are less likely to be drug drivers and vice versa (Cusack et al, 2003).

The focus groups revealed low drug driving rates among respondents. Two participants in the focus groups admitted to drug driving (cannabis) and one of these participants was from an urban area. With 58% of those questioned admitting to drink driving, it was therefore consistent with the findings of the MBRS that drug driving rates would be low among these drivers. However, a few participants indicated that they knew more drug drivers than drink drivers. The point was made that there is currently no drug test for Irish motorists.

"I know people who are pure anti drink (driving) and would be off their head on drugs and drive on."

"I would know more people who take drugs (and drive) than drink (drive) actually."

"I know people who have been stopped by the guards while drug driving and there’s nothing said to them. They (the Gardai) can’t do a bit about it. It’s a complete joke."

7.1.7 Fatigued driving among focus group participants

Research by Mahowald (2000) and Philip et al (1999) has established a link between fatigue and road accidents. Studies suggest that fatigue may be involved in between 10% - 20% of all road collisions (SWOV, 2004; Garbarino et al, 2001; Sagberg, 1999; Horne and Reyner, 1995a). The focus groups revealed a high number of drivers had experienced fatigue while driving. All of those questioned about fatigued driving admitted to driving while tired. One participant had crashed as a result of falling asleep at the wheel. Six other participants admitted to narrowly avoiding a crash having experienced a microsleep at the wheel. Participants perceived fatigued driving to be a widespread problem and viewed tiredness as being a main contributor to young male driver road deaths. This contention appears well founded given the
growing body of international evidence which suggests that young drivers account for nearly two-thirds of all sleep related crashes (Maycock, 1996; Horne and Reyner, 1995b; Pack et al, 1995). The results from the focus groups appear to support the general findings of these studies. Some participants perceived fatigued driving to be the biggest contributing factor to young driver road deaths. Other participants contended that the impairing effects of fatigue were greater than those associated with alcohol consumption.

"Those rumble strips do actually work, they saved me a few times."

"I often drove home nights there and I'd nearly go off the road from tiredness".

"I think tiredness causes a lot more accidents than drink."

"If you had a couple of pints in you, your eyes are open, you're alert, but if you're really tired you can't keep your eyes open, and you end up on the other side of the road with just the blink of an eye."

Coping strategies varied among the young male drivers. Summala and Mikkola (1994) suggest that young drivers’ inexperience and scant knowledge of fatigue coping strategies may account for the relative high fatigue related crashes among young drivers. One participant was heard to say “you have no control over tiredness”. The focus groups revealed that drinking energy drinks, opening the car window, taking a short walk or turning up the radio were coping strategies employed by young drivers. However some young drivers admitted to engaging in dangerous coping behaviours such as increasing their travel speed and altering their driving style to increase their concentration levels.

"You'd stop and have a walk around the road; you wouldn't go to sleep though... you'd pace down the road for 20 odd yards."

"If my eyes were closing I would go to sleep but if I was normally tired I would stay driving...listening to the radio, and turning up the music or whatever just to keep myself awake."

"If you drive harder (faster) it keeps you awake...it would wake you up if you start driving on."
7.2 Results in relation to objective 2 - To investigate the effect on young male drivers of fear appeals that focus on death and disability as a consequence of bad driver behaviour.

7.2.1 Responses to short films

The first documentary, "Left behind", presented the threat of death to viewers by highlighting the emotional trauma of losing a family member in a road crash. The short film was designed to show the pain inflicted on those family members "left behind". The focus group participants responded positively to this short film and it was generally agreed that it did "have an impact" and "send out a message". However, this film was generally considered less persuasive than the second documentary, "Shattered Lives", which focused on the threat of serious injury as opposed to death. The few participants who perceived the "Left Behind" film to be the more effective of the two films were found likely to have lost someone close to them in a crash. The fact that they could relate to the emotions being depicted in the film seemed to positively influence their evaluation of the film. Generally the film was well received by the majority of participants.

"Most people when they’re going out on the road like, they don’t think about who they are leaving behind."

"Well that would make people think more about their family and about how it would affect them."

"It’s easy to sit down here and look at things that happened to other people. It doesn’t hit you as much, but when it happens to yourself and you see someone else go through it, it brings it all back again."

(Participant who had lost a close friend in a crash.)

However, some focus group members suggested that the film was biased and was not objective enough to be credible. One participant took offence to what he perceived as intemperate language used in the film whereby one of those "left behind" labelled the young man who had crashed into his mother "a boy racer". The point was made that the audience did not really know the specifics of the case and this presentation was therefore one sided. The so called "boy racer" died in the crash and so had no opportunity to offer his account of the crash. This participant’s perception of the
presentation substantiates findings by Hass and Linder (1972) who demonstrated that presentations which acknowledge both sides of a story are more persuasive. Their research also found that two-sided presentations were also less likely to provoke psychological defensive mechanisms such as the response of the participant in the focus group.

"The first film seemed very biased... like you know they were saying that she was walking along and a "BOY RACER" came out and hit her."

The second film "Shattered Lives" presented the threat of serious injury to participants. The short film highlighted the ramifications of living life in a wheelchair as a result of a car accident. The frank interviews with young drivers, condemned to life in a wheelchair appeared to resonate with focus group participants. Eighty five percent of those questioned perceived the "Shattered Lives" film to be the more persuasive of the two short films. This finding suggests that young male drivers are more responsive to fear appeals which use serious injury rather than death as the primary motivator. Participants were generally more fearful of injury and its detrimental effects on their quality of life and that of their family than the prospect of death. Participants regarded paralysis as a more frightening prospect than death. This finding mirrors the results of a British study which also found that young drivers are more fearful of serious injury than death (LARSOA, 2007).

"They're showing what can happen to you if you survive...it's not everyone who has a car crash that dies like."

"I thought the second one (film) was more effective, looking at lads paralysed. If I was in a crash I'd rather be dead than paralysed."

"I know if it was me I couldn't stick it, I'd rather be dead than paralysed."

"I'd rather be killed outright."

However the results were not so clear cut when participants were asked which they considered to be a more frightening prospect; killing your friend in a crash (54%) or paralysing a friend in a crash (46%). A double standard was found to exist among
focus group participants. While almost all of the participants said they themselves would rather be killed than suffer for the rest of their lives in a wheelchair, only half of respondents said that killing their friend was preferable to paralysing them. About half of those participants questioned found death to be too final a consequence for friends even though the alternative meant committing them to a lifetime in a wheelchair. The “Shattered Lives” film seemed to be very effective in hammering home the point that not everyone dies in a crash.

“It’s more pain on yourself to see them (friends or family) killed cos you won’t be talking to them anymore but it’s more pain on them and their family to see them alive and not be able to move.”

“If it was a relation of your’s at least you’d still have them there. They might be paralysed but you’d still have them there.”

Participants professed empathy for the young drivers featured in the “Shattered Lives” film and generally expressed the view that it was easy to relate to these drivers and their stories. While participants strongly endorsed the notion of death being preferable to being totally incapacitated, they were still cognisant of the pain their death would cause their families. However, some respondents believed that the ongoing suffering that their family would endure in coming to terms with them sustaining an incapacitating injury would be worse than dealing with their death. Some respondents believed that the guilt associated with being such a burden to your family would be very difficult to bear. In short, paralysis was generally considered a much more distressing prospect in terms of its effects on the driver and their family. The short film appeared to raise the idea of young drivers having a moral duty to their families to drive safely and in so doing avoid torturing them vicariously. One participant suggested that it would make one think twice about speeding.

“Once you’re gone you’re gone like but if you have to look at your family and you’re parlayed from the neck down and they’re all trying to help you and everything, I’d say you’d feel a lot worse.”

“If you were going down the road and you were doing 60mph and it’s straight you know, and you thought, I’ll flake on, you’d be thinking will I chance it ….or say… I won’t be bothered putting them (family) through it (prospect of death/disability).”
The second documentary also proved effective in highlighting less obvious repercussions of being paralysed. A few participants were struck by the fact that the driver did not see his friends anymore due to his immobility and their busy schedules. The "Shattered Lives" documentary appeared to sidestep the problem of bias that was found to be an issue for a few participants with the first film. In "Shattered Lives" the driver himself is speaking about the circumstances leading to the crash so there is no room for doubt as to his culpability. The lack of representation by the driver involved in the crash in the "Left Behind" film allowed room for doubt among participants as to where the blame should be placed. This type of defensive reaction was neutralised by the driver’s admission of reckless driving in the "Shattered Lives" film.

"...whereas your man was saying I picked up my dad’s car, I was speeding. I remember speeding, and I’m paralysed for the rest of my life.” (Participant referring to the young driver’s admission of fault)

7.2.2 Responses to anti speeding adverts

Participants were asked to evaluate five anti speeding adverts and offer their opinions on how effective they perceived the adverts to be. The results indicated that "Haunted" was perceived to be the most effective advert followed by "High Rise" and "Zombie Girl". Approximately half of participants believed "Wipe off 5" to be effective. Only one respondent believed "Scarface" was effective. Both "Haunted" and "High Rise" are adverts which do not contain high physical threat. "Haunted" is a drama type advert that relies heavily on the use of guilt as the primary threat. Irish adverts such as "Shame" have also relied heavily on the use of guilt as a primary threat. These adverts have generally proved highly effective.

“If you did kill someone, it would be in your head for the rest of your life”.

The "High rise" and the "Wipe off 5" adverts were educational, lecture-style adverts which highlighted the effects of speed on crash severity. Participants praised the creative execution of "High Rise" which was deemed to effectively depict the escalating effects of speed.
Participants were generally impressed with adverts that were original in concept or that were executed creatively. Harrison and Senserrick (1999) found that the originality of an advert’s creative execution was linked to its capacity to evoke behaviour change. Some participants thought these adverts were informative. However, a few participants were sceptical of the claims being made by both adverts and tried to dismiss the information contained in the adverts. Defensive cognitive processes were found to be provoked by these type of lecture-style adverts.

“Everyone has different reaction times”.

“It depends an awful lot on the different cars”.

While “Zombie Girl” and “Scarface” are high physical threat adverts, there was a marked difference in style. “Zombie Girl” focused on the threat of killing a child while “Scarface” was more abstract and focused on depicting the physical injury to human flesh during a car crash. “Zombie Girl” was perceived as reasonably persuasive while “Scarface” was generally regarded as “useless”. It appears that using graphic imagery is not effective in its own right. Participants indicated that high threat adverts needed to depict the human response to the injuries sustained. Some participants however did not find the “Zombie Girl” persuasive any longer because of the effects of advertising wearout.

“We probably don’t take any notice of it because we’ve seen it so many times”.

Some participants commented that the used of children in road safety adverts was effective because they are so vulnerable and innocent. One of the participants noted that a child was used to dramatic effect in the “Shame” advert. However some of the comments were offered by young men who had recently become fathers. The comments below may be examples of perceptual bias precipitated by fatherhood. However, perceptual bias alone cannot account for the relatively strong response to the “Zombie Girl” advert which depicted a young girl getting knocked down.

“You’ll always have an impact with children.”

“Anything involving children (is persuasive)... everyone has brothers and sisters”.

148
7.2.3 Responses to anti drink driving adverts

Focus group participants were asked to vote for any of the three anti drink driving adverts they perceived as effective. From the results; “Fireman” (18), “Crash” (12) and “Don’t do it” (3) some interesting observations can be made.

“Fireman” and “Crash” are high threat adverts. They were both found to be highly persuasive. The strong performance of the “Fireman” advert was found to be due to the clever narrative which provided a twist in the storyline. Respondents contended that the inclusion of something unexpected or a twist in the storyline made high threat adverts more effective because it stimulated cognition.

“That one was the most effective I think because there was a brilliant twist to it, I thought.”

“It would catch your attention more.”

The “Crash” advert could also be classed as a high threat physical fear appeal. This advert also proved popular but some viewers found the advert “just didn’t make any sense”. The difficulty in interpreting the advert was due to the creative execution of the advert. Adverts must be comprehensible in order for them to be effective. The research suggests that adverts that are creatively executed can be more thought provoking and therefore effective. However, if the creative execution of the advert is too complex it may fail to deliver the intended message. For this reason all adverts should be extensively tested before being put on the national airways.

Dejong and Atkins (1995) contend that road safety publicity campaigns should aim to shift the societal norms of road users. Studies by Goffman (1963), Yanovitzky and Bennett (1999) and Wallack (1984) suggest that the use of social stigma is an effective strategy for promoting behaviour change. However the “Don’t do it” advert which was designed to provoke guilt and social stigma was ineffective in promoting attitude change. Research by Dejong and Atkins (1995) suggests that social marketing efforts aimed at young people should portray adolescents of their own age in the advert. The protagonist in this advert was a middle aged man. However, this does not account for the high rating given to the “Haunted” advert which also featured a
middle aged man. Further questioning revealed that the advert was generally deemed unpersuasive because it failed to draw clear conclusions and recommendations for the viewers. The image of the intoxicated man driving off into the darkness was generally regarded as an inappropriate ending. The advert failed to show the consequences of drink driving or promote any adaptive behaviour that could provide a solution to the problem. Focus group participants interpreted this to mean that “he drove off and got away with it”. These results from the focus groups appear to support previous research findings which suggest that providing specific information on recommended adaptive responses helps to maximise behaviour change (Witte and Allen, 2000). Avery (1973) also found that adverts must draw clear conclusions for the audience in order for them to be effective.

7.2.4 Responses to seatbelt wearing adverts

Both the “Pinball” and the “Heaven can wait” advert were well received. Both adverts were generally thought to be persuasive. However, since seatbelt wearing rates are already high among the focus group participants there was little interest in these adverts. The “Pinball” advert is a high threat advert which showed serious injuries resulting from car accidents. It also contained an interview with an expert in crash injuries. However, participants did not indicate whether this interview added to the credibility of the advert. It was perceived as being an effective advert. However, most participants expressed a slight preference for the second advert, “Heaven can wait”. The high production values and creative execution of the advert were important features of the advert. Again the twist in the advert proved important to viewers as this was found to facilitate positive word of mouth communications.

“It’s something you’d go and tell a fella about the next day”.

The “Heaven can wait” advert contained a moderate threat and yet outperformed the more graphic “Pinball” advert. The positive framing of the advert was considered very effective by focus group participants. The advert showed the positive effects of seatbelt use rather than the negative effects of not wearing a seatbelt. This finding suggests that high threat adverts are not always the most effective adverts.
7.3 Results in relation to objective 3 - To investigate the effect of high physical fear advertisements on young male driver attitudes.

The use of high threat, physical fear appeals is a debatable issue. While conceivably the ethical question of their use can be countered with “the end justifies the means” argument, there is still some debate as to their effectiveness. The focus groups revealed that some young drivers engage in maladaptive responses when confronted with road safety adverts. It emerged that approximately 40% of those questioned have switched over from a road safety television advert in the past because they did not want to watch it. This threat avoidance behaviour has implications for the effective delivery of road safety messages for young drivers. Other participants commented that they knew people who regularly switch over to another television channel when high threat road safety adverts appear on television. It was found that those who turn over from high threat adverts are likely to be those who lost someone close to them due to a road accident. These adverts were thought to dredge up painful memories for some people.

“I think the advertisements affect the family and friends and parents a lot more .... the young lads, they don't seem to think... it only comes back to haunt the parents.”

“You'd see the likes of my sister would just flick the channel... it would be too much for her.”

Participants had mixed views on the use of high threat adverts. Some participants took a stronger stance in relation to high threat adverts. It was obvious that some participants resented these graphic, fear inducing intrusions into their viewing time.

“If you watch people getting mangled constantly then you’re going to get desensitised or if you know someone who has had someone died you’re going to change the channel because you don’t want to watch it.”

In relation to the “Shame” advert, some participants said:

“I know a lot of people that won’t watch it”...even when they hear the song come on they change over.”

“It would sicken you (high threat adverts)......some of them are just wrong to be on telly.”
Some participants however considered that high threat advertising was necessary to deliver road safety messages to young drivers. One participant was of the belief that high threat adverts and films should be shown more frequently on television in order to instil in drivers, the necessary fear level for behaviour change.

"We're not seeing enough of it (high threat films/adverts)....that should be hammered into you, all day, every day, anytime you watch television you should be seeing it."

A few participants expressed the view that adverts needed to be made even more graphic to press home the message to an ever increasingly desensitised audience. One participant was of the opinion that because of the high level of news coverage of road crashes, people had grown accustomed to high threat communications. This opinion seems to be in agreement with the findings of Avery (1973) who found that people "inoculate" themselves from graphic news reports by reinforcing their defence mechanisms.

"It (advertising) needs to be a bit more sharp."

"It needs to be more blunt... people see that in the news every night with Charlie Bird going on about it."

Other participants suggested that high threat adverts should be used in tandem with lecture-style adverts for maximum effect. Both "Wipe off 5" and "High rise" were lecture-style adverts which educated rather than distressed the viewer. Both adverts were well received. Research by Cameron and Harrison (1998) suggests that educative-style adverts should be used to improve driver behaviour while high threat fear appeals should be utilised when addressing activities which may result in dangerous driving. Some participants referred to lecture-style adverts as "eye-openers". A number of respondents in the focus groups however, believed that high threat adverts were still necessary in order to augment the effectiveness of lecture-style adverts.

"You need both".... (high threat drama type adverts and lecture-style adverts).

"Just batting information out to you won't get the message across."
“Getting the right message and getting the message right” as Egger et al (1993 p.79) so succinctly put it, is difficult. Participants expressed the view that the threat content of an advert was not as important as the content’s ability to provoke thought. This suggests the need for cognition by viewers in order for the advert to be effective. This assertion bears a strong resemblance to the conclusions reached by Donovan et al (1995). Their findings indicated that the level of threat in an advert is a secondary consideration when designing an effective advert. The authors found that if the emotions portrayed in the advert were perceived as credible by the target group, then the advert would be persuasive.

“It’s not what you see it’s what makes you think”. (Content that makes an advert effective)

The feedback from the focus groups indicates that many participants are of the belief that advertising on its own is a redundant exercise. This finding supports quantitative research by Delhomme (1999) who found that advertising is of little benefit on its own. Rather, it should be viewed as a support for legislative and enforcement activities which seek to directly reduce road deaths. Due to the inherent difficulties associated with social marketing, long term behaviour change is extremely difficult to achieve through advertising alone. The films and adverts shown were however found to be effective in “sending a message” which did compel viewers to cognitively process the material. However, it appears that many people need to feel personal loss before behaviour change occurs. The limitations of advertising are outlined by the following participant comments.

“All television ads are a waste of time…it’s the same as the rest of them, none of them (adverts/short films) work.”

Why? - “Because it’s on the telly and it’s not real.”

“Most people who speed or drink and drive… just watching that ad isn’t going to stop them…..unless they crash or get caught or something…that’s the only way it’s gonna stop them.”

“The videos wouldn’t (change your behaviour) but if you had someone close to you that is after dying in a crash, it would like.”

“People are in front of you at funerals and you can see the effect of it whereas on the advertisements…they are a third party I think.”
The focus groups highlighted the massive gap that exists between transitory attitude change and long term behaviour change. Long term behaviour is most likely to be the product of years of "continuous interventions" that "disrupt the road user's psychological self deception" (Lyle Bailie International 2004, p.112). Sutton (1982) also suggested that social marketing campaigns may be slower to yield quantifiable results than commercially orientated marketing campaigns. Focus group participants were generally found to be unlikely to change their behaviours as a result of viewing the short films or adverts. The general consensus was that the adverts/films were, for the most part, persuasive. However the challenge appears to be in strengthening the lifespan of the message. This is conceivably possible through repeated viewings of the adverts over the course of a road safety campaign.

"It sends out a message alright but it wouldn't change the way I drive."

"It would make you think definitely, not long term though." (The two short films shown).

"It might for the first day but it would wear off (the effect)...like it wouldn't set into the back of your mind at all."

"Maybe for a short while (behaviour change) but not for long."

"A couple miles out the road and that (advert) would be out of your head straight away."

Indeed asking if an advert was likely to change driver behaviour is perhaps an invalid question given that participants have only viewed the adverts once. The effects of advertising take time to materialise. Individuals need time and multiple viewings in order to properly process the new information they gleam from every new encounter with an advert. However Krugman (1972) suggests that as little as three exposures to an advert can facilitate a decision being made to alter behaviour. Feedback from a few participants appears to agree and lend some weight to Krugman's theory.

"You'd want to watch an ad two or three times for it to sink in properly."
A general discussion on past Irish road safety adverts revealed some participants perceived a number of problems with the adverts. Some participants found that the scenarios depicted in the adverts were “fake” and overcooked. A high proportion of participants felt that the Irish road safety adverts were not realistic and this was found to have a negative impact on their persuasive potential. It appears that high threat advertising does have the potential to be effective. However the persuasive power of high threat adverts is undermined if the advert content is perceived as being unrealistic.

“The adverts aren’t realistic...I couldn’t see that happening (Shame advert)....there would be old women flipping cars every day of the week if that was going on.”

“Some of the ads they put on aren’t really realistic like...It doesn’t happen as easy as they make out in the ads either.”

“It doesn’t just happen as the way you see it on television like, it’s completely different like.”

Focus group participants also suggested that certain individuals (boy racers) are likely to reject road safety messages even if they are cognitively processed. Kotler and Zaltman (1971) and Burgess (2000) acknowledge that some personalities are resistant to the effects of advertising due to their biased view of the message.

“It’s just going to bug young people because again it’s directly aimed at them.”

“It might kinda upset some young fella, like saying that it’s targeting us and then they just go the opposite... it might have the opposite effect.”
7.3.1 Overview of findings

Provided below is a breakdown list of the study's best performing adverts in order of importance. The table categorizes adverts in terms of the level of threat utilised, the mechanism used for persuasion and the style employed by the advert. The table offers a broad overview of road safety advertising permitting some trends to be discerned.

<table>
<thead>
<tr>
<th>Advert</th>
<th>Type of threat</th>
<th>Mechanism</th>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haunted</td>
<td>Moderate threat</td>
<td>Guilt</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>High rise</td>
<td>Moderate threat</td>
<td>Logic</td>
<td>Lecture/Creative</td>
</tr>
<tr>
<td>Zombie girl</td>
<td>High threat</td>
<td>Guilt</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>Fireman</td>
<td>High threat</td>
<td>Twist in story</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>Crash</td>
<td>High threat</td>
<td>Twist in story</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>Heaven can wait</td>
<td>Moderate threat</td>
<td>Positive framing</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>Pinball</td>
<td>High threat</td>
<td>Logic</td>
<td>Lecture</td>
</tr>
<tr>
<td>Wipe off 5</td>
<td>Moderate threat</td>
<td>Logic</td>
<td>Lecture</td>
</tr>
<tr>
<td>Don't do it</td>
<td>Low threat</td>
<td>Guilt</td>
<td>Drama/Creative</td>
</tr>
<tr>
<td>Scarface</td>
<td>High threat</td>
<td>Gore</td>
<td>Lecture/Creative</td>
</tr>
</tbody>
</table>

The research provided mixed results. Adverts which used moderate levels of threat were found to be the most effective adverts in terms of initiating attitude change. However, only a small number of adverts in the study contained moderate fear appeals. High threat adverts were also found to perform reasonably well but these were subject to greater variation in performance. This variation in performance is attributed to the different creative styles employed by the adverts and the credibility of the advert message.
One reasonably consistent theme can be observed from the data. The focus groups revealed that creative, drama-type adverts are generally found to be the most persuasive road safety adverts. The creative execution of an advert is also important. It was found that adverts are more likely to be remembered if the viewer has to cognitively process the advert. Creative adverts were also found to facilitate word of mouth communications among the target group. However, creativity can also lead to the severe underperformance of an advert as demonstrated by the lowest rated advert, "Scarface". When producing an advert, it appears creative directors are walking a tightrope between creativity and comprehensibility. Consequently, adverts should be thoroughly tested before they are broadcast.

Adverts which employed guilt inducing tactics were found to be very effective. However, these type of adverts are found to under-perform if the fear appeal contained in the advert is too low to stimulate guilt. Adverts which evoked emotions such as guilt or which solicited sympathy and empathy were generally found to be considered effective by respondents. High threat adverts were found to be effective in provoking these emotions. Depicting injured children, injured friends or other vulnerable groups in high threat adverts was also found to be particularly effective according to respondents.

Drama adverts were found to outperform lecture-style adverts. Provoking an emotional response from the audience appears to aid in the delivery of the message. Drama adverts that contained a high fear appeal and evoked strong emotions were found to be effective. However, moderate fear appeals which were creatively executed and positively framed were found to outperform some high threat adverts.

Lecture-style adverts were found to vary in performance. This was essentially due to the creativity of the advert. Adverts which did not employ some type of creative device to highlight the message left little impression on focus group participants.
Chapter 8

Conclusions and recommendations
8.1 Conclusions and recommendations

Road traffic accidents are random, multi-factorial events. As such, there is no one action or recommendation that can be suggested which will eliminate their occurrence. It is outside the scope of this study to catalogue an expansive list of all the possible road safety recommendations that could be pursued in order to reduce road deaths in Ireland. Rather the purpose of this last section is to review the ideas generated by the focus groups and identify the best approaches going forward for specifically addressing the problem of young male driver road deaths in Ireland. For further reading on broad strategic recommendations for Irish road safety policy, one should consult the Review of Irish Road Safety Strategy by Wegman (2002). For an international review of road safety strategies one should consult the authoritative World Report on Road Traffic Prevention by Peden et al (2004). If the EU (and indeed Ireland) is to reach its ambitious road safety targets, then tackling young driver road deaths is of paramount importance. The Joint Transport Research Centre suggests a number of recommendations for reducing young driver road deaths (JTRC, 2006). The key recommendations of this research were synopsised in a reference document for the European Council of Ministers (ECMT, 2006 p.9). These countermeasures are as follows:

- “To proactively promote the highest possible overall levels of road safety, and ensuring the rigorous enforcement of road safety law, particularly with regards to speeding, alcohol, drugs and seatbelt use”.
- “To introduce high levels of pre-licensing accompanied practice, and protective measures during initial solo driving, including minimal BAC levels”.
- “To improve driver training and testing, including more focus on self-awareness and understanding the circumstances that lead to safer driving”.
- “To understand the benefits of technological solutions for monitoring and enforcement and for assisting the novice driver with the driving task, and selectively implementing these where they prove to be effective”.

The following discussion will evaluate these countermeasures.
8.1.1 Enforcement

"Ensuring the rigorous enforcement of road safety law" is vital if road fatalities are to be reduced on Irish roads. The Garda Traffic Corps has been in existence since 1953 but was only extended nationwide in 1973. Historically, the Garda Traffic Corps has been under resourced. However, recent expansions in resources and manpower are beginning to rectify this situation. An Garda Síochána established a dedicated Traffic Corps in 2004. In November 2006 there were 745 Gardai in the Traffic Corps\(^{25}\). By the end of 2007 approximately 1030 Gardai will have been assigned to this Garda division. However the ranks of the Garda Traffic Corps are expected to swell to 1200 Gardai by the end of 2008 allowing for increased levels of traffic enforcement on Irish roads\(^{26}\). At present, Irish enforcement levels appear to be below the average enforcement levels found in the EU (INRETS, 2004).

Mandatory Alcohol Testing (MAT) has proved very successful since its introduction on the 21\(^{st}\) July 2006. There was a 25% reduction in road deaths from August to December 2006 following the introduction of Mandatory Alcohol Testing (see footnote 26). However, drink driving remains a huge issue for road safety in Ireland. This report recommends a continuous increase in MAT activities going forward. High levels of MAT activities are recommended during weekend nights in order to bring the well established phenomena of “Saturday night fever” under control.

The Strategic Task Force on Alcohol has previously recommended that the Irish legal BAC (Blood Alcohol Concentration) be reduced from 80mg/ml to 50mg/ml in line with other European countries. This is also the recommendation of this study. Irish anti drink driving adverts declare that “one drink impairs driving” even though the Irish legal BAC remains at 80mg/ml. This discrepancy between legislation and advertising is unhelpful and sends an unclear message to the general driving public. The legal Irish BAC should be reduced to 50mg/ml in order to reflect the advertising message that is being delivered to drivers via road safety advertising.

\(^{25}\) [http://www.garda.ie/angarda/trfunits.html](http://www.garda.ie/angarda/trfunits.html) [01/04/07]

\(^{26}\) [http://www.justice.ie/en/JELR/Pages/WP07000024](http://www.justice.ie/en/JELR/Pages/WP07000024) [30/06/07]
Combined interventions should support each other rather than contradict each other. The implementation of a lower BAC for young drivers (preferably zero or 20mg/ml) is also recommended and should be implemented as a matter of urgency.

Enforcement activities should also be extended to test for drug driving. There is strong evidence of drug driving among young drivers in Ireland (Cusack et al, 2003). New pupillometery technology is now being used in the US and Australia to detect drug and fatigued drivers. This technology scans the driver’s retina to detect signs of fatigue or drug use. Following the appropriate testing of this new technology by the Medical Bureau of Road Safety, the Gardai should adopt this new enforcement tool. However new legislation may have to be passed to support this new detection technique.

Focus group participants suggested that opportunistic, speed enforcement activities should be redirected away from low speed urban roads. Participants suggested that more widespread speed enforcement activities were necessary on secondary and country roads. This seems appropriate given the high fatality rates on these road types. The Government’s Road Safety Strategy 2004 - 2006 proposed a privately owned, nationwide network of 500 - 600 speed cameras that would be capable of processing 11.1 million speed checks per year. In August 2005, the Department of Justice published a “Report on the Use of Safety Cameras in Ireland” which broadly supported this proposal subject to a number of criteria. These cameras represent a highly effective road death counter-measure. While raising revenue and the perceived threat of law enforcement, the camera system would also help reduce the total cost of road accidents in the state. The estimated cost of all fatal and injury road collisions reported to, and recorded by, An Garda Síochána in 2006 was €1.33 billion (R.S.A., 2007). This camera system should be delivered as a matter of urgency in order to curb speed related crashes. Speed related crashes are strongly associated with young male drivers.

27 http://www.justice.ie/80256E010039C5AF/vWeb/fJUSQ6EQCD6en/$File/safetycameras.pdf [20/02/07]
8.1.2 Graduated driving licensing systems

It is estimated that there are 430,000 provisional drivers on Irish roads. Focus group members suggested that inadequacies in the current Irish driving license system were significant contributory factors to Irish road deaths.

“It’s down to the government I think. How can someone with no experience walk into a place, get a licence and drive away the same day?”

“You can drive for two years on a provisional licence and having failed your driving test, sit into your car and drive away home”.

“Provisional licenses could be looked at.”

The implementation of a Graduated Driving Licensing (GDL) system represents one of the most promising prospects for reducing young male driver road deaths in Ireland. The introduction of such a scheme would help to combat the primary problem areas of speeding, drink driving, and risky driving among young drivers. However, the system would only be of benefit if credible enforcement levels and robust legislation are in place to support it.

The concept of a Graduated Driver Licensing (GDL) system was first developed and implemented in New Zealand. GDLs have since been adopted in Canada, Australia and a host of American states. A GDL system provides young drivers with a structured, three stage licensing framework. The system permits novice drivers to gradually gain valuable driving experience over time in low-risk environments. However, these schemes impose special traffic rules and strict restrictions on novice motorists. GDL systems vary from country to country in terms of the conditions imposed, the duration of the licensing period and the composition of the driving tests to be undertaken. However, certain characteristics apply to most GDL schemes. These may include a night-time curfew for novice drivers and a restriction on the number of same age passengers allowed in the car while driving without supervision. A lower legal BAC level is also applicable to novice drivers and demerit points for driving offences are also tougher for these provisional license holders.

28 “New plans to tackle driving test logjam”, The Irish Times, 24th Aug, 2006 p.6
GDL systems typically have three distinct stages. Young drivers are firstly given a probationary license which only permits them to drive under the supervision of a licensed driver. Following a minimum time period of safe and crash free driving an intermediate license is awarded to the driver. This license provides the driver with the opportunity to drive unsupervised and gain more driving experience. However the same restrictions generally apply to the driver during this period. Upon the successful completion of a driving test a full license is awarded to the driver which affords them full, unrestricted driving rights.

Vlakveld (2005) produced a report investigating the most effective countermeasures that can be enacted to curb young driver road deaths. The report found that imposing a zero BAC level on novice drivers could dramatically reduce young driver road deaths. However the lowering or total prohibition of alcohol for young drivers is just one road safety measure supported by a GDL system.

Young driver curfews and passenger restrictions have also been found to reduce young driver fatality figures. Vlakveld (2005) cites statistics from Austria which confirm that the implementation of a night time curfew and the prohibition of carrying same age passengers make significant contributions to reducing road fatalities. Accompanied driving is yet another effective safety measure that is legislated for under a GDL system. Vlakveld’s report cites statistics from Sweden which indicate that the crash rate for the first two years of driving can be dramatically reduced by accompanied driving. The data found that if a licence was obtained after gaining experience during a period of accompanied driving (for an average of 4,000 km), the resulting likelihood of a crash was 45% less. The positive effects of accompanied driving are also documented in a report entitled “Young driver risks and effective counter-measures” (ECMT, 2006). The report recommends at least 50 hours of pre-license driving practice for novice drivers. The introduction of “high levels of pre-licensing accompanied practice, and protective measures during initial solo driving, including minimal BAC levels” have been identified by the Joint Transport Research Centre (JTRC) as being particularly effective countermeasures.
Due to wide variance in GLD systems meta analysis is not possible. However, Hartling et al (2004) analysed 13 studies which had investigated the effects of implementing GDL systems. The research indicated that there was a 26% - 41% fall in road crashes involving 16 year old drivers during the first year of implementation when compared with the year prior to implementation. It should be noted that due to the scope of the research it was not possible to say to what extent the GDL system was responsible for this drop in crash figures. However, a growing body of research suggests that GDLs may reduce road deaths by between 10% - 60% (Hedlund, 2005; Hartling et al, 2004; Hedlund, 2003; Senserrick and Whelan, 2003).

Considering the high number of provisional drivers on Irish roads, a GDL system appears to hold much promise. In Ireland, it is mandatory for first time provisional drivers to be accompanied by a fully licensed driver at all times. However, this law is rarely enforced by the Gardai due to the sheer number of provisional drivers on Irish roads. It is unknown how many first time provisional drivers are driving unaccompanied on Irish roads every day. If the law regarding provisional drivers was strictly enforced in Ireland it would have economic implications for the Irish exchequer given the necessity for a mobile workforce. A provisional car driving license can be issued to a person of 17 years in Ireland. However a report by the European Council of Ministers states that “before the age of 18, any lowering of the age for solo driving will result in increased overall fatalities, and should be resisted”. It also recommends that “licensing conditions for motorised two-wheeled vehicles should be similarly stringent to avoid migration toward less safe forms of transport” (ECMT, 2006 p.3). A Graduating Driving Licensing scheme appears to hold real potential in terms of reducing young male road user deaths in Ireland. However, other issues such as the expansion of the Traffic Corps, the reduction of waiting times for driving tests and the expansion of public transport services need to be addressed if a GDL system is to be successful in Ireland. The Road Safety Council suggests that by March 2008, driving test waiting times will be reduced to no more than ten weeks29. However the implementation of a GDL system is still likely to prove unpopular and will require strong political leadership to be pushed through.

29 http://www.rsa.ie/NEWS/News/PACKAGE_TO_TACKLE_DRIVING_TEST_BACKLOG_ANNOUNCED.html [09/07/07]
8.1.3 Hazard perception training

Focus group participants suggested that deficiencies in the Irish driving test should be addressed in order to reduce young male driver road deaths going forward. The participants suggested that the current Irish driving test is inadequate as it fails to test a driver’s ability to drive safely on country roads. Focus group respondents contended that a hazard perception test should be incorporated into the Irish driving test. Maycock et al (1991) have also suggested that equipping drivers with the necessary skills for safe driving would result in a reduction in road fatalities. Hazard perception training teaches drivers “to read the road” and identify potential driving hazards quickly. In doing so, dangerous driving situations can be avoided before they arise. Gibson (1969) referred to hazard perception as “perceptual learning”. Early research into the field of hazard perception revealed that young drivers typically only scan the road immediately in front of them and fail to look further up the road for potential hazards (Brown, 1982; Mourant and Rockwell, 1972). Research by McKenna and Crick (1993) investigated the hazard perception latency of expert drivers, experienced drivers and novice drivers. The study showed that novice drivers had the slowest hazard perception response times of all the drivers tested. However, studies evaluating hazard perception training have produced mixed results.

A review of 14 controlled studies relating to defensive driving courses did not produce any consistent evidence of lower participant involvement in crashes (Lund and Williams, 1985). Research by the Department of Transport in Britain found that hazard perception training positively influenced participant responses in laboratory perception tests. However, the same level of improvement in hazard perception skills was not evident in participants who took part in on-road assessments. Both focus group participants and the JTRC (2006) strongly advocate training which focuses “on self-awareness and understanding the circumstances that lead to safer driving”. More research is needed to broaden the knowledge base in this area so that effective training courses can be designed for young drivers. However, young driver hazard perception training remains a promising road safety measure and should be kept under review.

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30 http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme2/theeffectsofhazardperception4761 [01/05/07]
8.1.4 Advanced driving training

According to Kuiken and Twisk (2001) drivers need to be continuously evaluating driving task requirements in order to determine the driving actions or avoidance reactions needed to overcome different driving situations. Young drivers are often found to exhibit a lack of metacognition. A lack of metacognition relates to a driver’s inability to effectively discern the gap between their inadequate task skills (a lack of higher order skills) and the skills needed to safely negotiate driving situations as they arise. This matching of the task skill to the driving task is called “calibration”. Calibration is seen to be an essential element in safe driving. Consequently, "improving driver training and testing" is a key recommendation of the Joint Transport Research Commission.

The focus group participants offered mixed opinions regarding the effectiveness of advanced driving courses. A number of drivers had completed the Hibernian “Ignition” advanced driving course. Some of those who had participated in the course were dubious about the benefits of the training. They suggested that the motives of young drivers undertaking the course were primarily fiscal. They admitted that, at the time, they were more interested in passing the course and receiving the insurance discount than actually applying themselves to learning new driving skills. However, a similar number of other drivers felt that they had benefited from the course and recommended it highly.

In order to pass a driving test, novice drivers must demonstrate that they can safely operate their vehicle and negotiate a variety of different traffic situations. However, passing a driving test does not mean that a driver possesses the necessary skills to deal with complex driving situations. “Second phase training” or advanced driving training takes place after a driver has passed their driving test. Second phase training relates to teaching drivers “higher order skills”. These skills may include advanced car handling techniques such as skid control and emergency manoeuvres. A number of studies suggest that novice drivers’ poor grasp of higher order driving skills is a major contributory factor to their elevated crash rates (Engström et al, 2003; Deery, 1999). However, research has found that advanced driver training which focuses on vehicle handling skills such as skid control and emergency manoeuvring can produce
counterproductive effects in young drivers. Research suggests that this type of training may actually negatively affect the driving style adopted by a novice driver (Christensen and Glad, 1996; Gregersen and Bjurulf, 1996). Research by Craen et al (2005 p.70) also concluded that the effects of second phase training “are limited, and can even be negative”. Furthermore, a study by Lund et al (1986) found that while young drivers who participated in an advanced driving course were more likely to pass their driving test, they were also significantly more likely to be involved in road accidents. While young male drivers may suffer from a lack of metacognition, it appears that training can exasperate this condition. Focus group participants themselves generally agreed that teaching young drivers advanced car handling skills would most likely result in elevated driver confidence levels and subsequent reckless driving. Focus group participants did however suggest that basic car driving classes should become part of the secondary school curriculum. The point was made that driving is unquestionably an essential life skill in modern Ireland. Some respondents suggested that if young people learned how to drive properly from the outset (instead of “going down to the forestry”) dangerous driver behaviours could be eliminated. Dangerous driver behaviours it appears are learned from a young age and reinforced over time. Early interventions were considered necessary.

“If you got them trained in to go slow … it’s the same with a seatbelt like, some fellas couldn’t wear a seatbelt but once you start wearing a seatbelt you can’t get into the car then without it.”

However, research has shown that drivers who have taken formal driving lessons from trained instructors do not boast lower crash rates than those drivers who took informal driving lessons supplied by non experts such as parents (Elvik and Vaa, 2004). Earlier research by Raymond et al (1973) also failed to find any significant effects of formal driver training among British high school pupils. The process of positively altering young driver behaviour remains difficult to achieve through training and still confounds researchers. Until the problems in delivering effective road safety training are more fully understood it is therefore advisable that other road safety measures be exhausted before embarking on a secondary school driver training programme. However, there is a strong case to be made for some form of classroom based driver education programme that takes place well before pupils mature to driving age.
8.1.5 Engineering and technology

Focus group respondents stated that poor road infrastructure contributes to road accidents. The European Commission estimate that roughly 600 deaths and some 7,000 accidents could be prevented if improvements were made to the trans-European road network. These improvements in road infrastructure could reduce fatalities by between 12% - 16% and decrease road accidents by between 7% - 12% (Directorate General for Energy and Transport, 2006). The risk of fatal collisions on rural roads is estimated to be as high as 11.5 fatal crashes per billion vehicle kilometres. This is six times higher than the typical motorway collision rate (ETSC, 2005a). In some European countries between 50% - 75% of all road accidents occur on rural roads. Research from the European Road Assessment Program (EuroRAP) indicates that rural roads represent 91% of the Irish road network. This finding, (quoted in the “Motor vehicle speed in the EU fact sheet”) suggests it is reasonable to conclude that Ireland’s road network is partially responsible for the high number of road deaths in Ireland (ETSC, 2005a). Furthermore, the motoring organisation, the RAC, found Irish roads to be the fourth worst in the EU31. Further investment in 2+132 roads, road safety audits and remedial road safety engineering should continue in order to reduce the risks of motoring in Ireland.

Focus group respondents also suggested that technological developments could prove highly effective in reducing young male driver road deaths. “*Understanding the benefits of technological solutions for monitoring and enforcement*” will become more important as new technologies evolve. New fleet management technologies are beginning to trickle down to private road users. There are already devices on the market33 that can be fitted to the car which will inform parents via text message if their child has exceeded the speed limit. The parent also has the option of immobilising the car the next time it is parked. As yet, these devices are still quite

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31 “Irish roads fourth most dangerous in Europe, says study”
http://www.breakingnews.ie/2006/08/04/story270752.html [13/08/06]

32 A 2+1 road is a specific category of three-lane road, consisting of two lanes in one direction and one lane in the other, alternating every few kilometers, and separated usually with a steel cable barrier.

33 http://www.halosecruir.ie/products/parentalcontrol.php [26/06/07]
expensive, retailing in the region of €1000 with additional monthly monitoring costs. However, focus group participants believed that the threat of parents removing the privilege of using the family car would act as an effective deterrent to reckless driving.

It must be remembered that the effectiveness of any enforcement system is dictated by the perceived certainty of punishment. Technological developments such as these fleet management systems elevate the perceived certainty of punishment. However, as yet there is a distinct lack of research pertaining to the effectiveness of these fleet management systems for private use within Ireland. This area does hold particular promise and is currently being used by the car insurance industry. Further work needs to be done in this area to fully develop this market so that this technology becomes so financially attractive to all young drivers (not just those insured on a family car) that they feel compelled to use it. Government subsidies could be used to accelerate the uptake of this technology.

Technology will undoubtedly have an ever increasing role to play in road death prevention in Ireland. Technological innovations such as Intelligent Speed Adaptation, Adaptive Cruise Control, Electronic Stability Control, crash data recorders and alco-locks will all positively influence Irish road safety as these technologies trickle down to a wider audience. It is envisaged that these new technologies may reduce road fatalities by up to 50% in the future (Directorate General for Energy and Transport, 2001b). However, young drivers often seek to offset the incremental gains in road safety provided by technology. Nevertheless, the challenge to make cars safer has become a chief concern of many car manufacturers and developments continue apace in this field.
8.1.6 Advertising

Despite the mixed results of this study a number of recommendations can still be made regarding road safety advertising in Ireland. It appears that the moral argument has been won in relation to seatbelt wearing. However, much work remains to be done in socially engineering young driver compliance with regard to drink driving and speeding. Advertising aimed at young drivers should focus on these areas. The focus groups revealed that speeding in particular is still very socially acceptable in Ireland. Road safety advertising should attempt to undermine the climate of acceptability that surrounds speeding in particular. Continuous and creative interventions are needed to "proactively promote the highest possible overall levels of road safety".

Given that road safety budgets are finite, it is important to produce adverts that are both relevant and credible to the target audience. Adverts must focus on the core motives of the target audience and take into account the perceptual landscape that young drivers inhabit.

Some of the current Irish road safety adverts were perceived by respondents as being visually impressive and highly dramatic but essentially "fake" and "over the top". This lack of advert credibility is a barrier to attitude and behaviour change. Due to the dramatic crashes depicted in some adverts, young drivers are found to cognitively discredit the accuracy of the advert. The upward trend in producing increasingly shocking adverts appears to have tilted the balance of power away from the advertiser. If the advert is perceived as being "over the top", then the integrity of the message contained in the advert is compromised. It is recommended that more research be conducted to ascertain what content young male drivers believe to be realistic and credible.

Drama based adverts that depict human pain and emotions such as remorse and guilt, have the potential to stimulate attitude change. The focus groups generally revealed that high threat advertising can be effective in hammering home a road safety message. However, they also found that high threat physical fear appeals cause some viewers distress. The focus groups produced evidence of defensive behaviours such as channel switching among respondents. This is a cause for concern.
More research should be done on segmenting the young male driver profile so that high risk individuals can be targeted. Not all young male drivers are dangerous drivers. More research should also be done on investigating the effectiveness of moderate fear appeals which may not stimulate the same level of defensive cognitive behaviours. However, it is unknown if adverts containing a moderate fear appeal have the same capacity for attitude change as those which contain a strong fear appeal, if all other variables are equal within an Irish context. The author recommends that high threat Irish road safety advertising should continue. However, this recommendation is contingent upon a more thorough analysis of target group perception and cognitive value systems being undertaken. Ensuring that road safety advertising is credible and realistic should take precedence over considerations relating to the levels of threat contained in the advertising.

One way of assessing the best content for road safety adverts is to open the communication channels between advertisers and young male drivers. The Transport Accident Commission in Australia run competitions which give young people the opportunity to submit their ideas for road safety adverts. Competition entrants are given a brief and asked to design an effective road safety advert. The winning advert is then produced by the TAC for television audiences. The “Make a Film, Make a Difference” competition is an example of harnessing the creativity of the target audience to overcome the perceptual problems associated with road safety advertising.

The data from the focus groups suggest that the content of Irish road safety campaigns should focus on serious injuries rather than death. Adverts depicting seriously injured or wheelchair bound drivers are found to be highly effective in provoking cognition among young drivers. The focus groups established that road safety communications which depicted serious injuries were much more potent than those which depicted driver death. Road safety adverts aimed at young male drivers should also highlight the threat of killing or seriously injuring friends as a consequence of dangerous driving activities. Young men appeared to place an especially high value on the lives of their friends and family.

http://www.mafmad.com.au [05/04/07]
The data suggest that the fear associated with their own mortality is not as great as the fear of being responsible for killing or seriously injuring a friend. Adverts which stimulate feelings of guilt and remorse have been found to be associated with high levels of persuasion. Such adverts need to graphically depict the effects of errant driver behaviour on others in order for them to be effective.

Lecture-style road safety adverts which highlight the dangers of errant driver behaviours such as speeding and drink driving were sometimes found to stimulate defensive cognitive processes. Some drivers were found to display scepticism at the claims made by these lecture-style adverts. Defensive cognitive processes were found to limit the effectiveness of these type of adverts. However, the majority of focus group participants did believe that these type of adverts could be effective if they were used in conjunction with dramatic, high threat road safety advertising.

Driver expectation of enforcement levels are influenced by advertising. The effective marriage of enforcement and advertising interventions permits the generation of synergies which can result in dramatic road fatality reductions. However, such gains are unlikely to be sustained in the long term if enforcement levels do not match the threat communicated by adverts. Advertising that stresses the threat of enforcement should be avoided until the level of enforcement displayed in adverts can be matched by the Garda presence on the roads. The threat of anti drink driving enforcement activities is not credible for many drivers in rural Ireland. Enforcement focused adverts may well prove to be effective in urban areas where enforcement levels are high. It is hypothesised that the drop in road fatalities in 2003 is attributable to the roll out of the penalty points system and the heavy promotional campaign that accompanied it. However, the subsequent rise in road fatalities in 2004 and 2005 may well be the result of advertising that was found to overstate the threat of enforcement. Enforcement levels need to be stepped up in rural areas. The gradual increase in Garda Traffic Corps numbers should help in this regard but the lack of late night transport links in rural areas is a central issue to Irish road safety which refuses to go away. This problem can only be addressed through the cooperative efforts of all stakeholders.
Road safety adverts that contained moderate fear appeals were found to be very effective. These adverts do not demonstrate any of the drawbacks associated with high threat fear appeals. However, more research needs to be conducted to assess the effectiveness of moderate fear appeals before they can be recommended. At this juncture it would be imprudent to recommend the immediate regression of Irish road safety advertising to moderate threat advertising. Given the low number of moderate threat adverts in this study such a recommendation would be presumptuous.

High threat advertising generally appears to be effective in provoking attitude change. However, the fact remains that 40% of the respondents asked were found to have turned over the television channel, when a high threat advert appeared on the television. The statistical weakness of the focus groups themselves precludes the author from making a judgement on this finding. Nevertheless, this finding is worrying. It is recommended that extensive quantitative research be undertaken to determine if cognitive level defensive systems are at this high level among the target group.

High threat adverts have served Irish road authorities well in recent years and they continue to make a positive contribution to Irish road safety. It is recommended that high threat advertising should continue in Ireland until substantive quantitative data can be gathered on target group defensive mechanisms. This research should be undertaken as a matter of urgency. A more thorough appraisal of moderate fear appeals is also recommended.

Television and cinema adverts can undoubtedly be effective in stimulating attitude change. However, in-car communications such as radio advertising perhaps merits more attention. Focus group participants mentioned adverts from “Red Fm” which they considered to be persuasive. Other in-car communications such as signs and stickers on the steering wheel or on a key ring could also be used as a cognitive trigger to remind motorists to drive safely. However, as yet, there is a lack of research in this area. More research is needed to assess the effectiveness of in-car ambient advertising.
8.1.7 Education activities

The data from this study suggest that there should be a move towards other methods to communicate with young drivers. The need to win the hearts and minds of young drivers dictates that communication efforts should be expanded beyond the confines of traditional marketing channels. Evidence from the focus group suggests that positioning crashed cars outside nightclubs may be effective in making people think twice about drink driving. The focus groups revealed that seeing the actual effects of crashes on vehicles is a "real eye-opener". This type of advertising would conceivably bypass many of the cognitive defensive mechanisms employed by young drivers who attempt to minimise the threat in other road safety communications. Young drivers would not be able to minimise the threat by suggesting creative license on the part of the advertisers. Neither would the young drivers be able to minimise the threat by switching over to another channel. The communication would send a message to drivers close to the time when a decision has to be made on how to get home. The close chronological proximity of the communication to the decision making moment may positively influence the captive audience when making plans to get home. However, it is also likely that this method of advertising may distress some people.

Focus group participants also recommended a more hands on approach to advertising. They suggested that road safety presentations should be rolled out nationally to all secondary schools. Some of the material shown in the focus groups (the RTE documentaries) is being sent to secondary schools for inclusion in the Transition year syllabus. However, focus group members contended that all secondary students should view this material given that driving is an essential life skill that they will all have to learn. Some respondents contended that high speed driving is an activity that is learnt over time. Many of the respondents interviewed began driving at twelve and thirteen years of age. Focus group participants indicated that early interventions which promoted safe driving were therefore necessary in order to tackle the problem of speeding among young drivers.
Overall, focus group participants identified “traffic informers” as the most credible and consequently the most effective road safety communication medium available to road safety experts. According to Vlakveld (2005) the use of “traffic informers” and “road shows” are a new trend that has recently emerged in threat based social marketing. “Traffic informers” are crash casualties who have been severely and permanently injured in a road crash. These young “traffic informers” give presentations to secondary school students on the circumstances surrounding their crash and the knock on effects it has had on them and their family. This type of presentation is similar to the presentation shown in the documentary “Shattered lives” which was shown in the focus groups. The results of this study suggest that this type of road safety communication is the most effective method of stimulating attitude change in young drivers. This type of advertising again pre-empts many of the cognitive defence strategies that can be employed by young drivers in response to media communications. The use of “traffic informers” in adverts and short films was thought to be highly effective. The candid honesty of the “traffic informers” meant that these presentations were perceived as being highly credible.

However, it is hypothesised that the effects of young drivers actually viewing a real life presentation by a “traffic informer” would produce even better results. It should be noted that these presentations are typically much longer than road safety adverts. It is not known if a certain time threshold needs to be crossed for a “traffic informer” presentation to be effective. Due to the necessity of such a presentation to solicit empathy in order to be effective, it is questionable if a 60 or even 90 second advertising slot could effectively produce this effect. For this reason the role of short, snappy television adverts is assured. However, such adverts cannot offer the same level of emotional engagement as “traffic informer” presentations. The author recommends the widespread use of “traffic informer” presentations in secondary schools across the country. These presentations could be shown to classes by means of a television or possibly even incorporated into a live, travelling road show where real life traffic informers actually visit the school. Road safety shows could also incorporate theatrical productions which might help to engage the audience via viewer participation.
Research investigating the effectiveness of one such road show entitled “Never Saw the Day” revealed that the core message of the show (road crashes have severe consequences) was effectively communicated to viewers. The British road show produced attitude change in viewers that was found to last up to a year. The research also found that people who had experienced the road show were also more receptive to future road safety campaigns (Vlakveld, 2005).

Road shows could also be used in conjunction with more traditional advertising channels to reinforce and accentuate the effects of social marketing communications. Whether the effects of a real life presentation by a “traffic informer” at a road show is more convincing than an audio visual presentation is unknown. This is an important research question that must yet be answered. More research into this area is advised. It is posited that the addition of these hybrid communication channels into the social marketing mix could provide an integrated communications package that would significantly reduce young male driver road deaths going forward.
8.2 Overall conclusion

“There’s always going be accidents”.

This rather philosophical comment emerged from one of the focus groups. The war on reducing road deaths has been fought with growing success for the last 30 years in Ireland. There is no reason why this trend should not continue. Developments in Irish road safety are moving in the right direction, albeit slowly. Three hundred and thirty eight people died on Irish roads in 2007\(^{35}\). Despite this massive loss of human life, this nevertheless represents an improvement in road fatality figures over recent years. However, at the very heart of any road accident is the human component which accounts for 95% of all road accidents. Until engineering and technology remove the human factor from the decision making processes involved in driving “there will be always accidents”. However road safety efforts must continue. Lives depend on it. Budgetary constraints dictate that research is essential to help tailor the most effective type of road safety campaigns. Interventions must combine to support each other if synergises are to be realised. Engineering, enforcement and education activities must serve to provide safer roads and road users with the support of robust, overarching legislation. In order to significantly reduce young male driver road deaths in Ireland legislative reform in the shape of a Graduated Driving System needs to be implemented. Strong political commitment will be needed to usher in such legislation but Ireland has proven itself to be a socially progressive society capable of adapting to the needs of the day. Increased enforcement activities in the shape of speeding cameras, Mandatory Alcohol Testing and new drug detection technologies are also needed to address the problem of young driver road death.

A more hands on approach to young driver education should be taken by schools and parents to help mould a generation of safer future drivers. Driver education should start well before driving age. Social marketing has a vital role to play in reducing road deaths, perhaps now more than ever in the history of the state. Ultimately though, the potential of social marketing is dictated by the inclusion and mobilisation of stakeholders and resources. Effective social marketing efforts can only act as a catalyst for engineering a safer road user society. It is not an answer in its own right.

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Appendix 1: Interview schedule for the focus groups

**Running order of the focus groups**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and preliminary questioning session</td>
<td>15.00</td>
</tr>
<tr>
<td><em>Short films: “Left behind” (12.42) and “Shattered lives” (12.47)</em></td>
<td>25.29</td>
</tr>
<tr>
<td>Discussion</td>
<td>10.00</td>
</tr>
<tr>
<td><em>Anti speeding adverts</em></td>
<td>4.18</td>
</tr>
<tr>
<td>Discussion</td>
<td>10.00</td>
</tr>
<tr>
<td><em>Anti-drinking adverts</em></td>
<td>2.19</td>
</tr>
<tr>
<td>Discussion</td>
<td>10.00</td>
</tr>
<tr>
<td><em>Adverts relating to seatbelt wearing</em></td>
<td>1.00</td>
</tr>
<tr>
<td>Discussion</td>
<td>10.00</td>
</tr>
<tr>
<td>Closing comments</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Total viewing time</strong></td>
<td><strong>33.06</strong></td>
</tr>
</tbody>
</table>

Total length of focus group (1.5 - 2 hours)

Focus group participants were firstly briefed on the purpose of the focus groups and the aim of the study. The participants were assured of their anonymity and encouraged to give their honest opinions. It was stressed from the outset that there was no such thing as a wrong answer and that the moderator would not cast judgement on opinions voiced by participants. The names and ages of participants were taken at this stage.

Focus groups generally took approximately between 1.5 - 2 hours to complete. At the end of each focus group participants were given the opportunity to ask any questions relating to the research being carried out or regarding any road safety topic they wanted information on. Having answered these final questions the moderator thanked the participants for their participation and the focus group came to a close.
Introductory questions relating to driver behaviour and driver history

These questions were asked throughout the duration of the focus group to identify the driving behaviour of young male drivers in Ireland. The questions were posed as different topics arose as prompted by the various adverts viewed.

- Have any of you been in a car crash?
- Did the crash change your outlook on your driving style?
- Were you driving or were you a passenger in the car at the time of the crash?
- How many people were in the car at the time of the crash?
- Do you know someone who has died in a crash?
- What percentage of Irish road deaths do you think 17 - 25 year old drivers represent?
- Why do you think that road deaths among young drivers are so common?
- Are you aware of news reports in the media relating to young driver road deaths? Did these news reports influence your driving?

- Do you ever go driving in forestry?
- What age did you start driving and where did you learn to drive?
- Do you think that you are a better driver or worse driver than other drivers on the road?

- Do you break the speed limit? If so then why?
- How much faster than the speed limit do you think you can safely drive?
- Does music affect your driving style? If so then how?
- Do you drive faster when you are driving alone or when driving with your friends as passengers?

- Which is more frightening? - getting killed in a crash or being seriously injured for life after a crash?
- Which is more frightening? - being responsible for a crash where you:
  - kill a friend
  - seriously injure a friend for life.
• Do you drink and drive? If so then why?
• If you have driven after drinking – how many drinks did you have?
• How many drinks do you think you can handle before your driving is impaired?
• Would you take a spin from one of your friends who had been drinking?
• Would you try to discourage a drink driver from driving or would you let them make their own decision? (Is it dependent on their condition?).
• Do you always wear a seatbelt (front and rear seatbelts)? If not why not?
• Would you ask your friends to wear a seatbelt if they were passengers in your car (front and backseat passengers)? If not why not?

Questions relating to the road safety adverts and short films

• Would any of these films/adverts change your driving behaviour?
• Which film/advert was the best? Why?
• Which one of these films/adverts did you find most persuasive? Why?
• Which film/advert was least persuasive? Why?
• How realistic were the films/adverts? – Were any of the films/adverts not realistic? If not then why not?
• Did any of these films/adverts scare you or make you think about changing your driving behaviour? Which film/advert and why?
• Does the message sink in or is it easily forgotten?
• How long would the effect from the film/advert last?
• Do you ever think about being disabled or killed in a crash?
• What do you think of graphic adverts? Are they effective or not?
• Do any of you turn off the television or switch channels when graphic road safety adverts appear on television?
• If you were making a road safety advert what would you include in it?
• What do you think of the current Irish road safety adverts? Why?
• Which film/adverts are more persuasive; those that deal with disability or those that deal with death?
Appendix 2: Road to Safety strategy 1998 - 2002

Primary target

Primary target: a 20% reduction in Irish road deaths and serious injuries by 2002 (in relation to 1997 road fatality figures). Road fatalities fell from 472 road deaths in 1997 to 376 road deaths in 2002. This represents a 20.3% reduction in road fatalities for the period. Furthermore, serious injuries fell from 2,182 in 1997 to 1,150 in 2002 (Department of Transport, 2004). This represents a reduction of 47% in serious injuries for the period. Therefore the primary target of a 20% reduction in both road fatalities and serious injuries by 2002 was achieved.

Secondary targets

Secondary targets relating to the enforcement of anti-speeding, anti-drink driving and seatbelt wearing laws were set down under the Road to Safety strategy. Targets relating to the completion of remedial road work projects at accident black spots were also established. However not all of the secondary targets were achieved by the strategy.

Speeding enforcement target: to reduce by 50% the incidence of speeding. A target was set to reduce the number of vehicles exceeding the 60mph speed limit on single-carriageway national roads from 51% in 1999 to 40% by 2002 (Department of Transport, 2004). This target was not achieved. Forty four per cent of vehicles were still exceeding the speed limits on these roads in 2002. A 1mph reduction in average car speed from 61mph in 1999 to 60mph in 2002 was recorded (NRA, 2003).

Seatbelt wearing target: to increase the front and rear seatbelt wearing rates to at least 85% among all car occupants. The increase in seatbelt wearing rates in Ireland has been dramatic in recent years. According to the National Roads Authority, front seatbelt wearing rates climbed from 53% in 1991 to 57% in 1999.
However, front seatbelt wearing rates rose sharply to 72% in 2003 (NRA, 2005a). This represents a substantial increase in front seatbelt compliance rates. Nevertheless, the target was not achieved. Rear seatbelts wearing rates were found to trail far behind front seatbelt compliance rates. A survey of a small sample of rear seat passengers in 1999 found that rear seatbelt compliance rates were as low as 20% among those surveyed (Department of Transport, 2004). No data was available for rear seatbelt compliance rates in 2002 due to low car occupancy rates. However it can be reasonably assumed that the target relating to rear seatbelt compliance rates was not achieved. The National Roads Authority estimated the adult rear seatbelt wearing rate to be approximately 46% in 2002. Rear seatbelt compliance rates for primary and secondary school goers were also low at 48% and 44% respectively (NRA, 2003).

**Drink driving target:** to reduce by 25% the number of fatal, alcohol-related road collisions during hours of darkness. Statistics indicate that the number of fatal collisions occurring between 21.00 and 03.00 on Irish roads in 2002 was 10.4% lower than in 1997 (Department of Transport, 2004). The target set out in the strategy was therefore not achieved.

**Engineering target:** to complete specific collision reduction measures at more than 400 additional national road locations. In 1994, the National Roads Authority began a programme of carrying out remedial engineering work on Irish national roads. A subsequent evaluation of this programme was published by the National Roads Authority (Crowley and Vigors, 2001). The report estimated a 595% average annual economic rate of return for the 104 schemes evaluated at the time. This figure was arrived at having considered the estimated economic cost of collisions (contained in the then Department of the Environment’s “1996 Guide to Road Safety Engineering in Ireland” report) and the costs of implementing the remedial measures. Traffic calming schemes have proved to have excellent economic returns. The NRA spent €10 million on road calming schemes in 71 towns and villages on the national road network from 1998 - 2002. Some 418 schemes were completed by the end of 2002. Therefore, the target of completing specific collision reduction measures at more than 400 additional national road locations was achieved.
Target: Specific collision reduction measures to be completed at 240 locations on the national road network by the end of 2000. The National Roads Authority completed specific collision reduction measures at 268 locations on the national road network by the end of 2000. Therefore the target was achieved. The National Roads Need Study technical report (based on 1998 and 1999 data) indicated that the collision rate on motorways was 65% lower than on two-lane roads (Department of Transport, 2004).

Collisions on motorways were also found to have a lower fatality rate and lower injury rate than those on two-lane roads. On the basis of these figures, it is calculated that the National Development Plan objective of providing 875km of motorway and "high-quality dual carriageway" would prevent 52 fatalities and 108 serious injuries per annum. In 2000, a low-cost, road improvement programme was carried out on non-national roads. Road improvements were carried out at over 320 locations up to the end of 2002.

Target: the reduction of road deaths among vulnerable road users (pedestrians, cyclists and motorcyclists). In 2005, pedestrians represented 18% of all Irish road fatalities (NSC, 2006c). This figure compares favourably with historical data. A decade earlier, pedestrians represented 28% of Irish road fatalities (Department of Transport, 2004). Nevertheless, Ireland and the UK had the highest proportion of pedestrian fatalities in 2002 among 13 EU member states surveyed (SafetyNet 2004b). However road fatality figures among cyclists have dropped in recent years. Cyclists represented 4.8% of road fatalities in 2002 compared with eight per cent of road fatalities a decade earlier (Department of Transport, 2004).

Young male motorcyclists (18 - 24 years) accounted for 51% of all motorcyclists killed and 41% of all motorcyclists injured in 2000. On average, young driver accidents accounted for 33.7% of all fatalities and 26.1% of all injury accidents on Irish roads in 2000 (National Roads Authority, 2000). Motorcyclists represented approximately 16% of fatalities in 2003 despite representing just 1.9% of the vehicle fleet that year (Department of Transport, 2004). The target to reduce the number of road deaths among vulnerable road users was not achieved.
Interim Targets

**Target:** Ireland’s road collision fatality rate per million inhabitants not to exceed 116 fatalities per million inhabitants by the end of 2000. The Irish collision rate was 110 fatalities per million inhabitants by the end of 2000 (Department of Transport, 2004). Therefore the target was achieved.

In 2002, the Director of the SWOV Institute of Road Safety Research, Mr. Fred Wegman, conducted a review of *The Road to Safety* strategy. In his critique, Mr. Wegman commended the strategy’s specific and ambitious reduction targets for road fatalities and serious road injuries. The review also commended the strategy’s hierarchical structure which used secondary targets as stepping stones to primary targets.

The effective implementation of the NRA and NSC programmes relating to the strategy were deemed important first steps in achieving a best-practice approach to road safety. However, the report did find evidence of an information gap between stakeholders. The rationale behind target formulation was also found to be lacking in coherency. The report suggested that enforcement campaigns, publicity, education and information campaigns should work in concert to achieve maximum results. The report emphasised the need for increased enforcement levels on Irish roads. Finally, the review also suggested that political commitment and significant financial investment on road safety measures are prerequisites to improved road safety in Ireland (Wegman, 2002).