

**MSc in Environmental, Health and Safety Management.**

**Dissertation.**

**An Analysis of Road Safety and Older Driver Behaviour**

**Supervisor: Mr. Victor Hrymak**

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**Submitted by: Tara McHugh**

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the requirements for the degree of MSc in Environmental Health and Safety  
Management.**

## **ABSTRACT**

This paper analyses road safety and the behaviour of older drivers in the area of County Monaghan. County Monaghan is a border County with many of the interviewees living in border towns.

The literature review covers aspects related to issues regarding road safety and driver behaviour, not only to older drivers but to drivers of all ages. The literature review revealed the importance of road safety worldwide, highlighting the hazardous outcomes of negative driver behaviour.

A methodology was planned and carried out to analyse older driver behaviour. A pilot study was conducted to determine the suitability and relevance of the methodology. The use of semi-structured interviews revealed solid data, displaying older driver behaviour and attitudes to road safety.

In total 50 older drivers were interviewed, all of whom reside in the area of County Monaghan. Self reported behaviour including speeding, mobile phone use, drinking and driving, accident involvement and seat-belt use were examined. The information generated from the results allowed for a complete analysis of the driver behaviour. The results from the interviews carried out give an overall outlook of older driver behaviour in the area of County Monaghan.

The findings from the study show that older drivers are more careful and cautious on the road now that they are older, they have grown out of habits they once had when they first began driving, habits such as drinking and driving and suffering from road rage yet they still display risk behaviour on our roads, behaviour such as speeding. Speeding was noted as a major factor which the older driver admitted to.

## **DECLARATION**

I, Tara McHugh, hereby certify that this dissertation which I now submit for examination for the award of MSc in Environmental Health and Safety Management is entirely my own work and has not been taken from the work of others except with the extent that such work has been cited and acknowledged within this text of my body of work.

This dissertation was prepared according to the regulations of the Dublin Institute of Technology and has not been submitted in whole or in part for an award in any other Institute or University.

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Signed: \_\_\_\_\_

Date: \_\_\_\_\_

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## **CHAPTER 1: INTRODUCTION**

“Reaching a destination is usually the main goal of driving, (Fuller, 2004). According to Schulze (2010), “Mobility is a matter of great importance in daily life: However, it also causes costs and involves accident risks”. Road safety is an area of research which impacts our daily lives, especially from a statistical point of view. Statistical evidence from the Road Safety Authority (RSA) shows that there were 239 road deaths in Ireland in 2009, (RSA, 2011).

“Road transportation provides benefits both to nations and to individuals by facilitating the movement of goods and people. It enables increased access to jobs, economic markets, education, recreation and health care which in turn have direct and indirect positive impacts on the health of populations”, (Global Status Report on Road Safety, 2009).

Road safety is an area worthy of research as studies from the World Health Organisation (WHO), (2009), show that, more than 1.2million people die on the world’s roads every year, and as many as 50 million others are injured.

“Traffic accidents are a major issue in transport policies around the world. In Europe, for example, approximately 40,000 fatalities occur in traffic accidents every year. The number of additional non-fatal accidents amounts to a multiple of this figure”, (Blaeijs et al, 2003).

According to Eksler et al (2008), “Road accidents are the tenth leading cause of premature death worldwide and, based on current trends, are likely to become the third leading cause of disability-adjusted life years lost by 2020”. Eksler et al (2008) also discusses how, “Road mortality varies in time and space both between countries and also between regions within the same country. Identifying and understanding the background of regional differences may lead to better understanding of the sources of road accidents, and enable the application of more effective road safety policies”. This highlights the importance of collecting and analysing road safety data from different areas, whether by county or by country, to understand the causes and to implement measures to conker these aspects leading to accidents on our roads.

Statistics from An Garda Síochána (2010) show that drivers accounted for 43% of the road deaths, passengers accounted for 26%, pedestrians accounted for 21% and motor cyclists



accounted for 8%. This further highlights the issues on our roads leading to loss of life, showing the importance of road safety as an area worthy of research.

## **CHAPTER 2: LITERATURE REVIEW**

This section highlights the crucial importance of road safety in our society today, the growing threats contributing to fatalities and injuries. For the literature review numerous areas were explored to understand and highlight the importance of road safety. Many avenues were explored to give an understanding of the pressures which poor driver behaviour leave on people and countries.

### **Road Traffic Crashes**

According to Eksler et al (2008), “Road fatalities are considered to be the consequence of accidents caused by deficiencies in the vehicle/road user/infrastructure system and are traditionally treated as random events”. Eksler et al (2008) further states that the major factors that are used to explain variations in their frequency are traffic structure and density, quality of infrastructure and vehicles, and driver behaviour.

“Road traffic crashes result in widespread suffering and premature death throughout the world”, (Steptoe et al, 2002), “Accident analysis has provided ample evidence that higher speed, vehicle weight and alcohol use lead to more fatal accidents, (Vereeck & Vrolix, 2007).

Due to the fact that injuries sustained in an accident differ between older and younger people, “what might be an injury-free, unreported collision for a younger driver is more likely to be a documented crash, because of associated injuries or death, for an older driver (Bedard, Guyatt, Stones, & Hirdes, 2002; Guohua, Braver, & Chen, 2002; Hakamies-Blomqvist, (1998), as cited in Di Stefano and MacDonald, (2003)).

### **Statistical evidence of the importance of road safety**

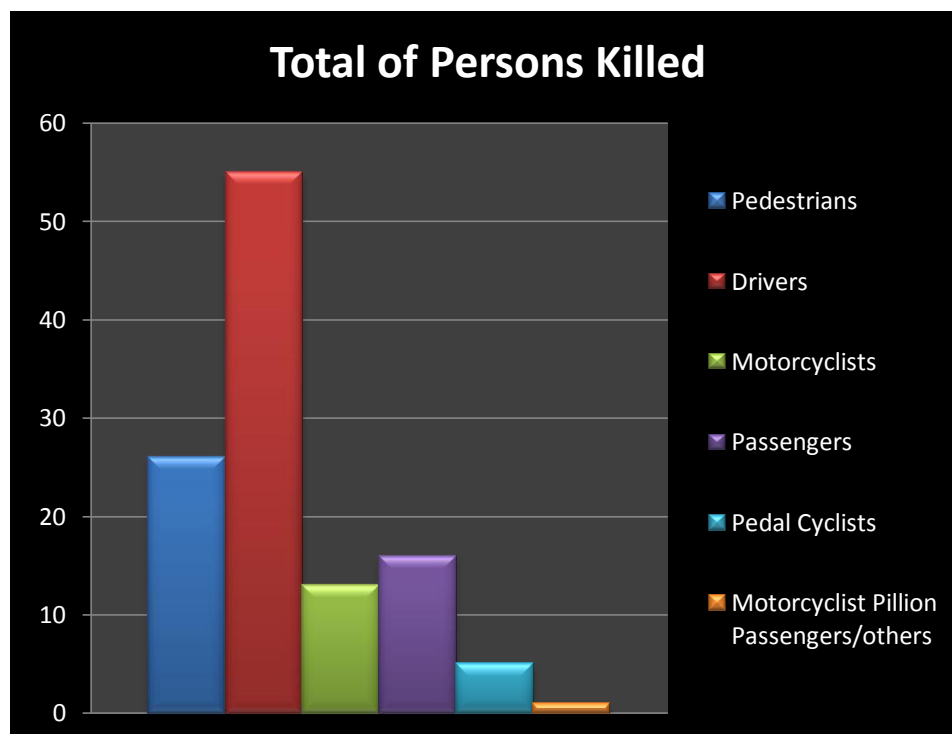
The differences in fatal, serious and minor collisions need to be distinguished to allow the statistics to be correct and in sync across the world. The Steering to Safety Summary report (2006) distinguish the differences, “A fatal collision is one in which at least one person is killed due to the collision, with death occurring within 30 days”. “A serious collision is one in which at least one person is seriously injured and is detained in hospital as an inpatient or is treated for any of the following injuries: fractures, concussion, internal injuries, crushing, severe cuts and lacerations, or severe shock requiring medical treatment”. “A minor collision

included collisions in which at least one person suffered a less serious injury such as a sprain or a bruise”.

According to Byrne (2007), “Statistics are the key measures of progress in road safety”. The WHO (2009) show from statistical evidence that, “More than 1.2 million people die on the worlds roads every year, and as more than 50 million others are injured”. The World Health Organisation (WHO) predicts that road traffic injuries will rise to become the fifth leading cause of death by 2030, according to the Global Status Report on Road Safety (2009).

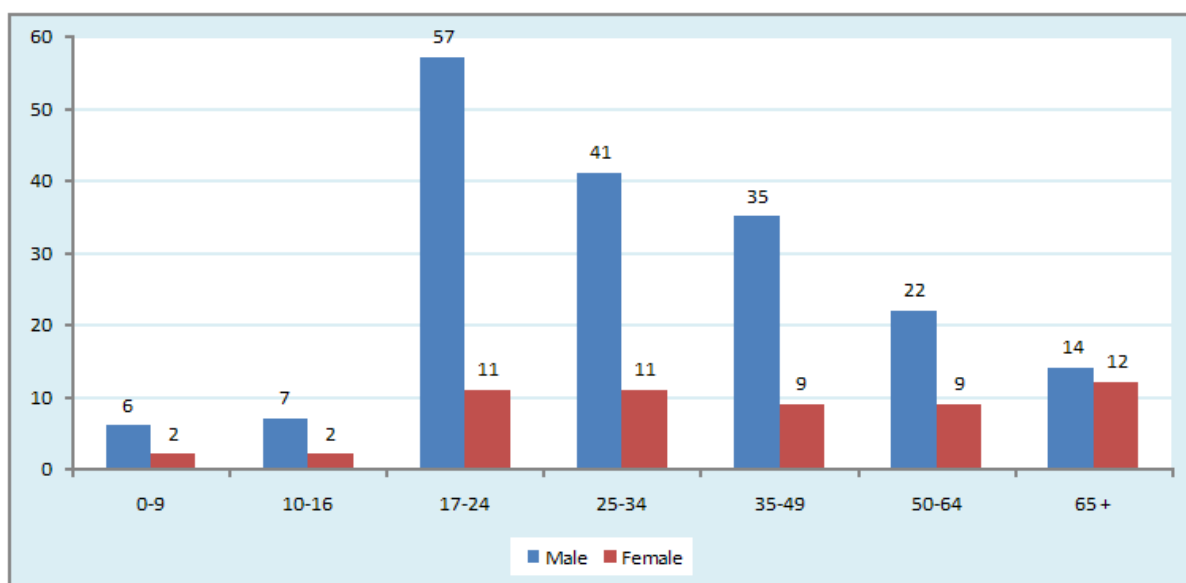
“The estimated cost of all road collisions reported to, and recorded by, An Garda Síochána in 2009 was €974 million”, (Road Collision Facts, 2009).

The following graph represents the total amount of persons killed so far this year; these figures represent road deaths on Irish roads up until 9am on August 19<sup>th</sup> 2011.



**Figure 1.** Results obtained from An Garda Síochána (2011).

The following graph represents the overall fatalities on Irish roads in 2009; these figures are shown by age and sex.



**Figure 2.** Overall Fatalities by Age and Sex, 2009.

Information obtained from the Road Safety Authority (RSA), Road Collision Facts 2009.

### **County Monaghan-A Border County**

The Steering to Safety Summary report (2006) showed that a higher proportion of fatal and serious collisions occurred in the border compared to non border region, in the Republic of Ireland (RoI) over the years 1996-2003. Single vehicle collisions are a problem in the Republic's border counties, accounting for a quarter of all collisions from 1996-2003. This report involved asking resident drivers of the border counties questions regarding their driving behaviour and history. When 1000 residents of the border region in Northern Ireland were asked if they had ever been involved in an injury collision in the Republic of Ireland a total of 19% said they had been.

The Steering to Safety Summary Report (2006) found that drivers from both sides of the border describe their driving in positive terms, they feel they are observant, cautious, and considerate and controlled, from description. 18% of drivers from the Republic of Ireland admit to being impatient on the road, their so called 'vice'. This contrasts to results found from the Northern border counties where 22% admit to fast driving, 19% admit to being nervous and 13% admit to being impatient.

The Steering to Safety Summary report (2006) revealed that, "The percentage of fatal collisions is higher in the Republic's border counties (6.5%) than in non-border counties (4.7%)".

The Steering to Safety Summary report (2006) discovered that most fatal collisions over the four years 2001 to 2004, in the Republic's border counties and Meath occurred at weekends when the weather was fine and the road surface dry. Some 38.0% of all these fatal collisions occurred between the hours of 9pm and 4am, a time which may be associated with drink driving. The most common contributory factor to the collisions was the consumption of alcohol (37.4%), followed by excessive speed (27.3%) and inattention (18.8%).

### **Driver Capability**

Fuller (2004) describes constraints of driver capability, "Driver capability is initially constrained by biological characteristics of the driver, such as information processing capacity and speed, reaction time, physical reach, motor coordination and perhaps flexibility and strength. Built on top of these characteristics are knowledge and skills arising out of training and experience". Fuller (2004) discusses the competence of drivers, and how capability is vulnerable to a host of human factor variables, including "factors of attitude, motivation, effort, fatigue, drowsiness, time-of-day, drugs, distraction, emotion and stress".

### **Human Error**

Reason (1990), formally defines human error as, "a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency". This statement can be entirely related to road safety with regard to a planned sequence being a drive, for example from work to home, yet it is interrupted by failures such as an accident with another vehicle.

According to Kontogiannis et al, (2002), "studies have shown that unsafe driver acts can be classified into two distinct categories (i.e., errors and violations) entailing different measures for reducing road traffic accidents". Parker et al., (1995) and Reason et al.,(1990) as cited in Lucidi et al, (2010) differentiate by stating the following, "Errors and violations are considered to have different psychological origins: errors are the result of information-processing problems, whereas violations have a large motivational component; as such, they require different modes of remediation".

"Errors are defined as the failure of planned actions to achieve their intended consequences (e.g., brake too quickly on a slippery road) and violations as conscious deviations from rules or safe practices (e.g., drive even though you realize you may be over the legal blood-alcohol limit) (Reason et al., 1990 as cited in Lucidi et al, 2010).

## **Error and Violations**

According to Winter and Dodou (2010), “Reason et al. showed that errors were statistically distinct from violations, supporting the hypothesis that errors and violations are governed by different psychological mechanisms. Errors reflect performance limits of the driver such as those related to perceptual, attentional, and information processing abilities. Violations represent the style in which the driver chooses to drive and habits established after years of driving”. This distinction is an important factor for understanding driver behaviour.

“Driver and pedestrian error and impairment were concluded to be the main contributory factors in 95% of the 2,041 accidents considered in a four-year study of accident causation in Great Britain (Sabey and Taylor 1980).

Winder and Dodou (2010) discuss safe driving, “It has long been documented that safe driving is not only accomplished by being able to drive in a relatively error-free manner”, they continue to state that, “Violations represent the style in which the driver chooses to drive and habits established after years of driving”.

## **The Driver Behaviour Questionnaire (DBQ)**

Kontogiannis et al (2002) state that, “it has been increasingly recognized that understanding the cognitive, attitudinal and social context of driving errors is very important in devising appropriate countermeasures to reduce the rate of road traffic accidents”. One way of helping to reducing the rate of road traffic accidents is by using the Driver Behaviour Questionnaire (DBQ). Winter and Doudou (2010) describe using the DBQ as a questionnaire consisting of 50 items describing a variety of errors and violations during driving. Respondents of the questionnaire were to indicate how often each deviation happened to them in the past twelve months. This was answered on a scale between 0 and 5, 0 referring to never and 5 referring to it happening nearly all the time.

“It is notable that the DBQ method, which focuses specifically on the different types of errors made by drivers, is a person-based approach to studying road user error”, (Salmon et al, 2010), therefore allowing for a greater understanding about whether errors or violations are being challenged whilst driving, in turn leading to a greater knowledge of driver error which will also allow for successful intervention measures to try and control road traffic accidents.

## **Stress**

In relation to stress being a factor in driver error, Westermana and Haigeny (2000) deal with the DBQ. The DBQ differentiates “slips and lapses (errors of action), mistakes (errors of intention), and violations (deliberate infringements)”. With regard to stress they state that, “given that driver stress is multi-faceted, it is entirely possible that different components of driver stress will exert different influences on driver error”. Westermana and Haigeny (2000) continue to state that not only may stress result in error but error may result in stress. In work by Staubach (2009), it is stated that stress and negative emotions, in combination have an effect on road safety.

## **Factors Causing Error**

Staubach (2009) carried out a study which aimed to identify the factors influencing and causing error in traffic accidents. Results from the study showed that distraction and reduced activity were influencing errors causing all accidents.

“Masked stimuli are considered to be the main factor if there is an evidence of adverse weather conditions. This includes (heavy) sleet, rain and snow, fog and/or dusk or darkness, but also if the driver is being dazzled by the sun or other vehicles”, as stated by Staubach (2009), who continues to report that “this may be caused by distraction, including secondary activities in the vehicle such as conversations, phone calls and operating devices, objects or events outside the vehicle which are not related to the driving task, or internal distraction, such as negative emotions or stress”. Staubach (2009) also states how if, for example, a driver is unfamiliar with the traffic situation they are in, information overload may occur; therefore causing distraction which in turn will lead to “selective attention on the driving task”. Staubach (2009) also considers reduced activity as a factor of driver error. Reduced activity may be caused as a result of drowsiness, drowsiness may be caused by alcohol, drugs, medication or a combination of the three mentioned all which may lead to reduced driver attention.

Champagne et al (2004) discusses the time of day being a factor regarding road traffic accidents, stating, “Our biological functions fluctuate over time and they depend on internal clocks (endogenous factors) as well as on external influences (exogenous factors) such as daylight/ darkness alternation”. The literature shows young drivers to be more sensitive road users and not only by statistical evidence. Champagne et al (2004) found that, “according to gender, motivation, and previous experience, differences in vigilance variations occur. Thus, young people seem to be more sensitive than older people”.

## **Older Driver Behaviour**

According to Karaim (2006), as cited in Donorfio et al, (2008), “By 2030 the 65-plus population is expected to double to 71 million, making up one-quarter of all U.S. drivers and 9.5 million 85-plus who will have spent most of their lives driving”. This fact highlights the importance of observing and analysing older driver behaviour, as an importance for the future. The differences in the people involved in collisions vary, according to Eksler et al (2008), “For road accidents, it is known that young male drivers are at approximately three times more risk than mature adults, and that elderly road users are more vulnerable in cases of collision”.

“Interest in the issues of mobility and traffic safety among older drivers has grown in the industrialized world as a result of the expected increase in the percentage of older persons in the population”, (Raitanen et al, 2003). According to Evans (1991), as cited in Parker et al. (2003), older drivers who have a crash are more likely than younger drivers to suffer serious injury or death. This is similar to that spoken of by Holland (2001) as cited in Clarke et al (2010) on their study regarding older drivers’ road traffic crashes in the UK, they found that both the driving styles and the types of crashes older people have differ from those of younger and middle-aged people.

“Given a crash, older drivers are more likely to suffer an injury than younger drivers, and consequently, accidents of older drivers are more likely to be included in the official figures than those involving young drivers” (Elander et al., 1993, as cited in de Winter and Dodou, 2010).

Parker et al (2000) highlights that it is important to understand the kinds of behaviours that are associated with accident involvement among older drivers as will enable road safety strategies to be devised which are most likely to be beneficial in reducing road traffic accidents among the elderly.

Golias & Karlaftis (2002) observed that when age is considered, drivers seem to be more law abiding and less risk taking as they grow older. According to their study drivers over 55 years old, seemed to drive distinctly more carefully than younger drivers, while those below 25 years old seemed to exert a distinctly less law abiding approach to driving or are more prone to during trip violations.

In Ireland, older drivers over 70 can only get driving licences for up to three years and need to get a doctor's certificate to prove they are fit to drive before they can get a new licence.



“Older drivers in better health drive more miles per week, have greater confidence in their driving, report a greater degree of enjoyment, and report fewer accidents, traffic violations, or near-miss accidents in the previous 10 years, (Donorfio et al, 2008).

In a study by Duke (2010) the results demonstrated that “risk estimates of percent accident involvement per percent of travel for drivers of large heavy vehicles continue to be over-involved until the age of 27 years, when the risk generally decreased until the age of 63, after which increases was observed”. Therefore older drivers display high accident involvement.

In a study by de Winter and Dodou (2010) violations increased with age, whereas for all other samples in the study, violations decreased with age. Errors, on the other hand, decreased stronger with age for the younger drivers than they did for the older drivers. Thus showing mistakes are easily made by the older driver.

Di Stefano & MacDonald (2003) conducted an assessment of older drivers and their relationship between on road errors, medical conditions and test outcome. The results showed that fail rate increased sharply and consistently with age, from 0% for those aged under 54 years, through 38% for those 75 to 79 years, to 71% for those 85 years and older. The older drivers which were sampled in the study did not have medically documented major medical problems that could account for their progressively higher failure rate with increasing age, the most likely underlying causes for the increase appear to be the “normal” age-related declines in some of the capacities that underlie safe driving performance. Di Stefano & MacDonald (2003) state that, “having had a significant amount of driving experience without recent formal training, they are likely to exhibit a range of bad habits that are unrelated to possible age-related impairments”. They continue to state that the results from the study “provide a generally valid indicator of the unsafe behaviours most typical of older drivers” and that “It is incontrovertible that older drivers’ performance tends to deteriorate significantly with increasing age”.

### **Type of Road/Weather**

The Steering to Safety Summary Report (2006) produced results on the area of County Monaghan. These results showed that on a number of roads, 85% of the traffic was driving less than the speed limit. On the N54 Cavan to Monaghan road some 85% of the traffic was

travelling at 87.2 kph or less. The report finds that this indicates that, in the view of reasonable drivers, the speed limit may be too high on certain roads.

The WHO (2009) state that, “prevention is by far the better option”, with regard to road safety and that “building safer vehicles and roads, designing infrastructure with the protection of pedestrians and cyclists in mind, enhancing public transport and improving our personal behaviour on the roads would reduce injuries and contribute to healthier populations generally”.

“Governments need to enact proper laws that require all road users to be protected through enforcements of speed limits that are appropriate to the type and function of the road”, (Global Status Report on Road Safety, 2009).

In a paper by Vanlaar & Yannis (2006) on their study on the perception of road accident causes, they found that drivers recognized a higher accident risk when driving in the rain especially in heavy traffic.

The type of road determines a driver’s speed and their decision on whether to driver faster or slower than the speed limit, results from the RSA (2009) show that over the period 1999-2009, there has been an up-and-down fluctuation trend in the number of fatal collisions on motorway and other/unknown road types”.

### **Types of Risk**

Fuller (2004) distinguishes between three types of risk associated with driving, these are, objective risk, subjective risk estimate and the feeling of risk. He defines objective risk as, “the objective probability of being involved in an accident”. “Subjective risk refers to the driver’s own estimate of the (objective) probability of collision. “The feeling of risk represents an emotional response to a threat”.

### **Driver Inattention**

Herslund and Jorgensen (2003) as cited in Staubach (2009) refer to “looked but failed to see”. This is a type of driver inattention, leading to errors which are caused by failures in drivers sight, visual search strategy and/or mental processing, “thus drivers do look in the direction where other road users are but do not perceive their presence” (Koustanai et al, 2008 as cited in Staubach, 2009). According to Brown (2005) these failures have been found especially for accidents involving older drivers. Sivak (1987) refers to problems which are driver-centred, examples of these problems being elderly drivers or drivers with disabilities.

This driver inattention is similar to that of Fuller (2004) with regard to his description of delayed avoidance response; his example of a delayed avoidance response might be not slowing down when approaching a turning vehicle, which was expected to be out of the driver's path by the time it was reached.

### **Road Rage**

"If you display road rage as a driver, it means you have uncontrolled anger that results in intimidation or violence against another driver", (RSA, 2011). The study from the Steering to Safety Summary Report (2006) found that over half of all drivers from each side of the border feel frustration at slow drivers. It found with only 46% of the opinion that other drivers 'have every right to do this'. Drivers from the Republic are more likely, however, to become angry (41%) compared to drivers from the North (20%). The Steering to Safety Summary Report (2006) found that the failure of other drivers to indicate when turning or changing lane is witnessed more in the South (38%) daily and 67% at least once a week.

In the SARTRE (2004) study on the perception of other drivers' behaviour, it was found that more than 55% of drivers in every country agree very or fairly much with the statement "I sometimes get very annoyed with other drivers".

### **Compliance with the Law**

In Vereeck & Vrolix (2007) it is stated, "The stronger the willingness to comply with the law, the lower the fatality rates". Their paper investigates the effect of the social willingness to comply with the law on driver behaviour and traffic fatalities. They continue to state that "the social willingness to comply with the law is an important aspect of the social values and moral climate that prevail in a country"; "it bears a significant impact on the number of traffic fatalities. Conversely, road safety is negatively affected by the unwillingness to comply with the law".

The Global Status Report on Road Safety (2009) refers to road safety legislation, "Enacting and enforcing legislation on a number of risk factors for road traffic injuries and deaths is critical in influencing exposure to risk, crash occurrence, injury severity, and post-crash injury outcomes".

"Comprehensive and clear legislation, enforced with appropriate penalties and accompanied by public awareness campaigns, has been shown to be a critical factor in reducing road traffic injuries and deaths associated with speed, drink-driving and the non-use of occupant protection measures", according to the Global Status Report on Road Safety (2009).

The RSA (2008) states that Irish driving licence regulations are required to operate within the framework of a harmonised EU system. Directive 91/439 on driving licences established common categories of licence and set harmonised medical standards for drivers. These requirements are transposed into national legislation, therefore putting an onus on drivers to comply with the law.

### **The Age of the Driver**

The age of the driver has serious impacts on driving behaviour; this can clearly be seen throughout the research. Campagne et al, (2004) discuss night time driving, the fact of it being monotonous and how most drivers will show signs of visual fatigue and inattention. This inability to stay fully alert and cautious, according to Campagne et al (2004) is usually affected by and varies with age. Campagne et al (2004) also states that, “Other factors, such as sleep deprivation, consumption of substances, such as alcohol, caffeine, or drug and environmental conditions, would facilitate or, on the contrary, limit the occurrence of drowsiness, and perhaps even of unexpected falling asleep”.

### **Benchmarking**

Wegman & Oppe (2010) describe benchmarking as, “A process in which countries or sub-national jurisdictions evaluate various aspects of their performance in relation to other, and so-called ‘best-in-class’ practices. The benchmark results provide countries or jurisdictions with information from other international parties that can be used as a basis for developing measures and programmes to increase their own performance”.

According to Wegman & Oppe (2010), “Benchmarking of road safety performances consists of the following core activities: identifying the key components of road safety performance, identifying whom to compare with (other countries/jurisdictions and ‘best-in-class’), constructing indicators for meaningful comparisons, determining and understanding gaps in performances, and, finally, establishing future attainable performances”.

The Global status report on road safety (2009) is the first broad assessment of the status of road safety in 178 countries, using data drawn from a standardized survey conducted in 2008. The results provide a benchmark that countries can use to assess their road safety position relative to other countries, while internationally the data presented can collectively be considered as a global “baseline” against which progress over time can be measured.

“It is important for countries to compare their safety performances with those of other countries. A first motivation for comparison is to know how the overall safety situation in the most recent years compares with that in other countries”, (Wegman & Oppe, 2010).

Yet, according to Wegman et al, (2005), as cited in Wegman & Oppe (2010), it is stated that, “Countries can learn from measures taken in all other countries. But to formulate targets or plans it is more realistic to compare with countries in the same situation, and/or with the same economical, historical and geographical background, and/or the same level of motorization and safety development”.

Wegman & Oppe (2010) continue to state that “Benchmarking the road safety performance of countries as a basis for learning and speeding up positive developments can be considered a promising step in improving road safety.

### **Seat Belts**

According to Steptoe et al (2001), “The use of seat belts is among the most effective methods of reducing injury in motor crash vehicles” and that “the introduction of seat belt laws and more stringent enforcement leads to increases in self reported and observed use”.

The Steering to Safety Summary report (2006) discovered that the vast majority (93%) of drivers on both sides of the border in Ireland said they wear a seat belt at all times and that some 2% never wear a seat belt. “In the event of a crash or roll-over, seat-belts protect the occupant of a car by preventing ejection and by reducing the frequency and severity of occupant contact with the interior of the vehicle and other occupants, (SWOV, 2003, as cited in Steering to Safety Summary report, 2006). The Global Status Report on road Safety (2009) states that, “Wearing a seat-belt reduces the risk of fatality among front seat passengers by 40-50%” and that “seat-belts can reduce fatalities among rear-seat car occupants by 25-75%”. Steptoe et al (2002) discusses that the “belief in the health benefits of seat belts and concerns about complying with the law are associated with greater use, while discomfort, perceptions of low risk of injury, and belief that seat belts are not necessary for careful drivers are related to non use”.

The results from the Steering to Safety Summary report (2006) showed that, seatbelts were generally regarded as safe by under 18’s and workers’ groups, but this perception was not reflected in their reported use of seatbelts. From the survey taken the Steering to Safety Summary Report showed that taxi drivers see seatbelts as problematic if they are attacked by a passenger. The results also showed that almost a quarter (23.1%) of the focus group

participants insisted on passengers wearing a seatbelt whereas most drivers felt it was up to the passengers themselves to decide.

### **Dangerous Driving**

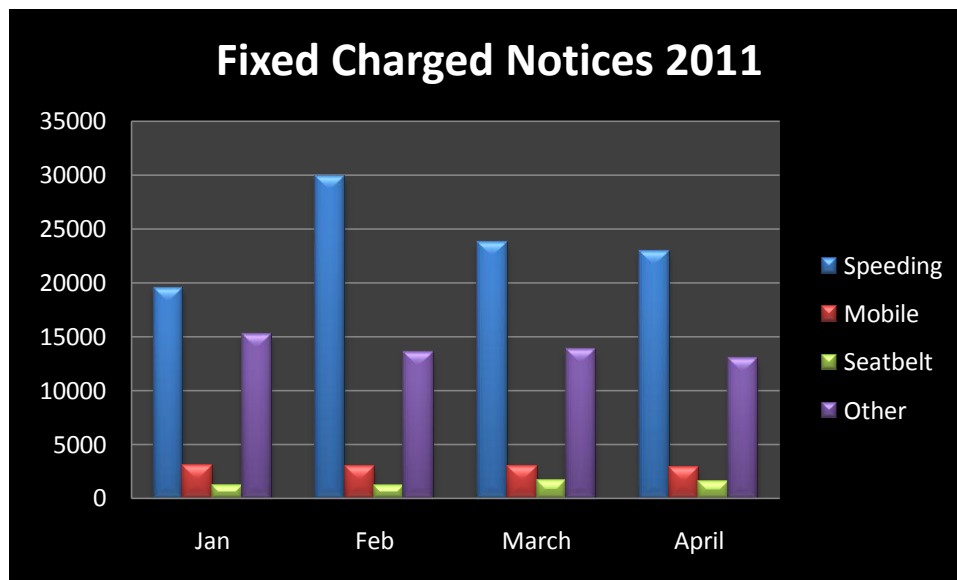
According to Vanlaar & Yannis (2006), “as long as drivers do not know what constitutes dangerous traffic behaviour, they cannot refrain from behaving dangerously”. They continue to state that “there will always remain a group of people for whom awareness of risk does not suffice to adapt their behaviour, leading to the statement that knowledge is a necessary but insufficient condition for safe behaviour in traffic”.

The RSA (2007) find the primary causes of road collisions, deaths and injuries to be:

- Speed inappropriate for, or inconsistent with, the prevailing circumstances or driving conditions
- Impaired driving through alcohol, drugs (prescription or non-prescription), or fatigue
- Failure to use or properly use seatbelts and child safety restraints
- Unsafe behaviour towards / by vulnerable road users (pedestrians, motorcyclists, cyclists, young children and older people).

### **Speed**

Figures from the RSA (2008) show that in 2008, the percentage of drivers exceeding the speed limit ranged from 16% to 86% depending on the road type and posted speed limit. The figures also showed that the percentage of drivers found breaking the speed limit by 10 km/h or more ranged between 3% and 47%, depending on the road type.



**Figure 3.** Results obtained from An Garda Síochána (2011). The highest peak with regard to speeding shows that 29,918 drivers were fined for speeding in the month of February 2011.

According to Vereeck & Vrolix (2007), “speed is a well-documented cause of accidents that can be prevented through limits and limiters”. Fuller (2004) discusses speed, stating that it is self-evident that the faster a vehicle travels, the less time is available to take information in, process it and respond to it. He continues to discuss reasons for drivers speed, “motivation for speed arises from variables such as available time for a journey, possible social forces relating to passengers (e.g., desire to ‘show-off’ to peers or to provide a comfortable ride for an elderly person)”, (Fuller, 2004).

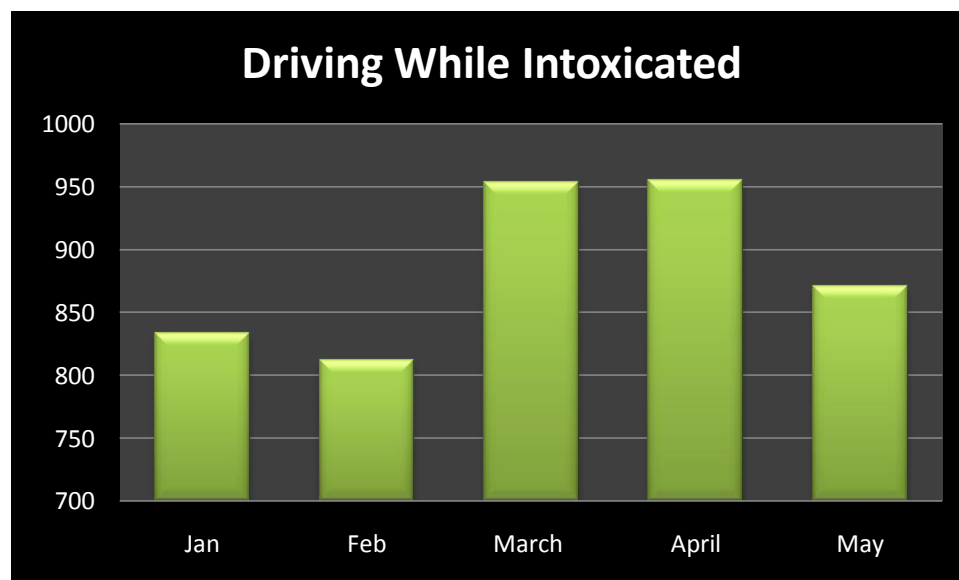
The Global Status Report on Road Safety (2009) discusses speed of a vehicle in relation to the crash outcome, “an increase in average speed is directly related both to the likelihood of a crash occurring and to the severity of the crash consequences”, the report continues to state that “a 5% increase in average speed leads to an approximately 10% increase in crashes that cause serious injuries, and a 20% increase in fatal crashes”. In relation to pedestrians, according to the report, they have a 90% chance of surviving a car crash at 30 km/h or below, but less than a 50% chance of surviving impacts of 45km/h or above. With regard to speed limits in different zones the report discusses the 30km/h relevance; these zones can reduce crash risk and injury severity. They are recommended in areas where vulnerable road users are particularly at risk, an example of this would be in areas around schools.

Vanlaar and Yannis (2006) predict that, “the prevalence of accidents due to breaking speed limits will rise with a rising prevalence of breaking speed limits, irrespective of the risk that comes with breaking speed limits”.

Hussain et al (2006) state that “while many factors contribute to collisions, excessive or inappropriate speed is a primary cause in a third of all fatal and serious crashes”.

### Drink Driving

The following figure shows the amount of drivers who were driving while intoxicated from January-May 2011. April showed the highest with 955 drivers driving while intoxicated. These figures likely grew in April due to Easter, holidays and bank holiday weekends, times when drivers tend to be more careless and more accidents occur.



**Figure 4.** Results obtained from An Garda Síochána (2011).

Erke et al (2009) discuss driver under the influence (DUI) checkpoints, “the aim of DUI-checkpoints is to reduce the amount of drink-driving and thereby the number of alcohol-related crashes”, they continue to state that “it is assumed that the perceived risk of detection deters drivers from drinking and driving, and that reduced drink-driving will reduce the number of alcohol-related crashes”. Erke et al (2009) continue to state that DUI checkpoints aim at reducing crashes involving alcohol. Along with this, drivers may assume the presence of the police and therefore commit fewer other offences such as speeding. Erke et al (2009) has found from study that drink driving contributes to the most severe crashes and that checkpoints are consistently found to reduce crashes.

With regard to drink driving in Ireland’s border counties, the Steering to Safety Summary Report (2006) found that one third (32.9%) of fatal collisions in the Republic's border counties occurred between 9 p.m. and 4 a.m., a time which may be associated with drinking



and driving”. The report also states that results from the National Safety Council (NSC) show that an average of 250 drivers are arrested each week for driving while under the influence of an intoxicant in the Republic of Ireland.

According to the Global Status Report on road Safety (2009), “The development and effective enforcement of legislation is critical in reducing drink-driving and excessive speed”. The Global Status Report on road Safety (2009) states that “drinking and driving increases both the risk of a crash and the likelihood that death or serious injury will result”.

Vanlaar & Yannis (2006) conducted a study on the perception of road accident causes, they discuss that intoxicated persons involved in accidents are likely to suffer more severe injuries than sober individuals involved in similar accidents. Vanlaar & Yannis (2006) continue to discuss how it is generally accepted that drinking and driving is very risky and increases the potential for traffic accidents, but people often tend to overlook the fact that, once an accident happens, the severity of the consequences can vary substantially according to the level of intoxication.

## **Mileage**

According to Langford et al (2006), independent of age, drivers travelling more kilometres will typically have lower crash rates per kilometre than those driving fewer kilometres. In relation to older drivers Langford et al (2006) state that “Because older drivers typically drive less distance per trip and hence have lower accumulated driving distances per year, they have greater crash involvement per unit of distance compared to drivers with greater accumulated driving distances”. “Driver age groups cannot be validly compared for crash involvement, if crash rates have been calculated solely on the basis of distance travelled”, (Langford et al. 2006).

Parker et al (2000) states how people who drive more expose themselves more to the risk of hitting, or being hit by another vehicle. In Hakamies-Blomqvist’s (2002) paper on driver ageing not causing higher accident rates per km, Janke (1991), as cited in Hakamies-Blomqvist (2002) states that driver groups with small yearly mileages have, independently of age, higher accident rates than driver groups with large yearly mileages. “This “low mileage bias” may inflate older driver risk per km estimates, as they are typically compared with other age groups having larger yearly driving exposure”, (Hakamies-Blomqvist, 2002).

“Drivers who drive more miles are more likely to violate regulations, drive while drowsy (McCartt et al, 2000), and have an increased risk of crashing (Kaneko and Jovanis, 1992).as cited in Duke (2010).

According to Charlton, Oxley, Fildes, & Les (2001); Macdonald (1996); Organisation for Economic Co-operative Development (2001), as cited in Di Stefano and MacDonald (2003) “when distance driven is taken into account, the risk of older drivers being involved in a reported crash is similar to that of novice drivers”.

“Older drivers may compensate to some extent for functional impairments by becoming more selective about how, when, and where they drive, tending to avoid driving during peak hour traffic, at night, or under adverse weather conditions”, Ball et al. (1998); Gallo, Rebok, & Lesikar (1999), as cited in Di Stefano & MacDonald (2003).

### **Mobile Phone Use**

Fuller (2004) discusses research carried out by Brookhuis et al. (1991) and Recarte and Nunes, (2003). This research showed that, “when engaged in a telephone task, drivers slow down, increase time headway to a vehicle in front and reduce mirror and speedometer inspections”.

The Steering to Safety Summary report (2006) discussed the results obtained from the focus group and cross border questionnaire, this showed that reported mobile phone use was very high ( making and receiving a call and texting) while driving, more than half (52%) of people admitted to making a mobile call while driving.

### **Drug Driving**

In Matthews et al (2011), a research carried out in Australia regarding factors associated with driving under the influence of drugs, 10% of nightclub attendees said they would knowingly drive or be driven by someone under the influence of drugs. The research showed that many of the male participants highlighted how past drug driving experiences would contribute to the carefree attitude towards this behaviour. The fact that they had driven under the influence of drugs without having an accident gave them a sense that this was a safe behaviour and one they could engage in competently.

Matthews et al (2011) discusses behavioural change, “in order for an individual to change their behaviour they have to perceive that the threatened event is both severe and probable. In the case of drug-driving, then, young people would need to believe that the consequences of drug driving (impaired driving and/or being caught and charged) are both severe and likely to occur”. Matthews et al (2011) further discuss this statement in contrast with regard to drink driving, how many perceive as dangerous behaviour, both in terms of driving skills and the likelihood of being caught. Views on drink driving, informed from previous experience and

knowledge gained from educational campaigns in the media about the risks of drink driving deters people from doing so.

Maguire (2009) discusses testing drivers for intoxicants. The responsibility for chemical testing of intoxicants in drivers in the Republic of Ireland rests with the Medical Bureau of Road Safety (MBRS). A total of 78 blood urine specimens were tested for the presence of drugs in 2000 with an increase to 1867 in 2008. According to Maguire (2009) Cannabis was the most prevalent drug.

According to Vanlaar & Yannis (2006) knowledge on taking illicit drugs and driving is not so widely available and even less information exists on prevalence and risk of accidents related to taking medicines and driving. They continue to state that “drug-driving as a rather new phenomenon that increasingly drew the attention should not dazzle us; drink driving remains a threat to society”.

### **Penalty Points**

On 31 October 2002 the Irish Government introduced The Road Traffic Act 2002, this brought in penalty points for speeding as part of a major road safety initiative. Under this system, speed-related driving offences attract penalty points on the driving licence. The accumulation of 12 penalty points over a 3-year period leads to automatic disqualification for 6 months, (Hussain et al, 2006).

Privately operated speed cameras were brought into operation in Ireland in early 2011. According to Hogan (2011) the number of drivers getting penalty points for speeding has trebled, following the introduction. Figures from Hogan (2011) show that the total number on the Road Safety Authority's national register increased by 50,303 between January and July 2011, in comparison with just 16,433 in the same period last year.

“Penalty points are credited with helping the steady fall in Irish road deaths”, (Hogan, 2011).

The Road Safety Authority displays a statistical breakdown of penalty points incurred in counties in Ireland. For the month of June 2011, the following table shows a breakdown of the points incurred with a total of 6139 points incurred in total.

|  |   |
|--|---|
| Contravention of requirements at junctions | 1 |
| Fail to comply with No Entry traffic sign  | 1 |
| Fail to drive on the left hand side        | 1 |

|   |      |
|---|------|
| Careless Driving                                  | 2    |
| Drive on hard shoulder/non carriageway – motorway | 2    |
| Fail to comply with mandatory traffic signs       | 3    |
| Fail to comply with traffic lane markings         | 3    |
| Fail to yield right of way at sign/line           | 3    |
| No child restraint front seat – child             | 3    |
| Fail to yield right of way                        | 4    |
| Fail to comply with Keep to Right/Left signs      | 8    |
| No child restraint rear seat – child              | 8    |
| No safety belt front seat – child                 | 9    |
| No safety belt rear seat – child                  | 10   |
| Driving along/across median strip                 | 11   |
| No insurance - (user)                             | 12   |
| Fail to stop before stop sign/stop line           | 16   |
| Breach of motorway outside lane driving rule      | 17   |
| Offence relating to Overtaking                    | 19   |
| Fail to comply with prohibitory traffic signs     | 27   |
| Entry to hatched marked area                      | 47   |
| Driving without reasonable consideration          | 85   |
| Cross continuous white line/broken white line     | 113  |
| Fail to obey traffic lights                       | 121  |
| No safety belt – driver                           | 366  |
| Driving a vehicle while holding a mobile phone    | 731  |
| Speeding  | 4516 |
| TOTAL   | 6139 |

**Figure 5.** Obtained from the RSA (2011)

## **CHAPTER3: METHODOLOGY**

### **The Aim of the Study**

The aim of this study is to analyse road safety and older driver behaviour in County Monaghan.

### **The Specific Objectives of the Study**

- To formulate a suitable methodology to retrieve information regarding road safety and older drivers, by developing a semi-structured interview suitable to the area of research, and structured in a way as to retrieve as much relevant information as possible from a network of participants.
- To research road safety thoroughly and present the findings through a literature research.
- To analyse the data obtained from the interviews.
- To present the results and findings through graphs and discussion.
- To identify the main risk factors involved in road safety, notably that of older drivers.
- To define guidelines to approach the issues found.

### **Research methods**

The fieldwork was carried out to understand the importance of road safety and to examine 50 older drivers behaviour. Changes in their driving habits were sought out with current habits analysed against the habits they had when younger.

The chosen methodology was semi-structured qualitative interviews; these were used to obtain information relevant to the research criteria with the added benefit of having the opportunity to obtain more information in certain areas and also to obtain information that was not included in the research criteria. These interviews were conducted with 50 older drivers in County Monaghan.

The research for this paper was carried out using various sources of information to gather the required data regarding older driver behaviour. The following were used to obtain the most current and up to date information on road safety and driver behaviour: Internet portals of recognised bodies such as the Road Safety Authority, the World Health Organisation, Newspapers and International peer reviewed journals and texts. The online library resources for journals proved most useful and beneficial to the paper in retrieving up to date, new and

relevant journal articles. Journal articles gave an insight into the entire area of road safety, worldwide, showing the work and study already taken by others in the field.

The literature review reflects the importance of road safety and driver behaviour. The importance of road safety and the implementation of measures to combat existing issues and threats on our roads were examined.

Interviews as a research method will be discussed in this chapter, along with why they were chosen as the primary research tool. The selection of interviewees and the interview process will also be discussed and the methods used to analyse the data will be discussed.

### **Limitations to the Study**

The study was of older drivers, people over the age of 50. Some of the interviewees seemed to hold back in their answers with a fear of negative impacts from their answers, for example, admitting to driving under the influence of alcohol. It sometimes seemed that the interviewee was giving answers they thought to be correct, with a fear of giving the incorrect answer. Therefore all interviewees were informed that no bias would be seen in their answers, there was no such thing as an incorrect answer and that the objective of the interview was to obtain truthful and genuine answers and information. It proved difficult with some respondents in retrieving truthful information and answers, perhaps the respondents were seeking to portray themselves in a better light. Both interviewing and analysing the data is a time consuming process, therefore time was a limitation, especially with 50 interviews to be conducted and the analysed.

As only 50 older drivers were interviewed, the sample of older drivers is unrepresentative of the wider population.

### **Semi-structured Interviews**

Qualitative semi-structured interviews were chosen over other research methods as they were deemed the most appropriate method to retrieve the required information. Semi-structured interviews give the opportunity to delve further into questions and topics and because of the wealth of information which can be gathered from people's answers. They provide an opportunity to engage with the interviewee in more detailed answers. The answers from the interviewees were not confined to categories, giving a personal answer reflecting their driving habits and behaviour.

A semi-structured interview was developed. The following areas were addressed in the interview questions:

- Gender
- Weekly Kilometres driven
- Full or provisional licence holder
- Driving test sitting
- Mostly a day or night time driver
- Penalty points/fines incurred
- Reasonable to overtake slow or inexperienced drivers
- Whether weather affects driving habits
- Accident involvement and effects
- Whether accidents can be prevented or it depends on driver behaviour
- Near misses whilst driving and effects
- Road rage
- Drink driving
- Mobile phone use whilst driving
- Seat belt use
- Speeding
- Conditions in which road safety laws are broken
- Reasons for adhering to road safety laws
- Blind overtaking
- Driving habits
- Factors jeopardising road safety

### **Recruitment of Interviewees & the Interview Process**

The methodology involved sourcing 50 individuals, over the age of 50 in the Monaghan area. The interviews began in February and were fully completed by June. Research was carried out prior to the interviews to ensure the area was worthy of research.

The participants sourced firstly through family and friends; from the first few that were conducted a snowball effect occurred where interviewees lead me to another source, and so on.

Each individual was asked the questions in a relaxed manner with the opportunity to elaborate on their answers. The results were recorded electronically on a laptop and summarised afterwards.

The respondents interviewed were all current drivers, all of whom were over the age of 50. 50% interviewed were male, the other 50% female. The interviews were carried out in their homes or my home.

### **Interviews/Questions**

The following questions were asked to each older driver. Depending on the answers and flow of conversation some areas were pursued further than others, such as accident involvement. Other questions were ignored at times, such as drink driving if the interviewee had previously stated that they are a pioneer all their lives.

- Approximately how many km would you drive weekly?
- Do you have a full drivers licence?
- Did you sit a driving test?
- Would you drive more often in day or night time hours?
- Do you think you are a good driver? A safe driver?
- Have you ever been fined for driving offences or have any penalty points? What for?
- Do you think it is reasonable to exceed the speed limit to overtake slow or inexperienced drivers?
- Do weather conditions have an effect on whether you break the rules of the road?
- Have you ever been involved in an accident? If so how did it affect you? Did it affect you for 1 week, 1 month...?
- Do you think that almost all accidents could be prevented or it depends on a driver's behaviour?
- Have you had many near misses when driving? How did this affect you?
- Do you ever suffer from road rage?
- Do you think that taking risks whilst driving means you are a bad driver?
- Have you ever driven while under the influence of alcohol?
- Have you ever accepted a lift from someone knowing they were under the influence?
- Do you ever use your mobile phone while driving? How often?
- Do you wear your seat belt at all times? Do you ensure all passengers do too?
- Do you ever break the speed limit? By how much?
- In what conditions do you feel you are more likely to break the speed limit?



- Are you more cautious about breaking the law because of a fear of getting caught or because of safety reasons?
- How often do you think you break the law? In what ways?
- Do you ever overtake blind? How often?
- Do your driving habits change if you have children or young people in the car?
- Do you think a drivers age or experience impacts whether they will be in an accident or not?
- What do you feel are the main factors jeopardising road safety?

### **The Pilot Study**

A pilot study was carried out to justify the relevance of the topic and to ensure it was an area worthy of research. Below is a summary of the first older driver interview which took place. The pilot study shows a marked difference between what the participant said and what they continued to say.

### **Summary**

The respondent drives approximately 50km a week, mostly in daytime hours. They hold a full clean driving licence and never had to sit a driving test. The respondent considers them self to be a good and safe driver and from the interview it is clear that the respondent's driving at a younger age was more careless as was fined twice for speeding offences, would frequently drink and drive and frequently suffer from road rage. The respondent now considers them self to be a safe driver, no longer suffering from road rage as is a more relaxed driver, stating that older drivers are more patient and cautious on the road. The respondent also states how being involved in an accident causes you to be more cautious on the road, if only for a few months. The respondent also feels that no matter what measures are put in place regarding road safety at the end of the day road safety all depends on driver behaviour.

Yet in revealing the above, the respondent also reveals that they feel it is reasonable to exceed the speed limit to overtake slow or inexperienced drivers. The respondent also admits to using a mobile phone when driving, continuing to admit to breaking the speed limit on a motorway and on good roads. From the interview it is clear that the respondent constantly breaks the law by speeding but feels they had worse driving habits as a young driver, older drivers are less reckless and have more patience. A fear of getting caught breaking road laws

is a greater reason for driving safely rather than for being safe. With regard to factors jeopardising road safety the respondent feels poor roads, speeding, overtaking, drunk driving and late driving therefore tiredness are the major factors.

### **Data Analysis**

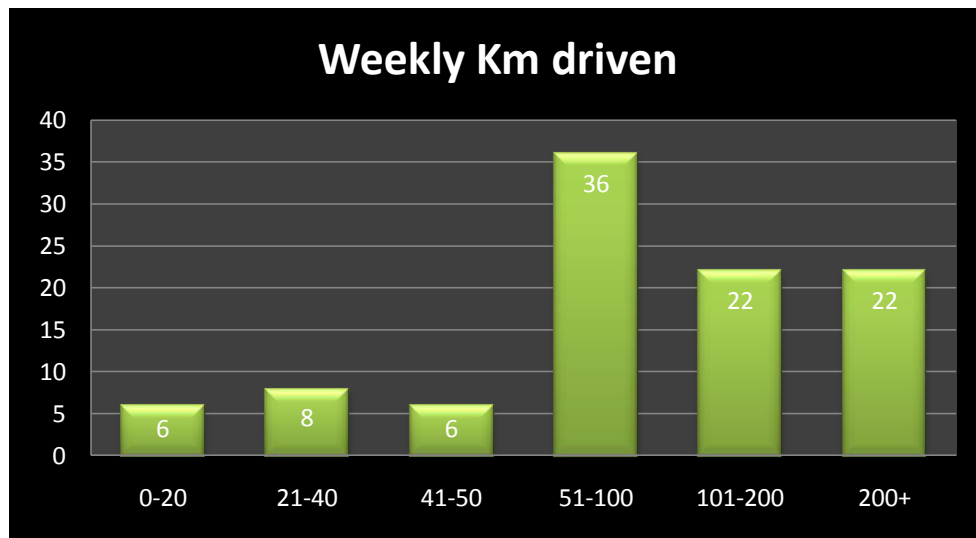
The interviews were summarised after the interview took place. The results were broken down into categories so the information could be displayed in an excel worksheet, a worksheet containing all information regarding the interviews which allows the data to be organized into a logical, coherent format. When all the data from the 50 interviews had been transcribed into an excel worksheet, the information was further processed into SPSS statistical software. In SPSS the information was broken down into data and variables. SPSS allows for the analysis of data from a statistical point of view. The results from the SPSS were then transferred back into excel where graphs were generated, allowing for the comparing and analysis of the data and the results obtained.

## **CHAPTER 4: RESULTS**

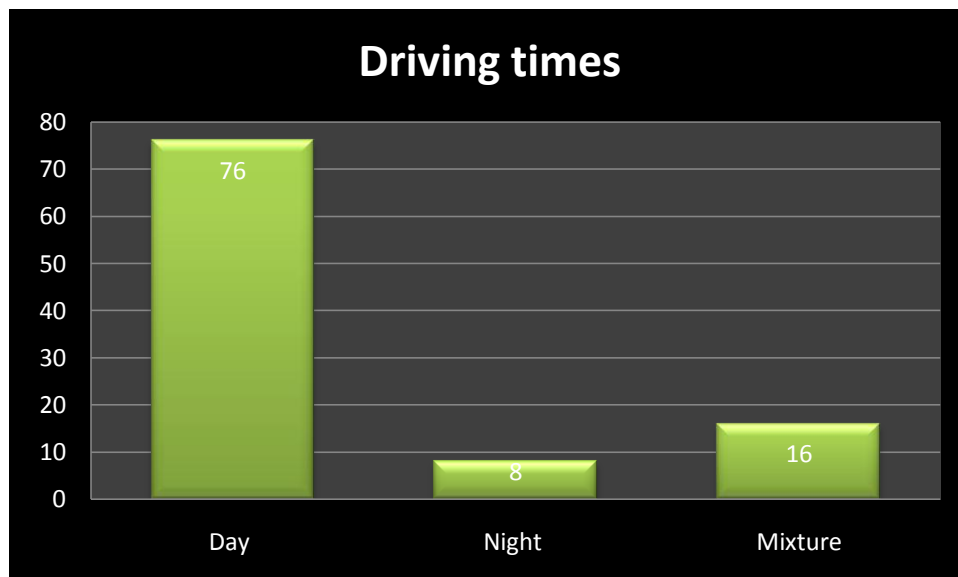
From the results obtained from the pilot study that was carried out it was decided to conduct 50 interviews with older drivers. The main body of research to be carried out through interviews were done so in the same manner as that of the pilot study. County Monaghan was chosen as a location of interviewees for ease of access to older drivers due to habituating there myself.

The objective of the data analysis is to discover the frequencies between the variables and to uncover existing trends and habits of older driver behaviour.

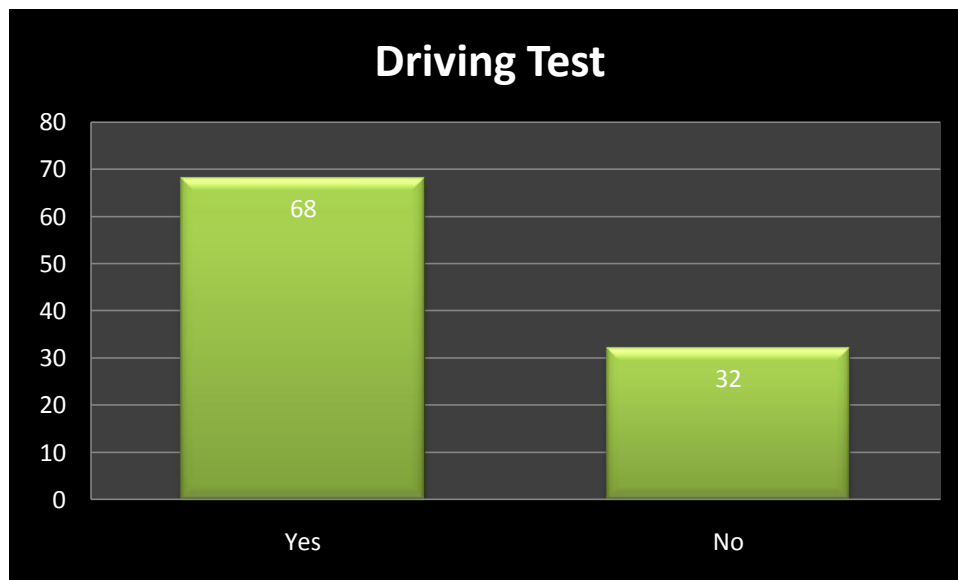
The results were analysed using SPSS, graphs were generated using excel. The findings and statistics are portrayed below.



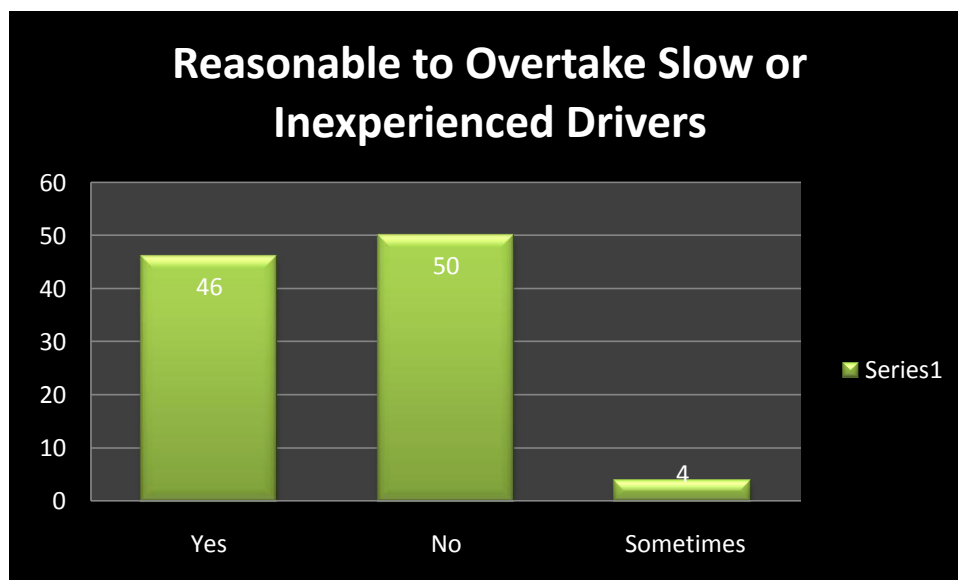
**Figure 6.** Of the older drivers interviewed 36% drive between 51-100km per week.



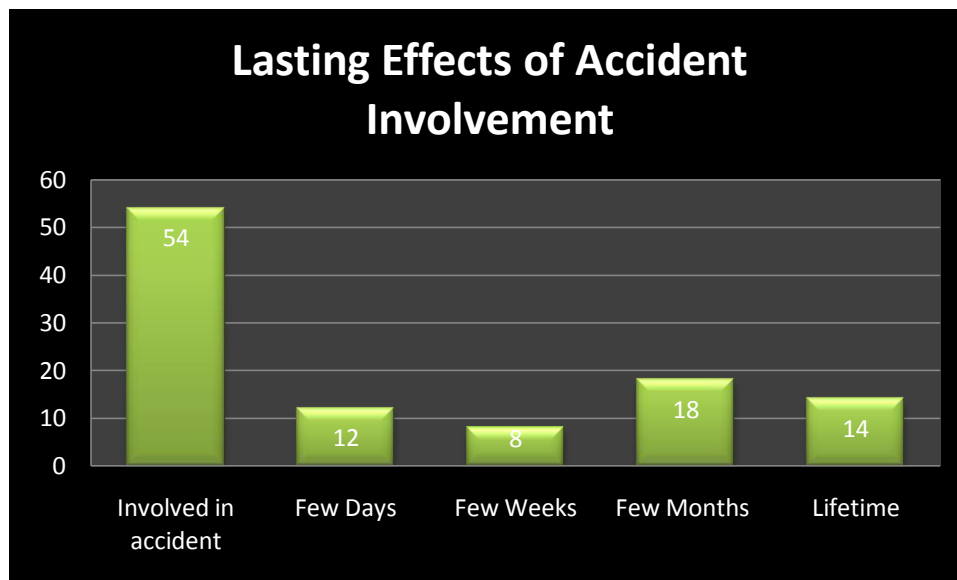
**Figure 7.** 76% of interviewees drive mostly in day time hours with only 8% driving more so at night.



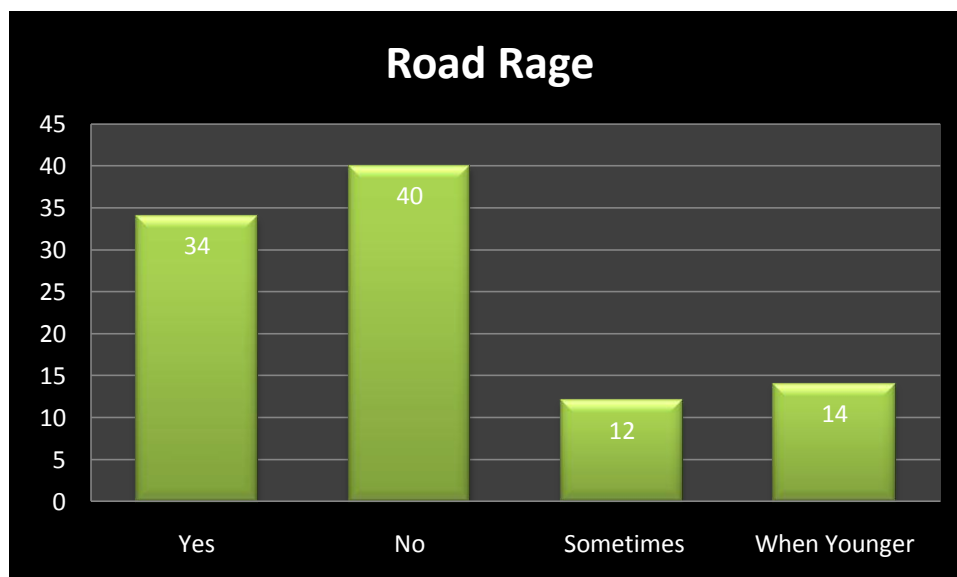
**Figure 8.** 32% of the older drivers have never sat a driving test.



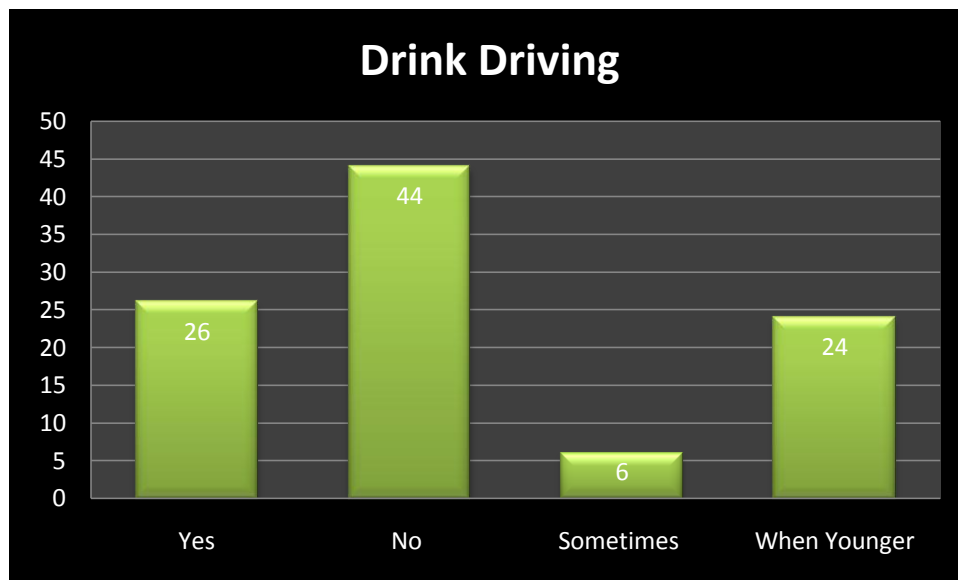
**Figure 9.** It was discovered that 46% of people interviewed thought it was reasonable to exceed the speed limit to overtake slow or inexperienced drivers.



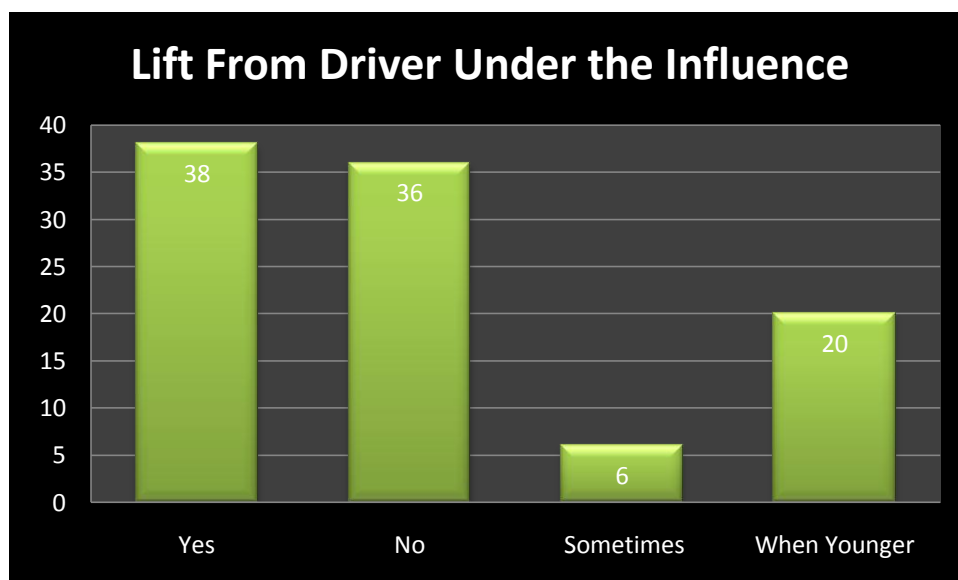
**Figure 10.** 54% of respondents had been involved in an accident at some stage in their lives, with 18% saying that it affected them for more than a few months and 14% saying that accident involvement has affected them for a lifetime. Affected by in this instance refers to being nervous because of accident involvement, anxiety in cars or from injuries sustained in the accident.



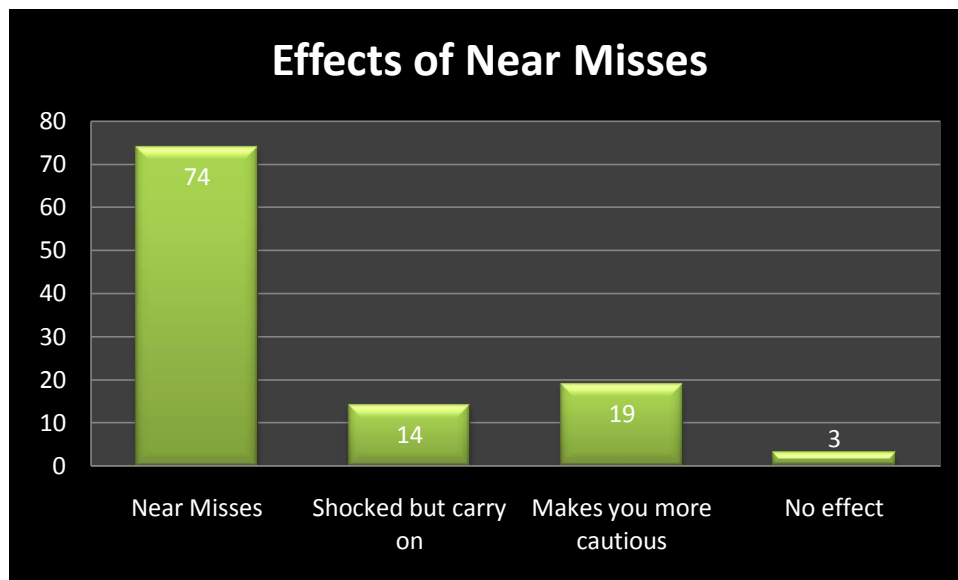
**Figure 11.** 34% of drivers admitted to suffering from road rage, with 14% stating they used to when younger but no longer do.



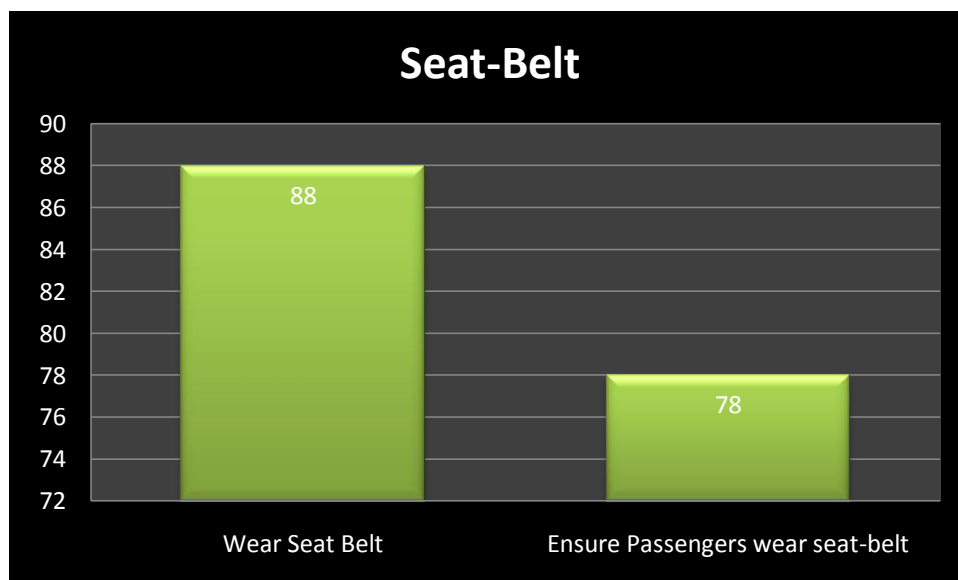
**Figure 12.** Of the drivers interviewed 26% admit to drink driving, 6% admit to drink driving sometimes and 24% admitting that they used to drink and drive regularly when younger but no longer do.



**Figure 13.** 38% of the sample admit to accepting a lift from a person under the influence of driving, whilst 20% admit they used to when younger but would no longer do so.

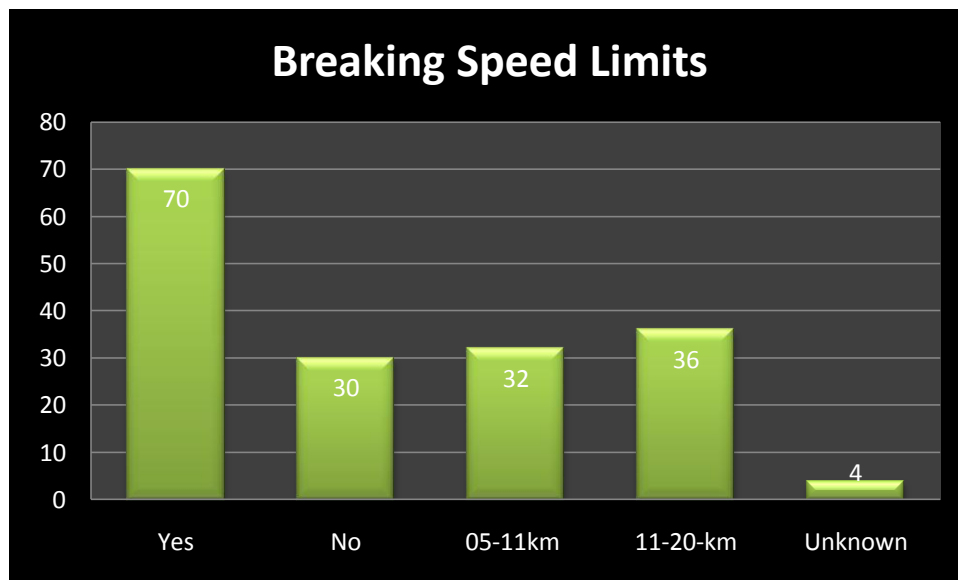


**Figure 14.** 74% have had near misses whilst driving, almost being in or causing an accident with 19% revealing that near misses make them become more cautious on the road.

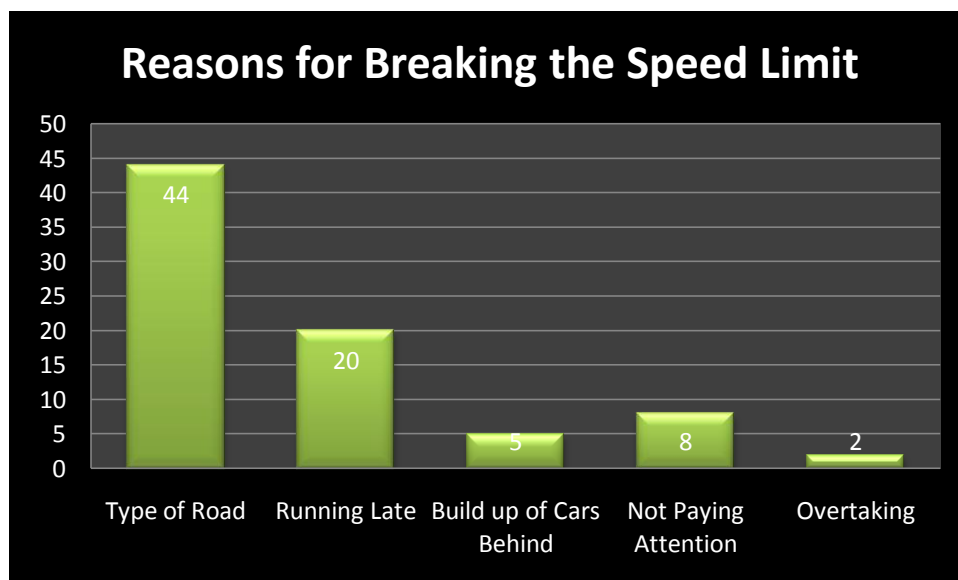


**Figure 15.** 88% of the sample wears their seat belt at all times with 78% ensuring that passengers do too.





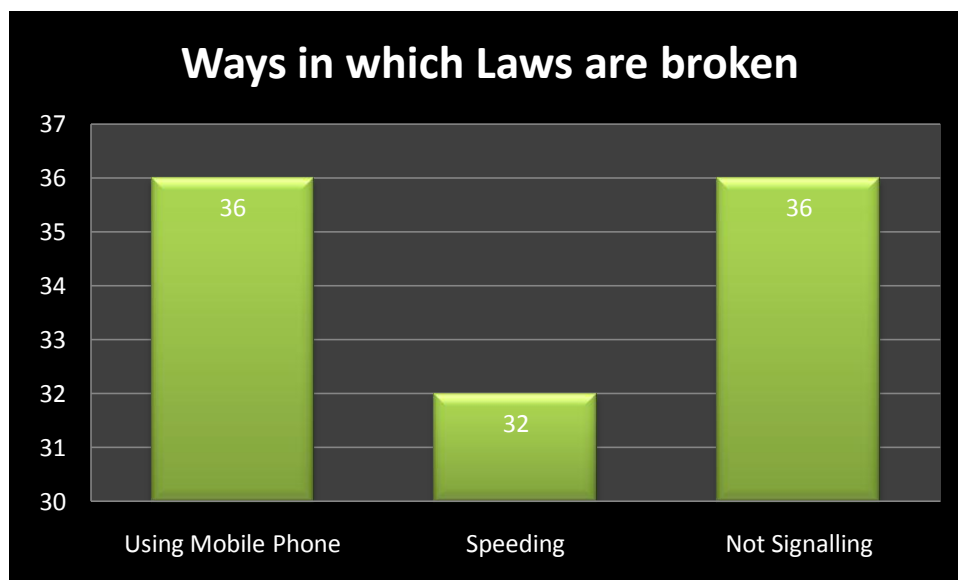
**Figure 16.** 70% of older drivers admit to breaking the speed limit regularly with 36% stating that they break the speed limit by between 11-20kph.



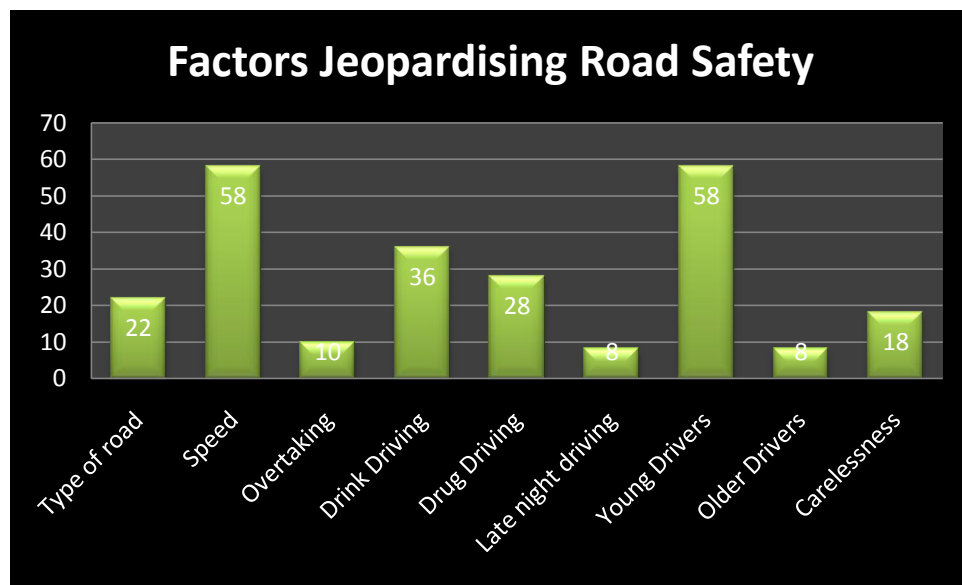
**Figure 17.** 44% break the speed limit due to the type of road they are driving on, with a motorway being the most mentioned road condition. 8% of drivers interviewed admitted to breaking the speed limit as they simply do not be paying attention.



**Figure 18.** When the drivers were asked, if they were more cautious about breaking the law because of a fear of getting caught or because of safety reasons, 30% admitted to being more cautious because of a fear of getting caught, with 34% admitting to it being a combination of the two.



**Figure 19.** When asked about the ways in which the drivers break the law, 36% said by using their mobile phone when driving, 32% feel they break the law mostly by speeding and 36% by not signalling.



**Figure 20.** When asked what they felt were the main factors jeopardising road safety 22% feel that road conditions do. This refers to either good roads where the ability to increase their speed is tempting to poor roads that are a danger regardless of the weather of the driving habits taking place on them. 58% feel that speed is a major factor jeopardising road safety, with 36% feeling that drink driving is a major factor affecting safety on the roads. With regard to drug driving, 28% feel that this factor affects the safety on the roads. Of the drivers interviewed, 58% feel that young drivers have a negative impact on road safety and 18% feel that carelessness when driving is a factor jeopardising the safety.

### Further Statistical Findings

The results from the data analysis show that 70% feel that weather affects their driving habits. This is reflected in either increasing speed on clear dry days to driving slower in wet and dark conditions in which visibility is lowered. 30% feel it their driving habits remain the same regardless of the weather.

A total of 36% of respondents have been fined for driving offences in their lifetime, these fines were mostly from speeding and having no tax.

22% of drivers interviewed feel that all accidents could be prevented by road improvements, campaigns, speed checks and breath testing. Yet, 62% feel that accidents will happen regardless of the road, type of weather etc, it is all down to driver behaviour.

When questioned about blind overtaking only 2% of drivers admitted to it, with 12% admitting that they used to overtake blind when they were younger but would not now.

74% of drivers interviewed believe that their driving habits change when they have other people in the car with them, especially children or young people. Whereas 22% state that their driving habits remain the same, regardless of who is in the car with them.

Of the drivers interviewed, 84% believe that a driver's age and/or experience impacts whether they will be involved in an accident or not.

## CHAPTER 5: DISCUSSION

The aim of this project was to analyse older driver behaviour in County Monaghan with regard to road safety. The interviews carried out highlighted positive and negative aspects of older driver behaviour, unfortunately more negative than positive.

The main positive aspect came from finding that the majority of older drivers have grown out of habits they had when they were young. For example 24% of respondents would no longer drink and drive but they used to when younger, they have either learned from their mistakes or have become more careful and cautious on the road now that they are older.

Over half (54%) of the older drivers interviewed have been involved in an accident, this figure can be seen in a positive light when compared against accident statistical figures such as studies from the WHO (2009), which show that, more than 1.2million people die on the world's roads every year, and as many as 50million others are injured. This can be seen in agreement with Fuller (2004), "Although drivers may target a level of risk, this is not to say that they target a level of accident involvement".

One of the main negative aspects from the research was that a third (32%) of the older drivers never sat a driving test. A question that remains unanswered is why older drivers have never had to sit a driving test? Some individuals sit the driving test several times before succeeding to pass, this means some older drivers on our roads may be unable to drive to a standard that is suitable and safe on our roads.

A negative aspect uncovered from the research discovered that almost half (46%) of older drivers feel it is reasonable to overtake slow or inexperienced drivers. This kind of behaviour can be linked to road rage, in which over a third (34%) admitted to suffering from. This can be compared to that of the findings of the Steering to Safety Summary Report (2009) which showed that 41% of drivers from the Republic of Ireland are more likely to become angry when driving.

The findings indicated that over a quarter (26%) of older drivers admit to driving while under the influence of alcohol. This is worrying; according to Borkenstein et al (1974) as cited in Vanlaar & Yannis (2006) driving under the influence of alcohol or other substances clearly increases the probability of involvement in an accident. Some 38% of older drivers admit to

accepting a lift from another person knowing they are under the influence of alcohol, with 20% revealing that they did when they were younger but would no longer do so now.

According to Langford (2002), “While there is growing research evidence to suggest that older drivers as a group do not have an elevated crash risk and are at least as safe as other age groups, the fact remains that a small proportion of older drivers do have diminished driving skills and do represent an exceptional crash risk”. This statement can be highlighted to the fact that almost three quarters (74%) of the older drivers interviewed admitted to having near misses whilst driving, with 3% stating that this had no effect on them. But on a positive note, having a near miss made 19% of the older drivers more cautious afterwards. Near misses can also be seen as driver inattention, as discussed earlier in this paper by Staubach (2009) when referring to “looked but failed to see”.

The data analysis showed that 88% of older drivers wear their seat-belts at all times, this is positive in the fact that “in the event of a crash or roll-over, seat-belts protect the occupant of a car by preventing ejection and by reducing the frequency and severity of occupant contact with the interior of the vehicle and other occupants, (SWOV, 2003, as cited in Steering to Safety Summary report, 2006). With regard to ensuring that passengers wear their seat-belts, 78% of older drivers ensure this. This is in contrast to the survey carried out; The Steering to Safety Summary Report (2006) whereby only 23.1% of a focus group admitted to ensuring this but most of the focus group stated that it is up to the passenger themselves.

The data analysis highlights aspects of older driver behaviour with regard to speed. A staggering 70% of older drivers interviewed admit to speeding on a regular basis, with a shocking 36% confessing to breaking the speed limit regularly by between 11-20km. These results are comparable to that of the SARTRE 3 Report (2003) in which respondents admitted to speeding more so on good roads such as motorways. A total of 44% of older drivers revealed that the type of road is the main reason for breaking the speed limit; this was either, a motorway, a dual carriageway, or simply any wide and straight road with clear visibility. This is comparable to the findings from the Gardaí, “The most dangerous drivers on the motorways, according to the Gardaí, are “middle-aged and older drivers””, (Holland and Cassidy, 2011).

4% of older drivers were unable to estimate how much they would break the speed limit by and 8% revealed that not paying attention was one of their reasons for breaking the speed limit. One older driver admitted that they could not comment as they are unable to read the speeds sign due their eyesight being so poor. As previously stated by Vereeck & Vrolix (2007), “speed is a well-documented cause of accidents that can be prevented through limits and limiters”. This is obviously not the case when the older drivers interviewed admit to speeding, regardless of the limits, they are speeding due to the good quality of the road in which they are driving on.

Many of the individuals sampled complained about the conditions of the roads in which they are driving. Many remarked on wide straight roads having low speed limits (50kmph) which made it difficult to obey. When the road is clear the sample found it difficult not to increase their speed and stick to or below the speed limit in that given area.

“Governments need to enact proper laws that require all road users to be protected through enforcements of speed limits that are appropriate to the type and function of the road”, (Global Status Report on Road Safety, 2009).

Many also complained about high speed limits on poor roads. Many felt that speed limits should be set on not only the type of road, whether primary or national but the condition of it, for example, if it is narrow with bends.

These remarks reflect the results displayed in the Steering to Safety Summary Report previously discussed, whereby traffic was driving less than the speed limit in certain areas, perhaps poor roads, and increasing speed in other areas, perhaps roads of a better condition.

30% of older drivers interviewed admitted that the reason they are cautious whilst driving is because of a fear of getting caught by the authorities, whilst 30% revealed it is to do with safety reasons. Drivers know it is easy to get caught breaking the law, especially when figures from the RSA (2011) reveal that there were a total of 6,139 penalty points incurred in the month of June 2011 alone.

A total of 36% of older drivers admit to using their mobile phone whilst driving. A total of 731 penalty points were incurred in June 2011 for drivers using their mobile phone whilst driving. Of the older drivers interviewed the data analysis revealed that 36% feel they break the law by failing to signal. This can be comparable to a study by Parker et al (2000) regarding elderly drivers and their accidents, results showed that “The two most frequently

reported individual behaviours were both errors and lapses: misreading signs and taking the wrong turn off a roundabout, and getting into the wrong lane approaching a roundabout or junction. These are just the types of situation that elderly people are likely to find difficult, as they are required to do several things at the same time". Parker et al (2000) also state that from their study "errors and lapses are more of a concern among the elderly".

In Winter & Doudou (2010) it was found that those who reported driving more hours per week reported more errors and violations. This can be comparable to the results obtained in this paper. The majority of the older drivers interviewed drive between 51-100km per week (36%). This mileage figure is low, therefore reflects the amount of older drivers that have been involved in an accident (54%). This figure of 54% has been taken over the lifetime of the older drivers, but if it were to be taken from when they reached the age of 50, it would be significantly lower.

Unfortunately many factors exist which are jeopardising road safety. All of the older drivers were asked which factors they thought were jeopardising road safety. A staggering 58% revealed speed and younger drivers to be the main factors, and drink driving (36%). The factors obtained from the older drivers are comparable to that of the results of the Steering to Safety Summary Report (2006) on the most fatal collisions over the four years 2001 to 2004, in the Republic's border counties. The most common contributory factor to the collisions was the consumption of alcohol (37.4%), followed by excessive speed (27.3%) and inattention (18.8%). 18% of older drivers interviewed referred to carelessness as a factor jeopardising road safety. This carelessness could also be linked to that of driver inattention, human error and lapses which are detailed earlier in this paper in the literature review.



## CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The cause of road traffic accidents involves numerous factors, all of which could not possibly be explored. They are not easy to predict yet a focus can be made, highlighting them to enhance driver awareness. This may include using a person's approach as a means to help the problem on the roads. "The person approach focuses on the errors of individuals, blaming them for forgetfulness, inattention, or moral weakness. The longstanding and widespread tradition of the person approach focuses on the unsafe acts—errors and procedural violations—of people at the sharp end", (Reason, 2000). Campaigns can be used in this instance such as poster campaigns or television advertisements. These campaigns according to Reason (2000) appeal to people's sense of fear.

Factors not only include those referring to people's state of mind as in whether they are intoxicated or not, outside factors such as the weather can cause error and effect driver behaviour. All factors must be considered when analysing driver behaviour when trying to understand the cause of road traffic accidents. Older drivers have serious impacts from their driving habits and this can be seen throughout the research and this paper with the factors shown.

"It is important to understand the kinds of behaviours that are associated with accident involvement among older drivers. This will enable road safety strategies to be devised which are most likely to be beneficial in reducing road traffic accidents among the elderly", (Parker et al, 2000).

The results indicate that older drivers need to be more aware of the consequences of unsafe driving on our roads. "Road safety is negatively affected by the unwillingness to comply with the law", (Vereeck & Vrolix, 2007). Although older drivers have lost some bad habits such as suffering from road rage, they are a threat on our roads, just like every other unsafe driver. Penalty points and fines do not seem to stop drivers from committing traffic offences, regardless of their age. The notion of inattention being linked to old age is worrying for road safety as human error and lapses were researched. Every age group and gender is capable of unsafe driving acts.

It can be concluded that, the older drivers sampled have a high tendency to speed, especially on wide straight roads such as motorways. According to Vanlaar & Yannis (2006), "as long

as drivers do not know what constitutes dangerous traffic behaviour, they cannot refrain from behaving dangerously”. From the literature review and the interview analysis carried out it is clear that the type of road is a major factor in changing driving behaviour with regard to speeding.

“Implications include a greater need to focus on perceived health rather than age, a better understanding and operationalisation of what variables older adults account for in self reported health, and the relationship between health and viability of public transportation”, (Donorfio et al, 2008). This statement is suitable for the older drivers who did not display unsafe driver behaviour. One cannot presume that all older drivers need to be re-trained; health checks could solve the problem.

A safety culture needs to occur on our roads which can deal with the issues and factors mentioned throughout. “The concept of safety culture is described by Cullen (1990), as cited in Cooper (2000), “it is loosely used to describe the corporate atmosphere or culture in which safety is understood to be, and is accepted as, the number one priority”. According to Lucidi et al (2010), “Driving behaviour can be influenced by a great number of factors not only related to personality. Furthermore, road crashes are not merely a consequence of the driver’s behaviour, but also of numerous other factors, such as randomness, weather conditions”.

This research highlights that more emphasis is needed on older drivers on our roads. According to Eskler et al (2008) policy makers are unable to control all the factors that contribute to higher risks in traffic, this refers to both the physical and human environment in which the accident takes place. It is difficult to control drivers on our roads by the distribution of the population by age, but measures can be put in place to help and enhance safety and safer driving.

“Addressing road safety in a comprehensive manner necessitates the involvement of multiple sectors, such as health, transport and police”, (Global Status Report on Road Safety, 2009), this needs to be undertaken with regard to older drivers that have not sat a driving test. It needs to be ensured that older drivers are aware of all foreseeable risks on Irish roads as simply failing to indicate can have major consequences.

According to Langford (2002), “There is no evidence that across-the-board mandatory assessment of older drivers as a requirement for continued licensing is effective in removing this small proportion of unsafe drivers from the road”.

In conclusion to the above statement the type of road safety intervention for older drivers would differ to that of a younger driver. A suggested type of intervention measure for older drivers would be a refresher course of skill associated with driving. Habits have been developed by older drivers, in order to lose these bad habits simply refreshing the older driver mind of correct and safer ways to drive and behave would be extremely beneficial in the long term.

Parker et al (2003) discuss intervention measures for older drivers. “Several strategies can be envisaged that might be used to improve road safety among older car drivers. For example, measures might be introduced that raise drivers’ awareness of the problems they are likely to encounter as they grow older, together with advice concerning how to recognise and deal with them”. Creating awareness in any situation is helpful, therefore in road safety it would be a positive strategy. Parker et al (2003) also state that “a system requiring some sort of assessment or test of driving abilities following a negative driving event could be introduced”. This would prove useful to the 54% of older drivers who have been involved in an accident. A negative driving event may refer to a near miss, this assessment would prove useful to the 74% of older drivers who have suffered near misses on the road, and especially useful to the 3% who said the near miss did not affect them in any way.

The Global Status Report (2009) shows that no country can afford to sit back and assume that its road safety is complete. Significant progress in national road safety requires close collaboration between relevant leaders and policies-directly or indirectly-impact on the safety of those on the roads.

According to the RSA (2007), “Ireland’s third Road Safety Strategy draws on the insight and experience of countries implementing best practice in road safety, among them, The Netherlands, Sweden, United Kingdom, Norway and France”. Wegman & Oppe (2010) state that benchmarking can be used as a basis for developing measures and programmes to increase a country’s performance. Earlier in the paper benchmarking was discussed. Ireland should use the Global status report on road safety (2009), and use the advice from Wegman et al (2005) and compare and benchmark against countries in the same situation as Ireland. Benchmarking is a way forward in road safety, working to achieve less accidents and fatalities on our roads by benchmarking against countries that are more successful in combating risks on their roads.

Fuller (2004) discusses a study by de Raedt and Ponjaret-Kristoffersen. Their study of behaviour in older drivers concluded that, “it would be advisable to evaluate compensatory abilities in the fitness-to-drive assessments of older drivers and recommend that older drivers should learn such strategies, as well as more ‘strategic’ decisions, such as avoiding high demand situations (driving in dark, fog etc.).

“While there are many individual differences in the ageing process, even relatively healthy older adults are likely to experience some level of functional decline in sensory, physical and cognitive areas (Janke, 1994 as cited in Duke et al, 2010). One needs to bear this in mind when understanding and analysing older driver behaviour.

If the above recommendations were put into practise it would be a positive start in combating unsafe driving acts by the older driver.

## REFERENCES

### Journals

- Barry, A.E., Howell, S.M., & Dennis, M., (2011) “Evaluating impaired drivers confidence and intention to “(Please) Drink responsibly”, *Journal of Safety Research*, 42 pp.137-142
- Baum, S., (2000) “Drink driving as a social problem: comparing the attitudes and knowledge of drink driving offenders and the general community”, *Accident Analysis and Prevention*, 32 pp.689-694
- Bjerre, B., & Thorsson, U., (2008) “Is an alcohol ignition programme a useful tool for changing the alcohol and driving habits of drink-drivers?” , *Accident Analysis and Prevention*, 40 pp.267-273
- Blaeij, A., Florax, R., Rietveld, P., & Verhoef, E. (2003) “The value of statistical life in road safety: a meta-analysis”, *Accident Analysis and Prevention*, 35 pp. 973-986
- Briscoe, S., (2004) “Raising the bar: can increased statutory penalties deter drink-drivers?” , *Accident Analysis and Prevention*, 36 pp.919-929
- Caird, J.K., Chishlom, S.L., & Lockhart, J., (2008), “Do in-vehicle advanced signs enhance older and younger drivers’ intersection performance? Driving simulation and eye movement results”, *International Journal, Human Computer Studies*, 66 pp. 132-144
- Caird, J.K., Chisholm, S.L., Edwards, C.J., & Creaser J.I., (2007) “The effect of yellow light onset time on older and younger drivers’ perception response time (PRT) and intersection behaviour”, *Transportation Research*, Part F pp. 383-396
- Campagne, A., Pebayle, T., & Muzet, A. (2004) “Correlations between driving errors and vigilance level: influence of the drivers age”, *Physiology & Behaviour*, 80 (4) pp. 515-524

- Clarke, D., D., Ward, P., Bartle, C., & Truman, W., (2010) “Older drivers’ road traffic crashes in the UK”, *Accident Analysis and Prevention*, 42 pp. 1018-1024
- Cooper, M.D., (2000) “Towards a model of safety culture”, *Safety Science*, 36 pp. 111-136
- DeLucia, P., Bleckley, K., Meyer, L., & Bush, J., (2003) “Judgements about collision in younger and older drivers”, *Transportation Research Part F: Traffic Psychology and Behaviour*, 6(1) pp. 63-80
- De Winter, J.C.F., & Dodou, D., (2010) “ The driver behaviour questionnaire as a predictor of accidents”, *Journal of Safety Research*, 41 pp. 436-470
- Di Stefano, M., & MacDonald, W., (2003) “Assessment of older drivers: Relationships among on-road errors, medical conditions and test outcome”, *Journal of Safety Research*, 34 pp. 415-429
- Donorfio, L K.M., D’Ambrosio, L.A., Coughlin, J.F., & Mohyde, M., (2008) “Health, safety, self-regulation and the older driver: It’s not just a matter of age”, *Journal of Safety Research*, 39 pp.555-561
- Duke, J., Guest, M., & Boggess, M., (2010) “Age-related safety in heavy vehicle drivers: A literature review”, *Accident Analysis and Prevention*, 42 pp. 364-371
- Eksler, V., Lassarre, S., & Thomas, I., (2008) “Regional analysis of road mortality in Europe”, *Public Health*, 122 pp. 826-837
- Erke, A., Goldenbeld, C., & Vaa, T., (2009) “The effects of drink-driving checkpoints on crashes-A meta-analysis, *Accident Analysis and Prevention*, 41 pp. 941-923
- Fuller, R., (2004), “Towards a general theory of driver behaviour”, *Accident and Analysis Prevention*, 37 (2005) pp. 461-472
- Golias, I., & Karlaftis, M.G., (2002) “An international comparative study of self-reported driver behaviour”, *Transport Research*, Part F 4 pp. 243-256

- Hakamies-Blomqvist, L., Raitanen, T., & O'Neill, D., (2002) "Driver ageing does not cause higher accident rates per km", *Transportation Research*, Part F pp. 271-274
- Hussain, O.T., Nayyar, M.S., Brady, F.A., Beirne, J.C., & Stassen, L.F.A., (2006), "Speeding and maxillofacial injuries: Impact of the introduction of penalty points for speeding offences", *British Journal of Maxillofacial Surgery*, 44 pp. 15-19
- Kontogiannis, T., Kossiavelou, Z. & Marmaras, N.,(2002) "Self-reports of aberrant behaviour on the roads: errors and violations in a sample of Greek drivers" *Accident Analysis and Prevention*, 34 pp. 381-399
- Langford, J., Methorst, R., & Hakamies-Blomqvist, L., (2006) "Older drivers do not have a high crash risk-A replication of low mileage bias", *Accident Analysis and Prevention*, 38 pp. 574-578
- Lonero, L.P., (2008) "Trends in driver education and training", *American Journal of Preventive Medicine*, 35 pp.316-323
- Lucidi, F., Giannini, A., Sgalla, R., Mallia, L., Devoto, A., & Reichmann, S. (2010), "Young novice driver subtypes: relationship to driving violations, errors and lapses", *Accident Analysis & Prevention*, 42(6) pp. 1689-1696
- Maguire, R., (2009) "Driving under the influence of drugs in the republic of Ireland", *Science and Justice*, 49 pp. 254-258
- Matthews, A., Bruno, R., Johnston, J., Black, E., Degenhardt, L., & Dunn, M., (2011) "Factors associated with driving under the influence of alcohol and drugs among an Australian sample of regular ecstasy users", *Drug and Alcohol Dependence*, 100 pp. 24-31
- Ozkan, T., Lajunen, T., EL., Chliaoutakis, Parker, P., & Summala, H., (2006), "Cross-cultural differences in driving behaviours: A comparison of six countries", *Transportation Research*, 9 pp. 227-242

- Parker, D., Manstead, A., Stradling, S. & Reason, J. (1992) “Determinants of intention to commit driving violations”, *Accident Analysis & Prevention*, 2 pp. 117-131
- Parker, D., McDonald, L., Rabitt, P., & Sutcliffe, P., (2000), “Elderly drivers and their accidents: the ageing driver questionnaire”, *Accident Analysis and Prevention*, 32 pp. 751-759
- Parker, D., McDonald, L., Rabitt, P., & Sutcliffe, P., (2003), “Older drivers and road safety: the acceptability of a range of intervention measures”, *Accident Analysis and Prevention*, 35 pp. 805-810
- Pecher, C., Lemerrier, C., & Cellier, J. “Emotions drive attention: effects on drivers behaviour”, *Safety science*, 47(9) pp. 1254-1259
- Raitanen, T., Tormakangas, T., Mollenkopf, H. & Marcellini, F., (2003), “Why do older drivers reduce driving? Findings from three European countries”, *Transportation Research*, Part F (6) pp. 81-95
- Reason, J., (2000) “Human error: models and management”, *British medical journal*, 320(7237) pp. 768-770
- Salmon, P., Lenne, M., Stanton, B., Jenkins, D., & Walker, G., (2010) “Managing error on the open road: The contribution of human error models and methods”, *Safety science*, 48 pp. 1225-1235
- Santos, G., Behrendt, H., & Teytelboym, A., (2010) “Part II: Policy instruments for sustainable road transport”, *Research in Transport Economics*, 28 pp. 46-91
- Schulz, H., & Kobmann, I., (2010) “The role of safety research in road safety management”, *Safety Science*, 48 pp. 1160-1166



- Scott-Parker, B., Watson, B., & King, M., “Understanding the psychosocial factors influencing the risky behaviour of young drivers”, *Transportation Research Part F: Traffic Psychology and behaviour*, 12(6) pp. 470-482
- Sivak, M., (1987) “Human factors and road safety”, *Applied Ergonomics*, 18.4 pp. 289-296
- Staubach, M. (2009) “Factors correlated with traffic accidents as a basis for evaluating Advanced Driver Assistance Systems”, *Accident Analysis and Prevention* 41 pp.1025-1033
- Steptoe, A., Wardle, J., Fuller, R., Davidsdottir, S., Davou, B., & Justo, J., (2002) “Seatbelt use, attitudes, and changes in legislation”, *American Journal of Preventive Medicine*, 23(4) pp. 254-259
- Vanlaar, W., & Yannis, G., (2006) “Perception of road accident causes”, *Accident Analysis and Prevention*”, 38 pp. 155-161
- Vereeck, L., & Vrolix, K., “The social willingness to comply with the law: The effect of social attitudes on traffic fatalities”, *International Review of Law and Economics*, 27 pp. 385-408
- Wegman, F., & Oppe, S., (2010) “Benchmarking road safety performance of countries”, *Safety Science*, 48 pp. 1203-1211
- Westermana, S.J., & Haigney, D., (2000) “Individual differences in driver stress, error and violation”, *Personal and individual differences*, 29 pp. 981-998

### **Electronic Information**

- Annual Report of An Garda Síochána, (2010), Available at:  
<http://www.garda.ie/controller.aspx?page=90> Accessed: 08.2011
- Fatalities and other traffic statistics, Available at:  
<http://www.garda.ie/Controller.aspx?Page=138> Accessed: 07.2011
- Fitness to Drive Your Perspective; Your Views? A Consultation Document (2008).  
Available at:  
[http://www.rsa.ie/Documents/Road%20Safety/Consultations/Fitness\\_to\\_drive.pdf](http://www.rsa.ie/Documents/Road%20Safety/Consultations/Fitness_to_drive.pdf)  
Accessed: 06.2011
- Free Speed Survey 2008 (Rural and Urban) (2008), Road Safety Authority, Available  
at:  
<http://www.rsa.ie/Documents/Road%20Safety/Speed/Free%20speeds%20survey%202008.pdf> Accessed: 08.2011
- Global Status Report on Road Safety: Time for Action, (2009), available at:  
[http://whqlibdoc.who.int/publications/2009/9789241563840\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf) Accessed:  
02.2011
- ICARUS: Inter-Cultural Approach for Road Safety, Questionnaire (2008), Available  
at: [http://www.webicarus.eu/UserFiles/File/questionario\\_ICARUS\\_ENG.pdf](http://www.webicarus.eu/UserFiles/File/questionario_ICARUS_ENG.pdf)  
Accessed: 01.2011
- ICARUS: Inter-Cultural Approach for Road Safety, Results of the Research on Risk  
Factors of Young Drivers (2008), Available at:  
<http://www.webicarus.eu/UserFiles/File/Results.zip> Accessed 07.2011
- Licensing Options for Managing Older Driver Safety (2005), Available at:  
[http://www.austroads.com.au/pdf/TestMethod2/4.\\_LICENSING\\_OPTIONS\\_FOR\\_M  
ANAGING\\_OLDER\\_DRIVER\\_SAFETY.pdf](http://www.austroads.com.au/pdf/TestMethod2/4._LICENSING_OPTIONS_FOR_MANAGING_OLDER_DRIVER_SAFETY.pdf) Accessed: 08.2011

- Road Collision Facts, (2009), Road Safety Authority, Available at: [http://www.rsa.ie/Documents/Road%20Safety/Crash%20Stats/2009\\_Road\\_Collision\\_Fact\\_Book.pdf](http://www.rsa.ie/Documents/Road%20Safety/Crash%20Stats/2009_Road_Collision_Fact_Book.pdf) Accessed: 08.2011
  
- Road Rage and Aggressive Driving (2011), Available at: <http://www.rulesoftheroad.ie/accidents-gardai-and-penalties/what-not-to-do/road-rage.html> Accessed: 07.2011
  
- Road Safety Authority, (2011), Penalty Points Statistics, Available at: <http://www.rsa.ie/en/RSA/Road-Safety/Our-Research/Penalty-Point-Statistics/> Accessed: 06.2011
  
- Road Safety Strategy 2007-2012, (2007) Road Safety Authority, Available at: [http://www.rsa.ie/Documents/Road%20Safety/RSA\\_Strategy\\_ENG\\_s.pdf](http://www.rsa.ie/Documents/Road%20Safety/RSA_Strategy_ENG_s.pdf) Accessed: 08.2011
  
- SARTRE Report 3: European Drivers and Road Risk (2004), Available at: <http://sartre.inrets.fr/documents-pdf/repS3V1E.pdf> Accessed: 08.2011
  
- Steering to Safety Summary Report (2006), available at: [http://www.rsa.ie/Documents/Road%20Safety/Safety%20Performance/Steering\\_2\\_Safety\\_Report.pdf](http://www.rsa.ie/Documents/Road%20Safety/Safety%20Performance/Steering_2_Safety_Report.pdf) Accessed: 07.2011

### **Newspaper Articles**

- Hogan, T, (2011) “Point notices treble as cameras nab drivers”, *The Irish Independent* 11<sup>th</sup> August 2011
  
- Holland, K., & Cassidy, L., (2011) “Motorway Safety Campaign Unveiled”, *The Irish Times*, 11<sup>th</sup> April 2011

### **Official Material**

- Switzerland: World Health Organisation (2009), *Global status report on road safety: time for action*, Geneva: Department of Violence and Injury Prevention.