DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF GHANA

RISK PERCEPTION, RISK-TAKING ATTITUDE AND RISKY DRIVING BEHAVIOR AMONG DRIVERS IN GHANA

BY

SAMUEL OKOE OKWABI

(10260750)

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MPHIL PSYCHOLOGY DEGREE

(INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY)

JULY, 2014

DECLARATION AND APPROVAL

Candidate's Declaration

I hereby declare that, except for references to other peoples' works which have duly been acknowledged, the novelty of this work is the true and the original research of **Samuel Okoe Okwabi** and that it has not neither in whole nor in part been presented for the award of any merit in this University or elsewhere.

Candidate's Signature……...Date……

Name: Samuel Okoe Okwabi

Supervisors' Declaration

I declare that the preparation and presentation of this dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Ghana. I hereby declare that it has been submitted for examination with my approval as supervisor.

Principal Supervisor's Signature……..Date……

Name: Dr. Robert Akuamoah-Boateng

Principal Supervisor's Signature……..Date……

Name: Prof. Samuel Danquah

DEDICATION

This work is dedicated to all victims of road traffic accidents, especially, to those who suffered various consequences of road accidents through the recklessness and negligence of drivers. It is also dedicated to the numerous individuals, groups and organizations who have road safety at heart.

Special dedication is to Naa Ahema, my dearest, for her sacrifices and endurance that saw the successful completion of this work as well as the victory in my education.

ACKNOWLEDGEMENT

"Shout triumphantly to the Lord, all the earth. Come before Him with joyful songs. Acknowledge that the Lord is God He made us, and we are His, His people and sheep of His pasture Enter His gates with thanksgiving And His courts with praise; Give thanks to Him and praise His name For the Lord is good, and His love is eternal; His faithfulness endures through all generation". Psalm 100

Foremost acknowledgement is to God who made this work a reality. Throughout my studies, I hoped on His name and He never put me to shame. God almighty, His son Jesus Christ and the Holy Spirit are well acknowledged for the strength and revival. The contribution and support of the National Road Safety Commission (NRSC) is worth mentioning. This mission would not have been fulfilled without the commission's support; both financial and non-financial. I cannot forget my dedicated and trustworthy supervisor of this project, Dr. Robert Akuamoah-Boateng who has also contributed greatly to the success of this work. His ideas, vision and insight was enough to raise my enthusiasm for the topic. His comments and criticisms had a lot to offer to the timely completion of this work. Similar appreciation also goes to Prof. Samuel Danquah for his counsel and direction regarding valuable sources of data and information. Prof. C. C. Mate-Kole was a lifeline to a deadline, who at the final moment offered valuable feedback to see the researcher finish up the work. I express gratitude to the prof.

I cannot forget the immense support of the management, driving and non-driving staff and people of the Metro Mass Transit (MMT) for their assistance and support towards the success of this work. With the peace of God, I finally appreciate and thank all those who in one way or the other have contributed to the success of this project.

TABLE OF CONTENT

List of Figures viii

List of Tables ix

List of Abbreviations x

Abstract xi

Chapter 1: Introduction and Background of the Study 1

Introduction 1

Background of the Study 1

Risk Perception (RP) 2

Risk-taking Attitude (RtA) 4

Risky Driving Behavior (RDB) 7

Socio-demographic Variables 9

The influence of Gender 9

The influence of Age 11

The influence of Vehicle type operated 12

The influence of Experience 13

The influence of Educational level 14

Statement of the Problem 15

Consequences of Road Traffic Accidents 15

Relevance of the Study 18

Aims of the Study 21

Chapter 2: Literature Review 22

Introduction 22

Theoretical Framework ……..…….....22

Social Cognitive Theory ...……23

Theory of Planned Action ……...…….....26

The Psychometric Paradigm…….....26

Risk Homeostatic Theory 27

Literature Review …….....29

Rationale of the Study …….....38

Statement of Hypotheses ..……..……...38

Operational Definition of Key Variables ..……..……41

Chapter 3: Methods …….....42

Population …….....42

Sample and Sampling Procedure …….....42

Research Design …….....47

Research Instruments ……....47

Procedure ……...…….52

Data Collection ……....……53

The Pilot Study ……..53

Inclusion/Exclusion Criteria …….....55

Research Ethics ……..55

Chapter 4: Results …….....57

Introduction …….....57

Preliminary Analysis …….....57

Hypothesis Testing …….....61

Summary of Research findings 80

Chapter 5: Discussion 82

Introduction 82

Research Summary.....82

Discussion of Results 83

Implications for road safety 95

Recommendations for Future Research 99

Conclusions 100

Limitations 101

References.....104

Appendices.....117

LIST OF FIGURES

Figure 1: Distribution of fatalities by Road Users……17

Figure 2: Distribution of fatalities by Age……19

Figure 3: Social Cognitive Theory Model……24

Figure 4: Proposed Conceptual Model……40

Figure 5: Moderation Graph for Risk Taking Attitude……68

Figure 6: Moderation Graph for Gender……71

Figure 7: Moderation Graph for Experience……74

Figure 8: Moderation Graph for Type of Vehicle……76

Figure 9: Final Conceptual Model……80

LIST OF TABLES

Table 1: Frequency Distribution of Demographic Characteristics of Respondents……..46

Table 2: Summary of Descriptive Statistics, Skewness and Kurtosis……...58

Table 3: Correlation Matrix for key study variables…….59

Table 4: Hierarchical Multiple Regression Analysis on RP-RDB Relationship..…….62

Table 5: Hierarchical Multiple Regression Analysis on RTA-RDB Relationship..……..64

Table 6: Moderator Regression Analyses for RDB as a of Function of RP and RTA…..……..67

Table 7: Moderator Regression Analyses for RDB Function of Risk perception and Age……69

Table 8: Moderator Regression Analyses for RDB Function of RP and Gender…….……..70

Table 9: Moderator Regression Analyses for RDB Function of RP and Educ. Level...……72

Table 10: Moderator Regression Analyses for RDB Function of RP and Experience…….……..73

Table 11: Moderator Regression Analyses for RDB Function of RP and Vehicle type operated …..……75

Table 12: Summary of Independent t-test showing the Type of Vehicle on RDB……..……..77

Table 13: Summary of Means and Standard Deviations for Age and Gender on RDB…..……..78

Table 14: A Summary of the 2-Way ANOVA for the effect of Age and Gender on RDB……...78

LIST OF ABBREVIATIONS

RP…….Risk Perception

RtA……....Risk-taking Attitude

RDB…….Risky Driving Behavior

RTA(s)……..……Road Traffic Accident(s)

ETSC……European Transport Safety Council

ECMT……..……..European Conference of Ministers of Transport

OECD…….Organisation for Economic Co-operation and Development

DVLA…...…….Driver Vehicle and Licensing Authority

NRSC……National Road Safety Commission

MTTU……...Motor Transport and Traffic Unit

MMT……Metro Mass Transit Limited

WHO……..World Health Organisation

ABSTRACT

The study investigated the relationship between driver's risk perception, risk-taking attitudes and risky driving behavior. The purpose of the study was to explain the variance in risky driving behavior, an outcome variable, as accounted for by risk perception and risk-taking attitude and to expand the knowledge of these personality factors (risk perception and risk-taking attitude) that contribute to the increased levels of road traffic accidents in Ghana. The cross-sectional survey design was used to examine the relationships between the variables of interest. Convenience sampling techniques was applied to select 529 drivers from three study areas. Multiple regression analysis was used to examine the variance in the outcome variable, explained by the predictor variables. Results from the analysis revealed significant relationships between risk perception, risk-taking attitude and risky driving behavior. Further, significant variances were found for the predictors and outcome variable. Gender, Experience and vehicle type operated (commercial or private vehicles) moderated the relationship between risk perception and risky driving behavior. Significant differences in risky driving behavior were found between commercial and private drivers. The implications of the outcomes have been discussed.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.0 Introduction

This study examines relationships among risk variables in relation to accident causation. Specifically, the study views drivers' risky driving behaviour as predicted by risk perception and risk-taking attitude. In all, the study consists of five chapters. This chapter conceptualizes the study variables of interest and the overall rationale. It contains the introduction and background to the study. The chapter further outlines the problem statement, the relevance of the study and the aims/objectives of the study.

1.1 Background of the Study

The risky driving behaviour of the driver is explained in part, as a result of his or her risk perception and the attitude to risk-taking in a hazardous traffic situation (Ulleberg & Rundmo, 2003). Harre, Brandt and Dawe (2000) could not agree more by the claim that the driver's road behaviour is much influenced by his/her "risk state". Thus, drivers who perceive low crash-risk in an objectively higher crash-risk would adopt a reckless driving style, while those who perceive higher crash-risk in a similar situation will drive cautiously and consequently strive to prevent the risk from resulting into dangerous outcomes (Ulleberg & Rundmo, 2013). The subjective perception of risk of a traffic related hazard is believed to be an important component in driving, as well as road safety (Gregersen & Bjurulf 1996), whiles the subjective experience of risk plays a central role in a number of risk-based theories of driving (e.g. Deery, 1999; Bloomquist, 1986). In these driving theories, the perception, acceptance and/or misperception of

risk is used to explain the relationship between driving behaviour or driving style and accident involvement.

1.2 Risk Perception (RP)

Risk in relation to driving is a concept that has received many varied explanations. Most times, it is described as the likelihood that an individual will experience the effect of road traffic hazard (Mckenna and Crick, 1997). However, a general consensus about risk appears to be reached. It has been described as consisting of the probability of an adverse event including the magnitude of its consequences (Rayner & Cantor, 1987). Researchers (e.g. Rayner & Cantor, 1987) admitted that this description may only be adequate in explaining risk associated with engineering-type calculations. They concluded that such description would be misleading at a broader and complex level of large-scale societal risk management. Rosa has also defined risk as "a situation or an event where something of human value (including humans themselves) is at stake and where the outcome is uncertain" (Rosa, 2003, p. 56). Consequently, uncertainty is a phenomenon that is closely related to risk. Perhaps, this explains why in many theories of behaviour, psychological uncertainty is assumed to be a mediator of human behavioural actions responses in situations with unknown outcomes (Windschitl & Wells, 1996; Sjöberg, Moen, & Rundmo, 2004). Because it exists only in the mind, uncertainty is considered a psychological construct (Windschitl & Wells, 1996). If a person's knowledge was complete, that person would have no uncertainty.

Deery, a notable researcher in the field of risk perception has described the concept in relation to driving as 'the subjective experience of risk in potential traffic hazards' (Deery, 1999, p. 226). Researchers agree that the perception of risk is determined by the information regarding the

potential hazards in the traffic environment (i.e., the process of identifying hazardous objects and events and quantifying their dangerous potential: Brown & Groeger, 1988; Armsby, Boyle & Wright, 1989) as well as information on the ability of the driver to prevent those potential hazards from being transformed into actual accidents. Risk perception can therefore lead to road traffic accidents. Driver's beliefs about their ability to handle hazardous situations result from their self-assessed driving ability.

The perception of risk in a traffic situation is a concept that usually reflects the driver's subjective judgements and hence should be distinguished from objective risk. Brown and Groeger (1988) used the common dictionary meaning and defined objective risk as "the ratio between some measure of adverse consequences of events and some measure of exposure to conditions under which those consequences are possible" (Brown and Groeger 1988, p. 586). In other words, objective risk is a quantity to be estimated. The subjective risk perception (which was the focus of this study) is the individual's (in this case, the driver's) own appraisal of a traffic hazard to be risky or not (Sjöberg et. al, 2004).

Risk Acceptance is another concept that has close association with risk perception. The concept (Risk Acceptance) is used to describe a basic level of perceived risk, or risk threshold, which a driver is willing to accept and act with (Stein & Allen, 1987). This concept is common to many risk-based models of driving (e.g., Bloomquist, 1986; Janssen & Tenkink, 1988; Näätänen & Summala, 1974; Wilde, 1986). These models assert that the driver selects the amount of risk that they are willing to appreciate and tolerate. Because driving is essentially a self-paced activity, a driver determines the difficulty of his/her task by setting and accepting different risk thresholds. In this view, a driver's motivation determines the risk threshold for his or her driving behaviour. It is concluded that there are several reasons why a driver might take a risk (e.g., using the

mobile phone or concentrating on other in-car distractions while driving, driving beyond the acceptable speed limit, drink drive and so on). One such reason could be that, the driver may exhibit poor risk perception (White, Eiser & Harris, 2004). This means, he or she may perceive low levels of risk associated with answering the call or attending to the distracting element, over-speeding as well as the dander associated with alcohol and driving. This poor risk perception may result from the driver misjudging his or her ability to undertake the call while concentrating on the driving. It may also arise from the driver overestimating his or her ability to deal with and avoid a potential crash (DeJoy, 1989), or increased sensation seeking levels of the driver (Zuckerman, 1997). Consequently, the driver involves himself or herself in driving behaviours that could be described as risky and which could lead to accidents.

Research has revealed that drivers do experience risk at various subjective levels while driving although such experiences may not reflect the actual road conditions (Colbourn, 1978; Currie, 1969). Risk perception is thus considered a precursor of actual driving behaviour. Many studies (e.g. Cohn, Macfarlane, Yanez, & Imai, 1995) have indicated that risk perception is negatively related to risk behaviour in general. That is, a higher level of perceived risk for a particular behaviour is associated with a lower chance that an individual driver would engage in that behaviour. If this relationship is to mean anything, then it is important to measure how a driver interprets his situation and environment in an attempt to reduce driver error (Kaptein & Claessens, 1998).

1.3 Risk-taking Attitude (RtA)

Conceptual framework on the attitude-behaviour relationship is linked to the premise that attitude influences, induces, or molds behaviour (Mearns & Flin, 1995; Kraus, 1995). A meta-

analysis by Kraus found that reported attitude-behaviour correlations ranged from -0.10 to 0.91, (Kraus, 1995) and concluded that attitude and behaviour are highly associated provided the appropriate corresponding measures for each concept are utilized (Fishbein & Ajzen, 1977). Existing research evidence that sought to identify the specific attitude-behaviour correlations has revealed enough support (Ajzen, 1988; Ajzen & Fishbein, 1977; Assum, 1997; Fishbein & Ajzen, 1972; Kraus, 1995; Parker, 2002; Ulleberg & Rundmo, 2002; Ulleberg & Rundmo, 2003; Whissell & Bigelow, 2003; Parker, Lajunen and Stradling, 1998; Ulleberg and Rundmo, 2003). For example, a study by Assum (1997) has measured general attitude related to road safety and road traffic behaviour and found a significant difference between drivers. Although the conclusion drawn from Assum's study was that a direct link between the attitude measures and accident risk was not significant, his study supported the link between attitudes and behaviour by presenting evidence that a significant difference in behaviour is observed between drivers who had the right or correct attitudes and those who did not. Meanwhile, Bentler and Speckart's (1979) Structural Equation Modeling (SEM) analysis to determine the attitude-behaviour relationship found that attitude has direct effect on subsequent driving behaviour, without being mediated by intentions.

In terms of driving, West and Hall (1997) described 'Risk-taking attitude' as driving in a way that though does not contravene traffic laws yet increases the risk of being involved in a crash. Other researchers (e.g. Ulleberg & Rundmo, 2002, 2003) have also defined the term as dimensions that affect preferences towards risk-taking in traffic. With a risk-taking attitude, the driver may ignore safety values and engage in inappropriate behaviours, although such behaviours may be out of the general guidelines of driving. For instance, a risk-taking driver can drive at the highest permissive speed on a given road, although speeding is a major contributing

factor to a higher rate of crashes and injuries (Vassallo, Smart, Sanson, Harrison, Harris, Cockfield, McIntyre, 2007; West & Hall, 1997), and which also contribute significantly to risky driving behaviour (Ulleberg & Rundmo, 2003). Whissell and Bigelow (2003) investigated this association using an attitudinal scale to identify the link between speeding violations and reported crashes, and found a significant correlation between the variables.

Research has investigated the relationship between risk-taking attitudes and risky driving behaviour. In a random sample of Norwegian drivers for example, Iversen (2004) studied this relationship. In the study, risk-taking attitudes were correlated to risky driving behaviour. Using structural equation modeling analysis, three dimensions of risk-taking attitudes explained 52% of the total variance of risky driving behaviour. An important finding of this study was that persons with attitudes towards risk-taking actions seem to carry out risky driving behaviours. Iversen (2004) argued that the dimensions of risk-taking attitude in this study seemed to predict future risky driving behaviour.

Risk-taking attitudes and their component measures have also been studied to determine their individual and combined influences on risky driving behaviour (Ulleberg & Rundmo, 2002; Greening & Stoppelbein, 2000; Iversen 2004; Iversen & Rundmo, 2004; Iversen, Rundmo & Klempe, 2005; Assum, 1997; Malfetti et al., 1989; West & Hall, 1997; Whissell & Bigelow, 2003; Yagil, 1998). Many varied correlations from results of these studies have been obtained from samples in Norway, Brazil, Canada, Israel, New Zealand, United Kingdom and the United States (Iversen & Rundmo, 2004; West & Hall, 1997).

Risk-taking among different persons may vary. Some people are conservative towards risk-taking while the opposite is true for others. Differences in risk-taking attitude to driving can be

linked to many factors such as gender, culture, experience and perhaps even to physiology. For instance, males tend to be more risk seeking and older people tend to be more risk aversive (Ripley, 2008). Therefore, risk-taking attitude is also a precursor to risky driving behaviour. If we can measure a driver's risk-taking-attitude, then we can accurately infer his risky driving behaviour and successfully change those behaviours (Ulleberg & Rundmo, 2002).

The current study therefore, sought to find out the individual and combined effect of Risk Perception, Risk-taking Attitude and their relationship on Risky Driving Behaviour, among the driving population. The study was also conducted to determine the extent to which risk perception and risk-taking attitude predict driving behaviour in the Ghanaian context.

1.4 Risky Driving Behaviour (RDB)

The many varied empirical and theoretical models that seek to understand the nature of traffic accident and to reduce road traffic incidents have yielded some good outcomes. Risky driving behaviour also referred to as aggressive driving behaviours (Hennessy & Wiesenthal, 2005) is known to be one of such outcomes. Many subsequent researches have lent credence to the evidence that risky driving is an important contributor to traffic accidents (Iversen, 2004; Jonah, 1986; Lawton, Parker, Stradling, & Manstead, 1997b; Parker, Reason, Manstead, & Stradling, 1995a). Jonah (1986) reviewed the literature and demonstrated the link between a number of risky driving behaviours and traffic accidents. Parker et al. (1995a) have also demonstrated three types of driving behaviours, i.e. errors, lapses and violations (i.e. behaviours that involve deliberate deviations from safe driving practice) and determined the link between accident involvement and driving behaviour. These researches found significant correlations between violations and both past and future accident rates. Recently studies Iversen (2004) have found

associations between driving behaviour and accident involvement. Iversen's study for example found that people who were involved in at least a car crash during a previous year also engaged in more risky driving behaviour such as speeding, drink-driving, and distracted driving.

Risky (aggressive) driving behaviour has been defined as "any behaviour intended to physically, emotionally, or psychologically harm another within the driving environment" (Hennessy & Wiesenthal, 2001, p.661). This definition lends support to the general definition of aggressive behaviour as "any form of behaviour directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment" (Baron & Richardson, 1994, p.7). Tasca (2000) provided a concise definition of risky driving as has been explained, emphasizing on deliberate and wilful driving behaviours that, though not intended to physically harm other road users, yet show disregard for their safety and well-being, show disregard for the rules of the road and which are associated with willingness to risk- taking (Lawton et al., 1997; Parker et al., 1992). Possible explanations for such behaviours have been identified, including impatience, annoyance, hostility and a desire to save time (Bone & Mowen, 2006).

The specific behaviours, which constitute risky driving behaviours in this study include but not limited to tailgating, weaving in and out of the traffic, mobile phone communication while driving, in-vehicular distractions (e.g. applying make-ups and personal grooming), drink driving, improper passing (e.g., cutting in too close in front of vehicle being overtaken), passing on the road shoulder, improper lane changes, speeding etc.

Speeding for example has been studied by many researchers as an indicator of risky driving behaviour (Aarts & van Schagen, 2006; Jonah, 1997). Excessive driving speed is considered one of the most important contributors to road crashes, irrespective of age and experience (Elliott,

Armitage, & Baughan, 2004). Brown and Cotton (2003) in an Australian study revealed that although aware of the potential consequences for speeding, drivers still engage in speeding behaviour. Other studies have indicated speeding as a major driving behaviour (Clarke, Ward and Truman, 2002; West and Hall, 1997; McKenna & Horswill, 2006).

In the current study risk perception and risk- taking attitudes were studied as predictors of risky driving behaviour, an outcome variable which has the potential to cause harm to drivers, passengers, pedestrians and other road users.

1.5 Socio-demographic Variables

The study continued to look at the moderating effect of some socio-demographic variables on the relationship between risk perception and risky driving behaviour. The influence of socio-demographic variables and personality variables on driver behaviour has been widely studied by several researchers in many countries including Ghana (Nordfjærn, Jørgensen & Rundmo, 2010; 2011; 2012; Afukaar, Antwi & Amaah, 2003; Akaateba & Amoh-Gyimah; Odero, Garner & Zwi, 1997; Oltedal & Rundmo, 2006; Lund & Rundmo, 2009; Yagil, 1998; Deery, 1999). These studies therefore lend credence to the associations between demographic variables, driver attitude and behaviour in relation to road safety. The socio-demographic variables of interest to the researcher included age, gender, educational level, experience and vehicle type operated .

The Influence of Gender

Rowe and Wright (2001) stated that 'Perhaps the most widely demonstrated demographic factor related to risk perception is that of gender' (Rowe & Wright 2001, p. 348). A similar conclusion is drawn by Slovic (1999), who argued that several studies have shown that males tend to judge

risk as both smaller and less problematic than females do. Road traffic accidents have skewed heavily on gender lines. The fatality rate for male drivers is more than triple that for female drivers (NHTSA, 2009; Hennessy & Wiesenthal, 2002). Males' overrepresentation in road deaths may be linked to their risk perception skill as well as risk-taking attitudes. For instance, male drivers appear to be more risk loving than females, especially during adolescence (Vavrik, 1997). Reports also say that, male drivers in fatal crashes are more likely to have been speeding than female drivers in fatal crashes (NHTSA, 2007).

Other studies (e,g. DeJoy, 1992; Oltedal & Rundmo, 2006) have also found gender differences in young drivers' subjective risk judgments related to traffic. For instance, DeJoy (1992) showed that in general, males perceive risk related to driving to be less compared to females. Sivak, Soler, Tränkle and Spagnol (1989) also found that male participants perceived a risk to be lower compared to female participants. The most significant differences were found in ratings of relative driving skills. Trankle, Gelau and Metker (1990) presented and asked participants to assess some traffic situations. The study revealed that compared to other age groups, young male drivers in particular assessed situations involving inclining/declining curved roads, darkness, and rural environments to be less risky. However, among female participants, there were no significant differences related to age. The various studies on risk perception in relation to gender adjudged that misperception of hazards (Finn & Bragg, 1986) and optimistic bias (Dejoy, 1989) related to own driving skills are the causal factors in traffic accidents. Inaccurate levels of perception and information processing are known to cause misjudgements and poor perception.

Males have also been found to engage in driving more and significantly faster in towns, report more intention to drink and drive, and report engaging in other unsafe behaviours more often

than female drivers of the same age (Harré et al., 1996). Similar differences have also been found in risky driving behaviour (Harréetal., 2000, 1996; Oltedal & Rundmo, 2006) and in relation to sensation seeking (Zuckerman, 1997). Witte and Donohue (2000) have also shown that sensation-seeking tendencies caused the male driver to experience greater frustration and exhibit greater judgment distortions around rail crossings, which in turn resulted in risky driving behaviour. Another study involving male taxi drivers also showed that high risk personality and sensation seeking were associated with risky driving behaviour such as high speeding and traffic rule violations (Burns & Wilde, 1995). In this current study, the researcher studied the influence of gender of the driver on the relationship between risk perception and risky driving behaviour.

The Influence of Age on the relationship between RP and RDB

How old a driver is has an influence on the risk perception and risky driving behaviour relationship. Age has been found to moderate this relationship in some studies (e.g. Deery, 1999; Gregersen, 1996; Ivers, Senserrrick, Boufous, et. al, 2009). Driving involves complex cognitive and perceptual skills that may not have fully developed at certain ages (Deery, 1999). For instance, in one research study, Trankle, Gelau, and Metker (1990) asked participants to assess the riskiness of some traffic situations presented on slides. Compared to older age groups, the young drivers particularly assessed situations involving inclining/declining curved roads, darkness, and rural environments to be less risky. Young drivers have been reported to be the most represented and the most affected in road accidents (Greening & Stoppelbein, 2000; Rhodesa & Pivik, 2010; Sivak et al., 1989). There is clear evidence from crash statistics that young drivers are at higher risk of crashing compared to older drivers (Williamson, 2000). Due to their limited experience to develop the complex, higher-order perceptual (Brown, 1982) and cognitive skills required to safely interact with the traffic environment, young drivers have been

overrepresented in road traffic accidents (Deery, 1999). Vehicle control skills, such as steering movements have also been attributed to young drivers' accident causation (Miltenburg & Kuiken (1991, cited by Macdonald 1994b). Several cognitive processes have not been left out in the link to risky driving behaviour in young drivers (Teese & Bradley, 2008), including underestimating the extent to which they are at risk of serious consequences while driving (Delhomme et al., 2009; Matthews & Moran, 1986; Taubman-Ben Ari et al., 2004) and overestimating their driving skill and their ability to recognize hazards (Harré et al., 2005; Horswill et al., 2004).

Many other researchers have come to a conclusion that irrespective of the gender, young drivers are often more aggressive and risk-oriented than older ones (Lawton et al., 1997; Evans, 1991). Young drivers often drive recklessly and exceed speed limits to a great extent which, in turn, significantly correlates with a high risk of traffic accidents (Elander, West, & French, 1993). Young male drivers thus show a disproportionate risk of accident involvement (Elander, et al., 1993). The study therefore, also looked at the moderating effect of age on the relationship between risk perception and risky driving among samples in Ghana.

The Influence of Vehicle type operated on the relationship between RP and RDB

Like in most countries of the world, there are two main road transportation systems in Ghana: a commercial/occupational or public means of transport and the private ownership means of transport. The researcher used the expression vehicle type operated, to refer to whether the driver is a commercial/occupational driver, whose occupation is to drive to earn an income, or the driver mostly drives a private vehicle. The mechanisms (in terms of 'survival' or meeting basic needs of life) involved in the operations of these two vehicle type operated s are quite different. For instance, although both drivers may appreciate reaching their destination in time (Wallén-

Warner & Åberg, 2008), commercial/occupational drivers would be ready to take up any behaviour (including speeding, cutting in front of other drivers, stopping and picking up passengers on the road, etc. (Afukaar et al., 2003)) that would help make up the 'sales' for the day and even more.

From the description of their work routine, occupational drivers seem to recognize that there are risks involved in the work they do. However, as research revealed, the commercial driver's survival needs seem to moderate their perceived risk and road traffic crash (Teye-Kwadjo, 2011). The researcher reported that commercial drivers acclaimed that their entitlement to retirement benefits and fixed salaries irrespective of whether they (drivers) go to work or not, means they may no longer have any reason for taking risks to earn extra income to feed themselves and families. Conclusion reached was that, generally, drivers are more likely to be involved in risky driving behaviour when they drive commercial vehicles than when they drive private vehicles. Another study by Bediako (2004) has also reported that commercial drivers in Ghana have a high risk perception in relation to traffic yet, they show negative attitudes towards risk-taking. But what is influence of gender, age, and the occupational driver's role on the risk perception and risky driving behaviour? The current study analysed this effect on the relationship.

The Influence of Experience on the relationship between RP and RDB

There is limited research that gives evidence to the relation between experience (annual mileage) and driving behaviour. Although research results suggest that road traffic or crash risk differences are due to factors related to age (Trankle et. al., 1990; Deery, 1999 Sivak et al., 1989), a research conducted later has expressed doubt on this conclusion and suggested that driving experience is more likely to account for the change (Waller, Olk & Shope, 2000).

Generally, the driver's lengthy period of driving or experience on the road accounts for some of his or her decision making in driving situations. For example, frequent exposure to the risk hazards during driving and reaction to them affected the driver's risk acceptance (Stein & Allen, 1987). What the driver chooses to do on the road is more important and depends on his or her road experiences (Özkan, Lajunen & Summala 2006). There are evidence that novice drivers are more likely than experienced drivers to adopt a riskier driving style (e.g., speeding, tailgating) and thus are more likely to find themselves in potentially risky situations (Mayhew & Simpson, 1995). Also, novice drivers are less likely to deal with risky situations effectively due to lower levels of driving experience. These research results affirm the effect of driving experience on driving behaviour. In the current study, it was hypothesized that the driver's perception of risk will have an association with risky driving behaviour. The study further proceeded to examine the moderating effect of the driver's experience on the relationship between risk perceptions and risky driving behaviour.

The Influence of Educational Level on the relationship between RP and RDB

Level of education is another variable of interest to researchers as far as risk perception is concerned. Education is noted to be systematically associated with the degree of 'correctness' in relation to the probability and consequence of an accident. This could imply either a high or low risk perception depending on the existence and degree of misperception of risks in the general population (Sundblad et al., 2007). Some researchers showed that highly educated individuals have lower perceived risks (Savage 1993; Rowe and Wright 2001), whereas others have failed to find any significant association between risk perception and educational level (Sjöberg 2004). As argued by Sundblad et al. (2007), in general, level of education determines one's sense of control that implies lower perceived risks. Meanwhile, some other researches have indicated a positive

association between education and risk perception (e.g. Peräaho, Keskinen & Hatakka, 2003; Morowatisharifabad, 2009; Wanberg, 2010), indicating that high levels of education implies high perception of traffic risk.

A review of the Ghanaian literature on road traffic accidents has revealed that very little has been done to look at the factors that underlie driver's risk behaviour (Teye-Kwadjo, 2011). The study of psychological factors involved in road traffic accidents in the Ghanaian setting became a necessity, in addressing the increasing rate of accidents. Of course, any research targeting road traffic accidents in Ghana should employ a structured approach that provides the foundation for possible interventions. In an attempt to address this need, the present study addressed important aspect of road traffic accidents in Ghana, by focusing on the personality (psychological) factors that contribute to driving behaviours of the generality of drivers in Ghana and by extension, contribute to the high rates of road traffic related death and morbidity.

1.6 Statement of the Problem

Consequences of Road Traffic Accidents

The effects of road crashes are worth discussing as the reality may arouse the needed interest and thus research into it. Road traffic injuries are estimated to be the eighth leading cause of death world-wide, with an impact similar to that caused by many diseases such as malaria, and the leading cause of death for young adults aged between 15 and 44 years (WHO Report, 2013). The report further stated that, the rather low-income and middle-income countries which have only 48% of the total number of vehicles in the world, are said to account for over 85% of these casualties. In 2004, the 15-member countries of the European Union spent over €180 billion on treatment of traffic injuries alone (ETSC, 2008). The World Health Organization's report (WHO,

2013) reveals that the African Region has the highest road traffic fatality rate. The risk of dying as a result of road traffic injury is highest in the African Region (24.1 per 100 000 population).

A National Road Safety Commission (NRSC) report indicates that, road traffic accidents (RTAs) is the leading cause (11, 506 crashes) of reported death and injury among adolescents and young adults in Ghana (NRSC Annual Report, 2010). This workforce age group of 16-35years has become highly vulnerable to motor crashes. 59% of all road traffic fatalities affect the people between ages 16 and 45 years. Between the period 2006 and 2010, road traffic accidents (RTAs) resulted in 182,479 casualties, including 28,257 fatalities, 29,933 serious injuries, and 44,640 minor injuries (NRSC, 2010).

These Road Traffic Accidents are estimated to be costing the nation $165 million each year. This figure according to the NRSC report in 2012, represents 1.6 percent of gross domestic product (GDP). Studies show that vulnerable road users, especially pedestrians and occupants of passenger-carrying minibuses (the major means of public transport for the majority of the Ghanaian populace) are the most represented in these traffic casualties (NRSC, 2006). Figure 1 shows the road traffic deaths by road user class for 2006.

Road Users' Fatalities Distribution

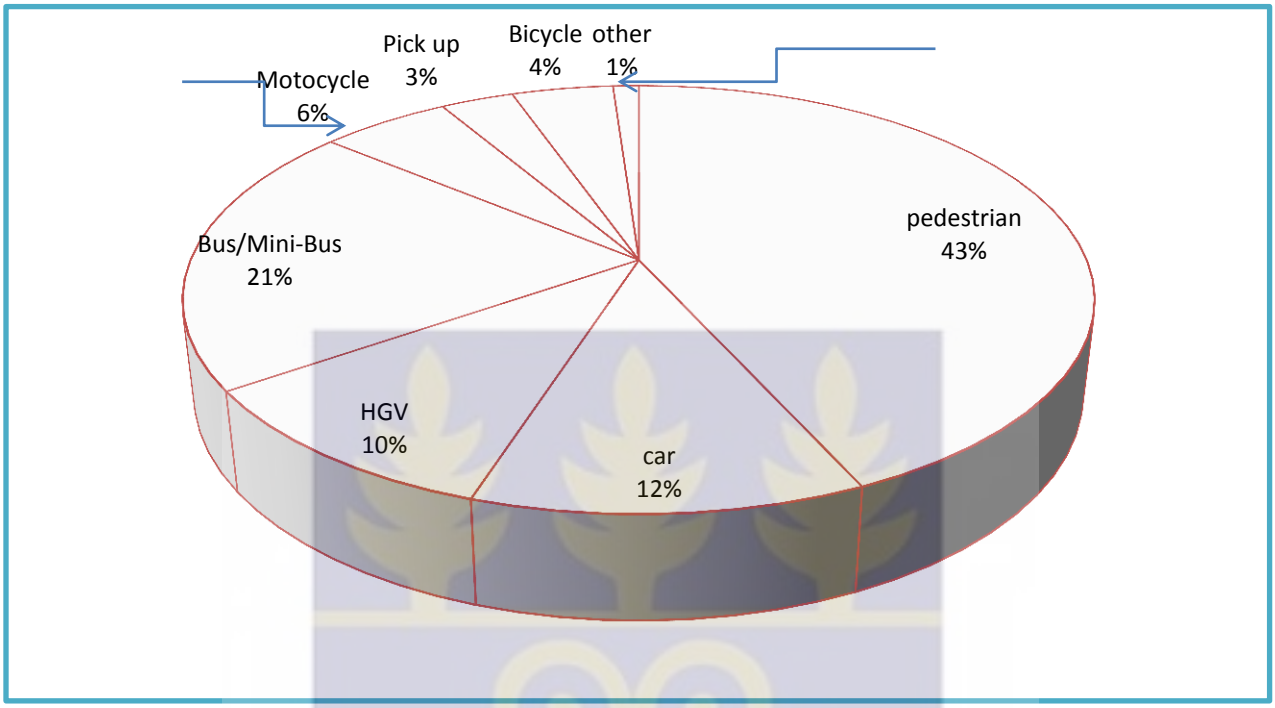


Figure 1: Distribution of fatalities by road users
Source: National Road Safety Commission, 'Road Traffic Accident Statistics, 2006

Increasingly, road traffic accidents or crash is becoming a developmental and public health issue. However, it has not gained the same level of attention as other developmental challenges that confront the country (NRSC, 2010). As rightly projected, road traffic accidents (RTAs) and fatalities will be the sixth leading cause of deaths and the second leading cause of disability-adjusted life years lost in developing countries by 2020 (Murray & Lopez, 1997). In reaction, developed countries have studied the causes and effects of RTAs and have implemented measures to reduce the incidence (Odero, et al., 1997; Soderlund & Zwi, 1995). However, low and middle income countries including Ghana have lagged behind in addressing the effects of RTAs, by failing to implement comprehensive interventions that have shown to be effective in reducing injury and deaths (Nantulya & Reich, 2003; Odero et al., 1997; O'Neill & Mohan, 2002; Soderlund & Zwi, 1995). Again, despite the challenges associated with the menace, the

psychological factors influencing road traffic accidents in the nation have received little or no attention and thus the magnitude of the traffic problem in the nation remain a challenge.

In the wake of all these, the National Road Safety Commission puts the national vision of Road Safety as "Ghana, a country with the safest transportation system in Africa" (NRSC, 2010, p. 5). The strategic target of the commission is to reduce the current fatality rate to a single digit by 2015 which translates into less than 1,000 fatalities. After all the education to all road users including the drivers, as well as the engineering considerations, enforcement and emergency and medical services that have been put in place before, during and after incidences of road traffic crashes, this 2015 vision of the Road Safety Commission appears a distance away, as crash statistics continue to rise. Some other factors, perhaps psychological other than the education/training and engineering factors are contributing greatly to the menace and which have been neglected. This is because behaviour (in this case the driver's behaviour) is primarily a function of attitude (Mearns & Flin, 1995). This urge pushed the researcher to study some of these psychological factors, to address the problem.

1.7 Relevance of the Study

The World Health Organization (WHO) in the year 2010 declared the decade 2011 to 2020 as a decade of global action for road safety. In Ghana, the vision of the National Road Safety Commission (NRSC) is quoted as "Ghana, a country with the safest transportation system in Africa" (NRSC, 2010, p. 5) with the strategic target of reducing the current fatality rate to a single digit by 2015. Militating against these goals is the record of numerous road traffic accidents or crashes and/or fatality resulting from the driver's risky driving behaviour. Generally, age distribution of traffic casualties tilts towards the youth and the most active manpower age

group (Mayhew & Simpson, 1995; Deery, 1999; Teese & Bradley, 2008; Harré et al., 2005; Horswill et al., 2004). In Ghana, for instance, 59% of all road traffic fatalities affect the people between age 16 and 45 years. The figure 2 gives evidence to this.

Road Traffic Fatalities Distribution by Age

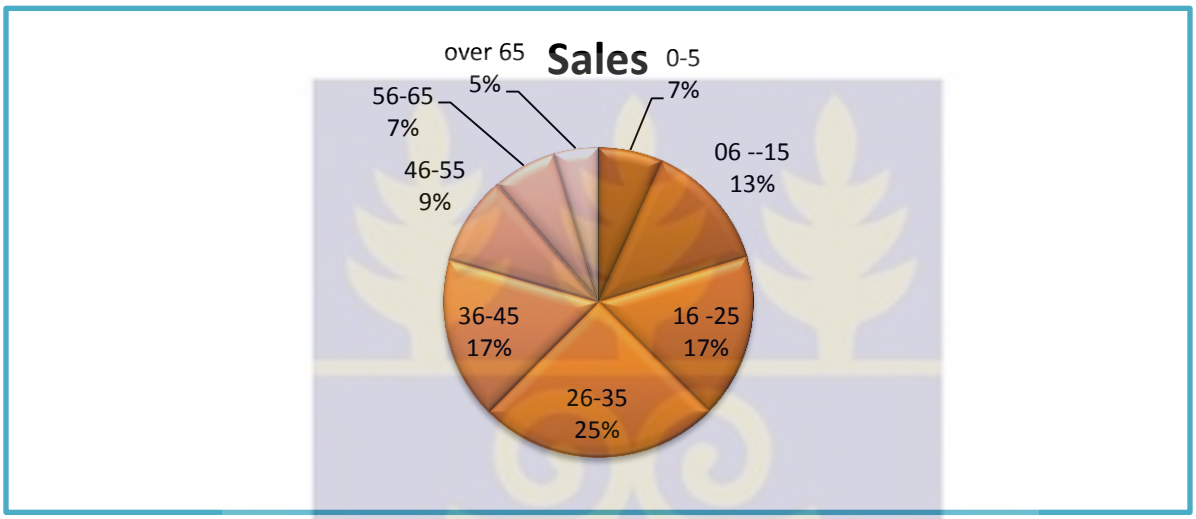


Figure 2: Distribution of fatalities by Age
Source: National Road Safety Commission, 2011

The overrepresentation of these age groups in road traffic accidents implies the nation is losing out on her most productive and important asset, which is the human resource that is needed for all developmental purposes. The overwhelming majority of these road traffic crashes as indicated, are related to human errors (Parker, West, Stranling & Manstead, 1995.), in which driver behaviour is a primary determinant (Parker, Lajunen, & Stradling, 1998) and hence, correcting drivers' risky behaviour is normally regarded as an efficient way to improve safety (Parker, West, Stranling & Manstead, 1995; Ma, Yan, Huang & Abdel-Aty, 2009). Underlining these human errors and the driver's behaviour are psychological factors.

However, limited studies are available to provide the underlying psychological factors leading to the increased levels of Road traffic accidents (RTAs) in developing countries, including Ghana. This limitation is revealed in studies that relate to the availability of road traffic accident's related mortality and morbidity data and statistics, identification of vulnerable or at-risk road users, identification of risk factors and the development and application of appropriate countermeasures (Forjuoh, 2003; Jacobs et al., 2000; Kopits & Cropper, 2005; Nantulya & Reich, 2002, 2003; Odero, Khayesi & Heda, 2003; Posada, Ben-Michael, Herman, Kahan, & Richter, 2000). The absence of analytical research about RTAs has yielded great obstacles in developing a research-based interventions and programs. The impact of RTAs on the health of the Ghanaian, coupled with the fact that, in Ghana very little has been done to comprehensively analyze the relationships among risk perception, attitudes and driving behaviour in a single study of the generality of drivers in Ghana suggested an immediate need to conduct this study. The researcher comprehensively analyzed the core psychological factors: risk perception and risk-taking attitude and their relation to road traffic accidents, as well as the extent to which risk perception and risk-taking attitude predict risky driving behaviour. The study further compared commercial/occupational drivers and private drivers on their risky driving behaviour tendencies, and to further bring out the factors that bring about the differences; an approach that has not received attention yet. This was done by accessing research data from drivers, analyzed and interpreted the data, to increase the understanding of these factors that lead to the increased risks of road traffic-related mortality and morbidity, which is a social problem of concern to safety on our roads.

The relevance hence, is that the study provided core psychological factors associated with and that predict road traffic accidents. The study also revealed risky driving behaviour differences

between commercial/occupational and private drivers and the factors that account for those differences. Outcome of the study is to inform road safety interventions, targeted at specific groups and help the NRSC achieve her single digit fatality rate by 2015 while also contributing to the UN's Global Decade (2011 - 2020) of Action for Road Safety. The study also adds to the body of knowledge in the field of risk analysis.

1.8 Aims of the study

The following aims were formulated:

1) Examine the variance in risky driving behaviour as accounted for by risk perception among drivers.

2) Investigate the variance in risky driving behaviour as accounted for by risk-taking attitude among drivers.

3) Examine whether or not socio-demographic factors (including age, gender, educational level, experience and type of vehicle usage (commercial or private vehicle)) moderate the relationship between risk perception and risky driving behaviour of the generality of drivers in Ghana.

4) Perform a comparative analysis of driving behaviours among groups (i.e. commercial and private drivers).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section devotes attention to the models that try to explain the occurrence of accidents and which further underpin research into the causes of road traffic accidents. The section also critically reviewed the literature on the variables of interest in an attempt to reveal the extent of work undertaken in this field, indicating the gaps that needed to be addressed.

2.1 Theoretical Frameworks

In attempting to understand why road accidents do occur and propose guidelines for researching their underlying causes, many different theoretical models have been suggested. While some have placed emphasis on individual characteristics, others have focused on the situational as well as the socio-ecological dimensions. However, since drivers contribute to over 90 percent of all road accidents (Parker et. al., 1995), majority of accident models have concentrated more on drivers than on any other class of road users. This study was guided generally by Mearns and Flin's (1995) socio-cognitive model of risk perception. The model postulates that attitude mediates risk perception and risky driving behaviour. However, in order to understand the risk perception and risk-taking attitude of drivers and how these variables predict their risky driving behaviours, accident causation theories were relied upon. For the purpose of this study three theories were considered: the social cognitive theory, the theory of planned behaviour, and the Psychometric Paradigm

Social Cognitive Theory (SCT)

Social Cognitive Theory (Bandura, 2002) provided an important framework for this study, because it helps to explain some latent factors in accident causation aside from explaining the usual factors addressed by other theories. The social cognitive theory (Bandura 1986; 1989; 1997; 2002) has been described as having an agentic orientation to human functioning. According to the proponent, the core assumptions of the theory are that three broad constructs (i.e., personal factors, behaviour, and environmental factors) are the primary determinants of human behaviour. The model thus presents bi-directional relationships.

The essence of the theory is that it enables us to describe and explain behaviour such as road user behaviour. A triadic reciprocal framework of the theory's constructs demonstrates that they mutually interact with each other and also points to the fact that all the constructs are relevant in explaining behavioural outcomes. The researcher employed this framework to investigate how the interaction of these constructs shape Ghanaian drivers' risk perception and indeed the driving behaviour. The perspective it assumes shows the importance of the human agency in the sphere of things. The theory is thus partitioned into two broad constructs: human agency and structure. Personal factors and behaviour is put under the human agency partition while environment is put under the structure partition. Put another way, human behaviour is determined by internal mechanisms and environmental factors. Inherent in the human agency is the role of self-efficacy in determining what behaviour individuals are likely to engage in. It also provides guidelines for designing and implementing interventions (e.g., accident countermeasures, etc.) to address the shortcomings of behaviours described (e.g., tail-gating, wrongful overtaking etc.). Figure 3 below is the conceptual framework of the theory.

Bandura's triadic reciprocal Model of the SCT

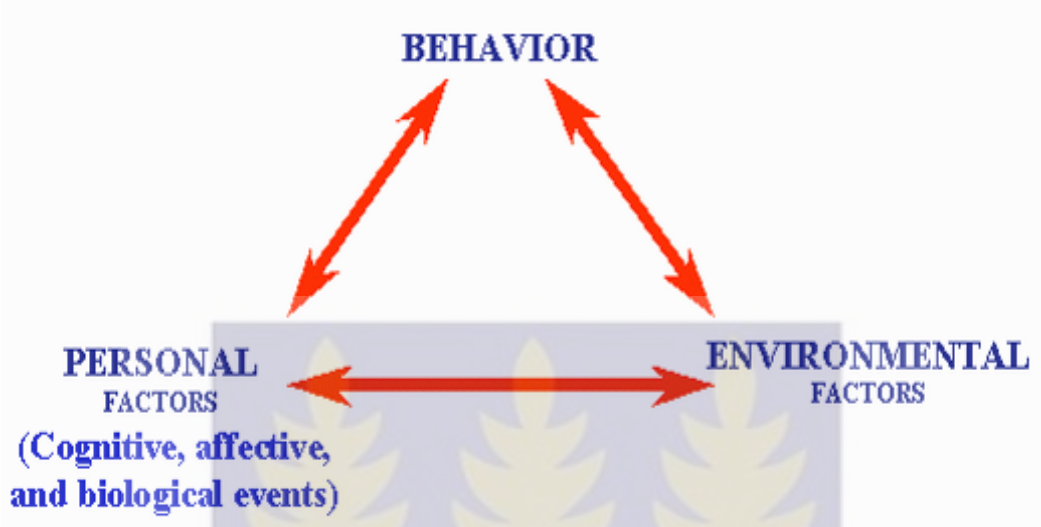


Figure 3: Conceptual Framework of the Social Cognitive Theory
Source: Pajares (2002). *Overview of social cognitive theory and of self-efficacy*.

This is foundational because affective beliefs and cognition are integral components of attitudes. Another reason why the researcher relied on this framework was to understand how these attitudes of Ghanaian drivers combine with their risk perception in determining their driving behaviour. Research indicates that cognition and behaviour may be inversely related e.g., drivers think that distracted driving is dangerous yet some of them pick calls, text and engage in distracted driving while on the road (Lawton et al., 2007).

Again, the attitude-behaviour relationship has been the subject of great debate in social psychology. This has given rise to Fishbein and Ajzen's (1975; 1980) Theory of Reasoned Action (TRA) and its extended version the Theory of Planned Behaviour (TPB: Ajzen, 1985; 1991). But what is not in doubt is that attitudes influence behaviour and vice versa (Festinger, 1975; Bem, 1972). McCrae and Costa (1995) have reported that an individual's internal dispositions influence how they perceive and appraise the environment. This finding supports

Waylen and McKenna's (2008) conclusion that risky road user attitudes are developed before adolescence.

It is also worth noting that environmental factors shape behaviour and personality characteristics (Bener & Jadaan, 1992). These factors represent both the physical and social aspects of the environment. Individuals (e.g., drivers) learn to speed beyond the assigned speed level for that particular road because they may have observed similar behaviour go unpunished within their social environment; a phenomenon referred to as observational learning. Likewise, pedestrians also may decide to cross the road outside of the crosswalk because they may have seen significant others do same. In reality, human development, adaptation and attitudes to change are deeply rooted in social systems within the environment. Hence, this causal structure emphasizes the point that people are both producers and products of their social environment (Bandura, 2001).

The social cognitive theory shares similarity with the nature-nurture debate theories in that while it accepts that both nature and nurture are principal determinants of behaviour, it does not suggest which construct is more important than the other. The SCT is applicable in many psychology disciplines and can be used to study varying behaviour patterns. It provides research methodology and integrates human agency and social structure. Though some researchers have criticized it for placing too much emphasis on the human agency factor, the SCT is applicable in many disciplines and can be used to study varying behaviour patterns. This theory provided a good fit for the present research because it addressed two key constructs (i.e., attitudes and behaviour) which are of key interest to this study.

Theory of Planned Action **(**Ajzen and Fishbein, 1980)

Ajzen and Fishbein (1980) formulated the Theory of Reasoned Action (TRA) after trying to estimate the discrepancy between attitude and behaviour. This resulted from attitude research from the Expectancy Value Models. The TRA was related to voluntary behaviour. The core assumptions of the TRA suggests that a person's behaviour is determined by his/her intention to perform the behaviour and that this intention is, in turn, a function of his/her attitude toward the behaviour and his/her subjective norm. This intention is determined by three things: their attitude toward the specific behaviour, their subjective norms and their perceived behavioural control.

Later on behaviour appeared not to be 100% voluntary and under control. This resulted in the addition of perceived behavioural control. With this addition the theory was called the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The TPB is a theory which predicts deliberate behaviour (Parker, et al., 1992), because behaviour can be deliberative and planned and is used in evaluation studies. The theory of planned behaviour holds that only specific attitudes toward the behaviour in question can be expected to predict that behaviour (Ajzen, 1991). In the driving sphere, the TPB will explain a driver's risky driving behaviour as being deliberate, culminating from his or her risk-taking attitude. Thus a driver with a risk-taking attitude can be predicted to engage in risky driving behaviours. This framework therefore suggests that drivers in Ghana who engage in risky driving behaviour do so because they have dispositions in their attitudes that make them engage in those behaviors on the road.

The Psychometric Paradigm **(**Slovic, Lichtenstein, & Fischhoff, 1981).

The psychometric paradigm is another framework that explains the concept of risk. This framework is credited to the work of Slovic, Lichtenstein, and Fischhoff (1981). The

Psychometric Paradigm posits that risk results from social construction and therefore it is subjective in nature and cannot be measured objectively (Slovic, 1992; 2000). Its subjectivity means that risks are susceptible to social and environmental influences. If this is the case for the drivers in Ghana, in which risk perception are formed from societal and environmental influences, the researcher sought to find out. It is a framework that helps to shape our understanding of risk perception and to provide methodological guidelines for designing survey instruments to study it and to offer interventions. The basic characteristics of the paradigm are in its emphasis on the use of psychometric techniques (e.g., rating scales, attitude measures, etc.), for risk estimation. These techniques are used to estimate people's risk and hazard perception in relation to natural and technological eventualities like nuclear meltdown. The framework has inspired a lot of the research methodology employed in studies in traffic psychology. It is useful for the identification of factors that have impact on risk perception (McDaniels, Axelrod & Slovic, 1995). Despite its usefulness, Wåhlberg (2001) has criticized the paradigm for being more of a descriptive model than an explanatory framework. Wålhberg thinks this weakness limits its predictive power and therefore restricts its applicability. It has also been criticized for failing to distinguish between general risks and personal risks. Despite these weaknesses it still remains the dominant approach to safety research and especially road safety studies in psychology in the absence of an all-encompassing model.

Risk Homeostatic Theory (Wilde, 1982, 1994**)**

The Zero-risk Theory (Näätänen & Summala, 1974), the Task-capability Interface (Fuller, 2005) and Wilde's (1982) Risk Homeostatic Theory are some of the driver behaviour theories that seek to explain driving behaviour. The Task-Capability Interface (Fuller, 2005) for example is a model that postulates that task difficulty in driving arises out of the dynamic interface between

the demands of the driving task and the capability of the driver. Näätänen and Summala's (1974) Zero-risk Theory considers the decisions that a driver makes to achieve the goal of reaching a destination and the role played by risk in this goal. The theory posits that there is predominantly a zero risk of collisions in such decisions. In the current study however, Wilde's (1982) Risk Homeostatic Theory (RHT) provided a framework to explain driving behaviour. The RHT is a psychological model that explains how the driver's behaviour irrespective of safety interventions, contributes to RTAs. By Wilde's (1994) explanation, drivers change their behaviour in response to new safety interventions. The report indicates that the riskiness of the way drivers behave will not change, until those interventions are motivating enough to change the amount of risk drivers are willing to engage in. The theory challenges the foundations of injury prevention strategies with the view that the best safety interventions are those that alter the driver's desired risk level, adding that interventions that only modifies the environment without affecting the target risk level, is not enough (Hedlund, 2000).

According to the theory, drivers continuously check the amount of risk (subjective risk) they feel they are exposed to and compare with the amount of risk they are willing to accept, and then try to reduce any difference between these two risks to zero. Thus, if the level of subjective risk is lower than is acceptable (due to a change in the driving environment for example), the driver tends to engage in behaviors that increase their exposure to risk. This risk homeostasis, which is a function of the driver (because of how much risk the driver is willing to tolerate, and not on the specific measures taken), is what accounts for increase or decrease in traffic accidents in Ghana. In fact, Wilde asserts that it is the propensity for risk acceptance which determines the actual accidents associated with driving behaviour. Consequently, Wilde proposes that humans and

communities will get the required number of accidents they wish to get unless the target level of risk is altered.

The RHT has been criticized on a number of methodological issues. Elvik (2004) indicated that the theory does not explain in detail how drivers set their target levels of risk and subjective risk. The review also showed that the theory fails to show how to empirically measure target level of risk. The theory has also been criticized in the view that where adaptation motives play a crucial role, Wilde's hypothesis which is constituted at the level of the social system by the driver population (i.e. accident rate), is not easily transferred to the individual level (Trimpop, 1996). Notwithstanding the controversies of Wilde's RHT, there appears to be a general agreement among researchers that road users do adapt their behaviour to certain risk-reducing measures (Assum et al., 1999). The researcher drew on the tenets of the RHT to investigate how the driver's risk perception irrespective of the driving environment influences driving behaviour.

2.2 Literature Review

The driver's risk perception and risk-taking attitude are known precursors to accidents (Ulleberg, & Rundmo, 2003; Iversen & Rundmo, 2004; Eiksund, 2009; Stanton & Salmon, 2009; Nordfjærn et al., 2011; Deery, 1999). Studies into the underlining factors of accident have no doubt centred on the driver's risk perception or risk-taking attitude, and hence driving behaviour. Some studies conducted in the past have identified that risk perception has a negative association with risky driving behaviour (Quimby, 1988; Cohn, Macfarlane, Yanez, & Imai, 1995). This implies that drivers who perceive a particular behaviour to be risky will less probably take part in that behaviour. Quimby (1988) in a study for instance, observed participants during 'on-the-road driving' and resolved that risk-taking, such as the choice of an inappropriate speed, was related

to measures of driving performance. In the study, participants' ratings of risk were negatively correlated with their accident history; drivers with a risky everyday driving style perceived low levels of risk in certain traffic conditions.

Not everyone however, agreed with that direction of effect (DeJoy, 1992; Rundmo & Iversen, 2003). Some have even engaged in a controversy regarding the direction of effect between risk perception and driving behaviour (Horvath & Zuckerman, 1992). The researchers indicated that a sense of competence may increase with involvement in risky driving behaviour that does not produce negative consequences, such as injury or penalty. In this way, Horvath and Zuckerman (1992) have indicated that risk perception may be a consequence, not a cause of behaviour. Moreover, some studies have cast doubt on the causal relationship between risk perception and behaviour. In a study that sought to understand the mechanisms underlying young drivers' risk-taking behaviour in traffic, Ulleberg and Rundmo (2003) studied the associations among personality attitudes, risk perception and risky driving behaviour and found an insignificantly causal relationship between risk perception and driving behaviour when attitude is controlled. In their survey both risk perception and attitude towards traffic safety were significantly related to reported risk-taking in traffic. Machin and Sankey (2008) challenged Ulleberg and Rundmo's study anyway. Their criticism indicated that only two items were included within the scale used to measure risk perception and therefore the broad dimensions of risk perception were not included. The researchers (Machin & Sankey, 2008), thus doubted whether risk perception was adequately represented. They therefore employed four scales in their study to represent risk perception in which case, two specific scales were found to significantly affect speeding behaviour. The paragraphs following indicate the progress so far, in terms of previous research, limitations and gaps that this study addressed in the variables of interest.

Deery (1999) found that young novice drivers perceived relatively low levels of risk in specific driving situations. He explained this finding by the fact that they (young novice drivers) underestimate the probability of specific risks caused by these traffic situations resulting in an accident situation (Brown & Groeger, 1988). These risk perceptions include potential hazards in the environment as well as self-assessed driving ability. Young drivers perceive traffic hazards, less holistically (Milech et al., 1989; Deery, 1999). The finding further indicated that instead of focusing on the difficulty involved in carrying out a particular task, young drivers focus on the danger involved in those tasks (Groeger & Chapman, 1996). Meanwhile, other studies have shown that young drivers are slow to detect hazards, and unable to discover hazards more often (McKenna & Crick, 1997). Compared to other groups, younger men do not perceive themselves at greater risk for traffic accidents (Glik, Kronenfeld, Jackson & Zhang, 1999). This finding was consistent with Gregersen's (1996) study that found that young drivers tended to overestimate their own driving skills. Also, in a study of risk perception related to 23 slide-projected traffic scenes among a total of 400 drivers, Sivak et al. (1989) found that eighteen to twenty-four year old drivers reported lower risk than did the middle-aged. In general, the majority of surveys show that young drivers underestimate hazards in traffic. Deery's study was however limited in the fact that the relative effects of experience and age on hazard and risk perception, and demonstrating how these processes are related to accidents involvement were not catered for. The study did not also cover the generality of the driving population.

Rundmo & Iversen (2003) have examined the association between risk perception and driving behaviour before and after a traffic campaign, using a sample of adolescents aged 18–24 years old. Their study purposed to examine the association between risk perception and traffic behaviour. The survey study revealed some key findings that indicated the association between

risk perception and behaviour. The researcher revealed that the traffic safety campaign carried out seemed to change risk perception related to speeding and other traffic hazards significantly. Secondly, a Structural Equation Model revealed that, assessment of the probability of traffic accidents and concern did not significantly predict self-report risky behaviour. The third finding was that, worry and other emotional reactions related to traffic hazards significantly predicted behaviour. The researchers finally reported that, sensation-seeking, normlessness and indifference with regard to traffic safety affected emotion-based risk perception. Their work however had methodological considerations in that, some of the campaign measures, e.g. the multimedia shows, focused on the consequences of serious injuries for the victim as well as on emotional reactions among close relatives of victims of fatal traffic accidents. It may be possible that young women relate more easily to emotions than young men.

Rosenbloom, Shahar, Elharar, and Danino (2007) examined 224 individuals to find out whether or not an advanced driving training aimed at recognizing, avoiding and handling risks in demanding driving situations, affected perceived risk of driving situations (measured by a questionnaire). The training involved both experience and feedback on real performance, and specifically intended to emphasize the dangers in loss of control of a vehicle. Higher levels of perceived risk were reported after the training as compared to before it, by females than by males, and by older adult drivers than by younger adult drivers. The researcher however reported of a response bias as a result of the different factors among the groups. The factors included the anonymity of the questionnaire, and the differences between the younger and older participants, in the timings of administrations of the questionnaire and in the price and circumstances of the training. The study did not fully differentiate between the effects of age and of driving experience on perceived risk, since the older-aged group was also more experienced than the younger-aged group.

To address this limitation of the effect of age and experience in the study by Rosenbloom et al., (2007), Ivers, Senserrick, Boufous, Stevenson, Chen, Woodwark, and Norton, (2009) in their study "Novice Drivers' Risky Driving Behaviour, Risk Perception, and Crash Risk: Findings from the Drive Study", explored the risky driving behaviours and risk perceptions of a cohort of young novice drivers and also determined their associations with crash risk. Their survey found that self-reported risky driving behaviours among novice drivers were linked to a 50% increased risk of a crash after control for multiple confounders. However, whereas perception of risk was associated with crash risk, it was not found to be an important crash predictor after accounting for reported risky driving behaviours. The limitations in their study were that first, the study was conducted on novice drivers and did not represent the generality of drivers. Samples were volunteers and not a representative sample of the general population and hence, estimates of the population prevalence of exposures or outcomes were not calculated.

Rhodesa and Pivik (2010) have meanwhile studied the age and gender differences in risky driving behaviour. The purpose of the survey was to examine age and gender differences in risky driving. It was also to determine whether these differences can be attributed to differences in how positive affect and risk perception contribute to risky driving behaviour. The study found that gender and age differences in risky driving behaviour can be attributed to differences in perceptions of risk and the enjoyment of risky behaviour. Thus, male drivers reported engaging in risky driving behaviours more frequently than female drivers and teen drivers reported engaging in risky driving behaviours more frequently than drivers of the adult age group. The researchers also reported that Positive Affect (liking for risky driving behaviours) and perceived risk mediated the relationships of age and gender with risky driving. Affect and risk perception were independent predictors of risky driving behaviour. Interactions of positive affect and

perceived risk with gender and age showed that positive affect more strongly predicted risky driving for teen and male drivers than for adult and female drivers.

The study notwithstanding came not without some limitations. Data did not address the genesis of affective and cognitive belief structures surrounding driving (Rhodesa & Pivik, 2010). Again, all risky driving behaviours, or even the most common or the most dangerous behaviour were not represented since the test item was culled from an existing one. The researcher acknowledged their work was also limited in their sampling procedure. Because of the nature of telephone surveys and the difficulty of reaching teenagers at home, 87% of their teenage sample was obtained through a targeted sample of households likely to have teenagers.

Brookland, Begg, Langley and Ameratunga (2010) have also examined the study 'Risk Perception and Risky Driving Behaviours of Adolescents and their Parents'. The study's aim was to examine the association between risk perception and driving behaviours of parents and their adolescents at the critical time when the young driver transitions into driving solo and crash risk is at its highest. Their study revealed significant positive correlations between parent and adolescent risk perception and driving behaviours with regards to exceeding the posted speed limits and driving fast for the thrill of it. This study was limited in the view that the sample comprised only of adolescents and their parents. The rest of the age group category was left out and thus the findings lack generalization.

Ulleberg and Rundmo (2003) have also looked at the issues with their study titled, Personality, Attitudes and Risk Perception as Predictors of Risky Driving Behaviour among Young Drivers. The aim of the study was to understand the mechanisms underlying young drivers' risk-taking behaviour in traffic using the personality trait approach and the social cognition approach. Their

study which was based on a self-completion questionnaire survey, carried out among adolescents in Norway found significant correlations among attitudes and risky driving behaviour and a non-significant association between risk perception and driving behaviour. Thus, the researchers reported that risk perception was a weak predictor of adolescent risk behaviour whiles a direct relationship between attitudes and risky driving behaviour was observed. Thus, sample who reported negative attitude toward traffic safety were also found to engage in risky driving. The study was limited in respect of the sample. The study was conducted only on young drivers; older populations' scores on the variables of interest are can help formulate better interventions against road traffic accidents. Ulleberg & Rundmo have also noted their use of self-reported data.

Ma, Yan and Huang have also undertaken a related study titled 'Occupational Driver Safety of Public Transportation: Risk Perception, Attitudes, and Driving Behaviour' in 2009. The aim of their study was to identify significant factors affecting the safety of occupational drivers in public transportation (i.e., taxi and bus) The self- reported survey looked at the these personality variables (Perception, Attitudes) among 248 sampled taxi and mini bus drivers in Wuhan, China, revealed interesting findings. First, results indicated that, drivers who reported more tendencies of aggressive violations and ordinary violations (of risky driving behaviour), and who had previously been involved in crashes are in high risks of crash involvement. The study also found that drivers' attitude towards rule violations and speeding had significant impact on risky driving behaviours. Furthermore, two dimensions of risk perception (i.e., Likelihood of crash and Concern) were also found to have significant indirect effects on the risky driving behaviour through their influence on drivers' attitude towards rule violations and speeding. However, ANOVA results did not find any significant difference found between taxi and bus drivers regarding risk perception and attitudes. The weakness in their study is revealed in their sample

used. The study used only occupational drivers of taxi and mini bus only. Those who drove private vehicles could have revealed important factors in risk perception and risk-taking attitudes but which were not looked at. The current study addressed this limitation.

A review of the literature on the variables under consideration further revealed a study reported in the Ghanaian setting and which was conducted by Enoch Teye-Kwadjo. In 2011, the researcher studied "Risk Perception, Traffic Attitudes and Behaviour among Pedestrians and Commercial Minibus Drivers in Ghana: A Case Study of Manya Krobo District". Employing a qualitative research methodology, the researcher investigated drivers and pedestrians' opinions about their traffic risk perception, attitudes and behaviour and their relationship with road traffic accidents with the overall goal of identifying and describing the proximal and distal factors of accident causation in the Manya Krobo area. Two main findings came from the study. First, challenging working conditions, road rage behaviours, passenger distractions, bad road infrastructure and equipment, and inadequate driver training were among the reasons described for dangerous driving (Teye-Kwadjo, 2011). Secondly, the major behaviours reported to be influencing pedestrian-vehicle crashes included pedestrian-unfriendly road infrastructure, nearness of stores and supermarkets to major roads, risky pedestrian road use behaviour, aberrant driving, street hawking, parental negligence, and general disinterest in pedestrian law enforcement. Major shortcomings from this study that would be addressed in the current study were that, the study focused on the perceptions and opinions of commercial mini-bus drivers and pedestrians only; private vehicle drivers however, also engage in risk and traffic crashes. Recent media reports revealed that, the number of private vehicles involved in road traffic crashes is on the increase (www.thechronicle.com/gh, June 21, 2011). The sample size used was small and thus, the data generated from this sample may show non-representativeness.

Another Ghanaian study in relation to the variables of interest has been carried out by Akaateba and Amoh-Gyimah (2013) in the Kumasi setting. The study titled 'Driver Attitude Towards Traffic Safety Violations and Risk-taking Behaviour in Kumasi: The Gender and Age Dimension' aimed to investigated age and gender related differences in drivers' self-reported attitudes towards traffic violations and the gains or motivations influencing the violation of traffic laws in Kumasi. The results of their study revealed that though not by a large margin, gender and age have significant influence on attitudes towards the commission of traffic violations. The researchers also reported that the perceived gains associated with traffic violations also to a large extent influence driver attitude towards traffic violation with men being more motivated by the perceived gains to be derived from traffic violations than females. Possible reasons to the gender differences in the frequency of violation of traffic laws could be linked to the cultural upbringing, the Ghanaian socialization process and traditional gender roles system (Akaateba & Amoh-Gyimah, 2013). The study further revealed that neither significant nor great age differences were found regarding the extent to which perceived gains influenced the commission of traffic violations. The study however focused on gender and age to the neglect of other potential demographic factors that influence driving behaviours. In fact, the researchers recommended that these other demographic variables such as educational level, extent of driving among others should be considered in future studies. This the current study has addressed by including these socio-demographic variables in the moderation analysis.

In a cross-cultural comparisons of traffic safety, risk perception, attitudes and behaviour, Lund and Rundmo (2009) studied differences in risk perception and attitudes towards traffic safety and risk, taking behaviour among Norwegian and Ghanaian samples. Their study found that perceived risk and attitudes significantly predicted risky driving behaviour and

accidents/collisions by as much as 53% among samples from Norway although attitude was not found to predict risky driving behaviour among the Ghanaian sample.

2.3 Rationale of the study

Following the foregoing discussions on the literature review, not much existed on the relationship between Risk Perception, Risk-taking Attitude and Risky Driving Behaviour among the generality of drivers. The need also existed for a comprehensive study to understand the moderating role of demographic variables, on the relationship between the risk perception, and risky driving behaviours among drivers. Moreover, no study was carried out especially in and among Ghanaians in an attempt to draw the relationship between the risk perception, risk-taking attitudes and risky driving behaviours among the generality of drivers. Since the operations of commercial/occupational drivers and private drivers differ in terms of 'survival', there was the need to compare these two driver groups to reveal the factors that would inform interventions. It was in this view that this study was conducted, to address this shortfall and provide a remedy for the social problem of road traffic accidents in Ghana.

2.4 Statement of the Hypothesis

In light of the aims above, the following hypotheses were formulated:

H1: Risk Perception would significantly predict Risky Driving Behaviour; thus risk perception would account for a significant variance in risky driving behaviour over and above the effects of socio-demographic factors.

H2: Risk-taking Attitude would significantly predict Risky Driving Behaviour; i.e. risk taking attitude would account for a significant variance in risky driving behaviour over and above the effects of socio-demographic factors.

H3: There would be a significant positive relationship between Risk Perception and Risk-Taking Attitude.

H4: Risk taking attitude would moderate the relationship between risk perception and risky driving behaviour; so that higher risk perception would reduce risky driving behaviour more for drivers who have a positive attitude to risk-taking than for those who have a negative risk-taking attitude.

H5: Socio-demographic variables (including age, gender educational level, experience and vehicle type operated) would moderate the relationship between Risk Perception and Risky Driving Behaviour.

H6: Commercial vehicle drivers would exhibit higher risky driving behaviour than private vehicle drivers.

H7: Older female drivers would exhibit less risky driving behaviour than younger male drivers.

Prior to data collection and analysis, the researcher proposed a hypothetical model of the relationships and associations among the study variables. Figure 6 shows the model

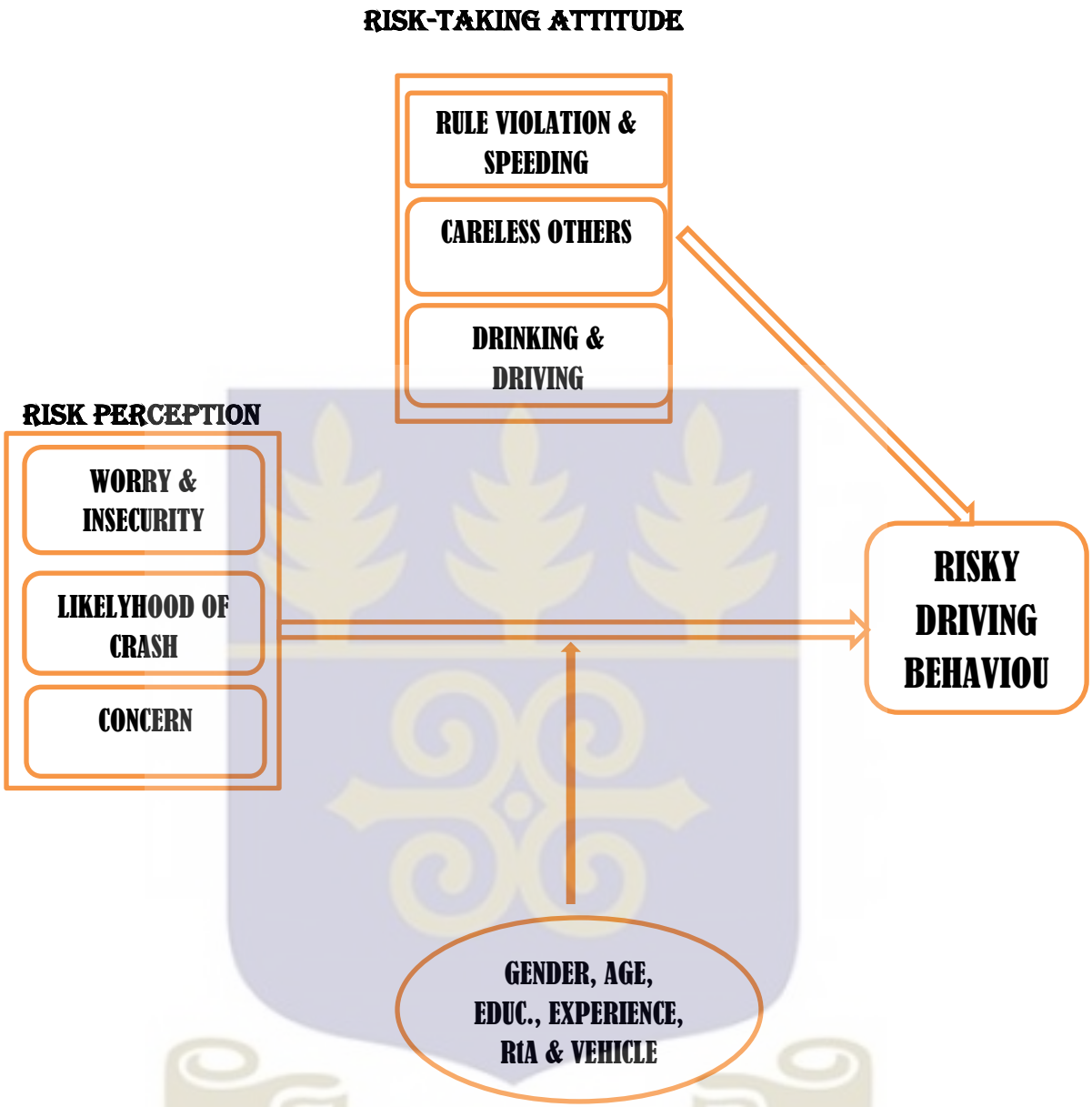


Figure 4: Proposed Conceptual Model

The model is explained this way. There is a direct relationship between risk perception and risky driving behaviour; thus, risky driving behaviour is predicted by risk perception. This relationship is moderated by age, gender, education level, experience, vehicle type operated and risk-taking attitude (RtA). Similarly, there is a linear relationship between risk-taking attitude and risky driving behaviour; thus, risky driving behaviour is predicted by risk-taking attitude.

2.5 Operational Definition of Variables

- Risk Perception - a driver's own appraisal or judgment of a traffic hazard to be risky or not risky and his ability to overcome the hazard.
- Risk-taking Attitude –driving dispositions in a driver, which the driver engages in when driving, and which can result in dangerous driving.
- Risky Driving Behaviour – a driver's propensity to engage in driving activities that are capable of resulting in a crash with another vehicle(s), humans, structures, objects etc.
- Vehicle type operated – the type of vehicle that a driver drives most often and the purpose (whether for income earning or not).
- Experience – the number of years a driver had been driving a vehicle.
- Gender – the biological sex of maleness or femaleness of the driver.
- Age – the number of completed calendar years a driver had attained.
- Educational level – the highest educational institute or facility attended and completed.
- Road traffic accident – a vehicular involvement in a crashes that results into injury (minor or severe), fatality, morbidity, damage of part or whole vehicle or malfunctioning of a vehicular system.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter is devoted to the methodological approach that guided the conduct of the study. It begins with the description of the population and the sample used for the study. This includes a detailed description of the characteristics of the sample, including the criterion for their selection as well as the procedures used in the sampling. It further discusses the research design adopted for the study, the research instrument that was used in the collection of research data, the procedure and the data collection strategies for the study. The general ethics that guided data collection and data discussions are not left out.

3.1 Population

The population of the study comprised of drivers in the Greater Accra, Ashanti and Eastern regions of Ghana who held valid driver's license and who by the provisions of the law, are qualified to drive a vehicle. The drivers who qualified for inclusion had a valid driver's license, provided by the Driver Vehicle and Licensing Authority (DVLA), which is the appropriate regulatory body for the issuance and regulation of driving licenses in Ghana.

3.2 Sample and Sampling Procedure

The researcher adopted two sampling techniques. The convenience sampling technique was used to select the private and some commercial/occupational participants for the study. This technique was chosen because the sample's participation in the study depended largely on their availability and willingness. Although the convenience sampling is the least rigorous technique involving the

selection of the most accessible participants and may also result in poor data quality (Marshall, 1996), it afforded the researcher the opportunity to collect useful data and information that would not have been possible to collect using a probability sampling technique, which most times require more formal access to full lists of populations (Leedy and Ormrod, 2001; Marshall, 1996). Also, because of the different locations from which the study took place, this technique was considered, more appropriate.

The purposive sampling technique was also employed to sample the female commercial/occupational drivers from the Metro Mass Transit (MMT) Limited. Although this procedure creates a selection bias, the researcher used the technique because there are not many (if any) of female commercial drivers in the country. The method was also chosen because the MMT provided a large number (Creswell, 2002) of female commercial or occupational drivers, whose selection helped in the analysis of the moderation of gender and vehicle type operated, on the risk perception – risky driving behaviour relationship as well as the analysis of risky driving behaviour differences between commercial/occupational drivers and private drivers. Although the female drivers from the MMT had received formal training and thus are more likely to have high risk perception or 'better attitudes' or engage in acceptable driving behaviours, the researcher draws on the fact that attitude is dispositional (Ulleberg & Rundmo, 2003). This meant that though training will reduce risky driving behavior among drivers, the risk-taking attitudes and the risky driving dispositions in them needs to be considered in a study like this.

With an introductory letter for identification and verification purposes, and an explanation of the significance of the study, the head of research, of the MMT informed and made female drivers of the company available. This was done after the researcher formally wrote to seek permission for the data collection. The researcher then arranged and met with these drivers during their off –

duty times. This afforded the researcher an opportunity to explain the significance of the study and to seek their voluntary consent for participation in the study, and the interviews were conducted. Participants that formed the private driver sample were selected from their places of work and other gathering points such as churches, school etc. These drivers were also approached with an explanation of the relevance and significance of the study. The questionnaires were issued and participants completed and submitted them to the researcher. Clarification or explanation was given to those that needed them during the survey process.

In all, 700 questionnaires were made available for respondents. The researcher adopted Cochran's formula to arrive at an appropriate sample size (i.e. Necessary Sample Size = (Z-score)^2 X StdDev X (1 - StdDev)/(margin of error)^2; Cochran, 1977). At an alpha level of .05, a 5 per cent Margin of Error, Confidence Interval of 95 and a Z-score of 1.96 (95 per cent confidence level), the appropriate sample size was determined. The 700 questionnaires were distributed to take care of some unreturned or rejected questionnaires. Out of this number, 538 questionnaires were retrieved. Twelve respondents reported not having a valid driver's license and another 9 questionnaires were not completely filled. The number of questionnaire items that were not responded to, on each incomplete questionnaire was too much that it did not permit for analysis. The researcher therefore excluded these as well as the unlicensed drivers from the analysis. Thus, a total of 529 questionnaires representing a response rate of 76 per cent were used for the analysis.

Examination of the questionnaires that were responded to revealed various demographic characteristics. The drivers comprised males and females of different age groups. 382 (72.2%) were male and 147 (27.8%) were females. Majority of the drivers (83.6%) were between the age range of 18 years (the minimum age for acquiring a driver's license in Ghana as required by law

– DVLA Act, 1999) and 50 years, with a few more (16.4%) participants above 50 years. They drove either a privately owned vehicle or commercial/occupational vehicle. The private drivers were those who drove their own or privately owned vehicles and did not earn any income from such driving. By commercial drivers, the researcher referred to drivers who drove to earn income and which they depended on for survival. These drivers were those involved with the driving of taxis, mini buses (tro-tro) and buses. It also includes the drivers of what is referred to as the 'work-and-pay' system, as well as drivers that drove their own vehicles for commercial purposes. Thus, any driver that earned an income from the driving activities and from which he or she depended upon for 'survival', was categorised as a commercial or occupational driver. Out of the male drivers interviewed, 296 (77%) drove commercial/occupational vehicles while 86 (23%) drove privately owned vehicles. Further, 36 of the 147 female drivers representing 24% drove commercial/occupational vehicles while 111 representing 76% were private drivers. These drivers had driven for at least three months, covering a distance of at least 10 thousand kilometres, and have had some form of (driving) education; at least, they either had a basic school education, an adult education, or were able to read and interpret some road signs. All these participants recorded having valid driver's license and they constituted the sample of the study. The demographic characteristics of respondents are presented in Table 1.

Table 1

Frequency Distribution of Demographic Characteristics of Respondents (N=529)

Demographic Variables	N	Percentages (%)
Gender		
Male	382	72.2
Female	147	27.8
Age		
Between 18 and 30 years	219	41.4
Between 31 and 50years	223	42.2
51years and above	87	16.4
Distance covered		
Below 10000km/h	15	5.5
Above 10000km/h	178	65.9
Number of years driving		
Below 5years	254	48.0
Above 5years	275	52.0
Educational Level		
JHS/SHS/MSLC and Below	350	66.2
Above SHS/MSLC	179	33.8
Type of vehicle		
Commercial/occupational	300	56.7
Private	229	43.3

The participants (males, females, private vehicle drivers, commercial/public vehicle drivers) were approached from different bus terminals in the three study areas (including the Achimota Bus Terminal, Tema Station, Neoplan station, Kejetia and Koforidua main lorry stations), transport companies, including the State Transport Company (STC), Metro Mass Transit (MMT), taxi stations, places of work, Legon and Kumasi school campuses, church and other gatherings that had the sample characteristics for the study. This was to ensure that different categories of drivers from different social groups were included in the study. The researcher together with research assistants contacted respondents from these places, to respond to the

questionnaire items. The sample consisted of drivers who had been driving for the last three months prior to the conduct of the study. This characteristic enabled the drivers to easily remember and respond to the questionnaire items, relating to their driving experience more easily.

3.3 Research Design

The study adopted a quantitative (correlational survey) approach to find the patterns of relationship between risk perception, risk-taking attitude and risky driving behaviour. The choice of this design helped the researcher to identify predictive relationships, although it did not produce causality (Mertens, 1998). This study design also allowed for the examination of the strength or otherwise and direction of relationships among the variables of interest and thereby, provided the basis for future studies. Also, due to the large sample size (Fife-Schaw, 1995) that was used for the study, and the fact that the sample was made up of drivers of different backgrounds, these accounted for the choice of this study design.

3.4 Research Instruments

The study employed a questionnaire that was administered to collect data for analysis. The 53-item instrument was divided into four sections. The survey instrument combined three different questionnaires that measured the variables of interest, in addition to the socio-demographic part.

The first section of the questionnaire was made of questions that sought to obtain socio-demographic data of respondents. The socio-demographic part in the questionnaire included drivers' age. Respondents were asked to select their age from three categories: 18 – 30 years, 31 – 50 years, and 51 years and above. These categories were chosen to conform to previous

research (e.g. Norris, Matthews, & Riad, 2000; Akaateba & Amoh-Gyimah, 2013). The section also requested respondents to state their gender (male or female), annual driving mileage (measured by how much distance the driver had driven a vehicle, during 12 months prior to the time of the interview), driving experience (measured by the number of years the driver had been driving) and vehicle type operated (i.e., whether the driver drove private or commercial/occupational vehicle). Further, the section also sought the level of education of respondents. Results from this section were used to find the moderator effect on the risk perception – risky driving behaviour relationship.

The researcher adapted Rundmo and Iversen's (2004) validated Risk Perception scale to measure drivers' risk perception. The scale which has extensively been applied in previous studies was considered a suitable measure of risk perception. The scale was scored on a 5–point likert scale containing ten (10) items. These included a 4- item each of 'worry & insecurity' component, and 'likelihood of crash' component and another 2- item 'concern' component. The scale and its three (3) components or sub scales have been found to be useful and reliable in previous studies. For instance, Crombach alpha indices of .89, .67 and .81 were found for 'worry & insecurity', 'likelihood of crash' and 'concern' components respectively (Rundmo & Iversen, 2004). Furthermore, Hoare (2007) reported Crombach Alpha indices of .55, .72 and .71 for 'worry & insecurity', 'likelihood of crash' and 'concern' respectively. Also, an acceptable Cronbach's Alpha coefficient of .88 by Machin and Sankey (2008) for the risk perception scale has been reported. The current study found reliable alpha indices for the dimensions of risk perception as .83, .85 and .93 respectively (see table 2). Respondents were asked to indicate how possible the enumerated items applied to them. The test items in each sub-scale ranged from (1) "not possible at all" to (5) "very possible". A higher score implied that the driver perceives higher risk in the

described scenario and vice versa. A minimum and maximum sum of scores of 10 and 50 respectively are possible for this scale. Scores for each item were summed and the total score was obtained for analysis.

Again, risk-taking attitude was measured by a scale (Risk-taking Attitudes Scale) validated among Norwegian sample, by Iversen & Rundmo (2004). The three sub scales included attitude towards rule violations and speeding (Rule Violation & Speeding), attitude towards the careless driving of others (Careless Others), and attitude towards drinking and driving (Drinking and Driving), and consisted of 11, 3, and 2 items, respectively, rounding up to 16 items in all. The scale has shown favorable reliabilities in previous studies. For instance, Habibi Haghi and Maracy (2013) reported reliability indices (Cronbach's Alpha coefficients) of .85, .9 and .59 for the three sub scales respectively. Other studies have reported that, Cronbach's α for rule violation & speeding was .88, .89 for careless others (riding with an unsafe driver) and .89 for drinking and driving (Hoare, 2007). Ulleberg and Rundmo (2002) estimated Cronbach's α of .84, .63, and .84 for rule violation & speeding, careless others (riding with an unsafe driver) and drinking and driving respectively. Preliminary investigations from the current study also found acceptable reliabilities of .87, .84 and .85 for the three respective dimensions of the scale (see table 2). Respondents were asked to indicate the extent to which they agreed or disagreed to the questionnaire items. The responses on the likert scale ranged from (1) "strongly agree" to (5) "strongly disagree". A high score on a scale indicated a positive attitude towards risk-taking or, a lower preference for risk-taking in different traffic scenarios. A minimum score of 16 (for high risk-takers) and a maximum of 80 (for low risk-takers) can be obtained for this scale. Scores for each item were summed and the total score was obtained for analysis.

Furthermore, Risky Driving Behaviour was measured by the 27-item version of The Manchester Driving Behaviour Questionnaire (Lawton et al., 1997; Parker et al., 1998). The Manchester Driving Behaviour Questionnaire (DBQ) has been widely applied, and shown to be useful in predicting driver behaviour in numerous countries (Lajunen, Parker, & Summala, 2004; Iverson and Rundmo, 2002; Machin & Sankey, 2008). Recently, the DBQ has become one of the most widely implemented measurement scales for studying self-reported driving behaviours (Lajunen & Summala, 2003). The original version, developed by Reason et al (1990), focused on two distinct behaviours that were named errors and violations. Errors consist of actions that are not planned while violations were considered to be deliberate deviations from safe driving practices. Although the main distinction between the concepts is the issue of deliberate versus accidental behaviour, it is noted that both factors are potentially dangerous (Lajunen, Parker & Summala, 2003). The original scale has since been modified by Lawton et al. (1997) to include additional items to assess other factors contributing to driver violations. More particularly, aggressive violations were proposed to be associated with an interpersonally aggressive component while "ordinary" violations do not have an aggressive aim, but are still deliberate violations (Lajunen et al., 2003).

The DBQ has been deployed extensively in safety research in areas such as perceptual and attentional influences on driving speed (Charlton, 2004), cross cultural studies (Lajunen et al., 2003), on-the-job driver accidents (Caird & Kline 2004), age differences in driving behaviour (Dobson Brown, Ball, Powers, & McFadden, 1999), the genetics of driving behaviour (Bianchi & Summala, 2004), issues associated with self-report bias (Lajunen & Summala, 2003), and associations with the likelihood of being involved in an accident (Dobson et al., 1999; Mesken, Lajunen & Summala, 2002; Parker et al., 1995; Reason et al., 1990). In addition, the DBQ has

been successfully implemented in a number of countries including: Arab Gulf countries (Bener, Özkan, & Lajunen, 2008), Finland (Bianchi & Summala, 2004; Mesken et al., 2002), Netherlands (Lajunen et al., 2003), United Kingdom (Parker et al., 2000), Brazil (Bianchi & Summala, 2002), New Zealand (Sullman, Meadows & Pajo, 2002), China (Xie & Parker, 2002) and Australia (Dobson et al., 1999; Newnam, Watson & Murray). The DBQ has shown satisfactory reliability (Lajunen et al. 2004) and cross-cultural stability, for all four scales (Sârbescu, 2013). Özkan et al., (2006) reported a test - retest reliability around 0.6 across a three-year period. Harrison (2009) also obtained reliability scores of .65, .75, .72 and .72 for errors, violations, lapses and aggressive violations respectively. The scale was categorized into four sub scales: aggressive violations (3 items), ordinary violations (9 items), errors (8 items), and lapses (8 items). Respondents were asked to indicate on a 5-point likert scale that ranged from (1) "Almost Never" to (5) "Almost Always", how often they did each of the violations, errors and lapses while driving. A response choice of 'almost never' was scored as 1 while a score of 5 was assigned to the response of 'almost always'. A least score of 27 and highest score of 135 are obtainable. For each respondent, the sum of scores from the 27 responses was used in the analysis.

The values obtained from previous studies on reliability and validity suggest that the survey instruments selected for this research have adequate psychometric properties that measure the domains of interest of the study. The scale and its sub scales also showed acceptable reliabilities in this current study, as indicated in table 2.

3.5 Procedure

Permission and approval was sought from the Department of Psychology, University of Ghana to enable the researcher conduct the study. This was granted and a letter of introduction was issued to help the researcher seek ethical clearance and obtain research data from participants. The researcher sought ethical clearance regarding the conduct of the study from the Ethical Clearance for the Humanities (ECH), of the University of Ghana. An approval from the ECH was granted (ECH 019 13-14) after a careful scrutiny of ethical considerations (see Appendix B). This was followed by institutional consent and assistance from key institutions. Specifically, the National Road Safety Commission (NRSC), the Metro Mass Transit Limited (MMT - Accra and Kumasi), the State Transport Company (STC) and the Achimota Bus Terminal were officially informed about the research, for their consent and participation. The researcher was granted permission, access and support after explaining the purpose and significance of the research to heads of the institutions above. The NRSC for instance, wrote to the researcher expressing interest and support for the study (see Appendices D) whiles the head in charge of research at the MMT wrote an endorsement on the researcher's permission letter to indicate their permission and support for the data collection (see Appendix E). Meanwhile, other organizations and individual drivers, especially those who drove private vehicles most often were also approached and their consent to participate in the study was sought. The researcher again explained the significance of the study to these drivers, followed by the data collection process. All these proceeded from a pilot study; thus a pilot study was first conducted, followed by the main study. The pilot was to assess the reliability of the survey instrument and its applicability in the Ghanaian context.

3.6 Data Collection

Research data was collected from drivers of various age groups, gender and who drove either private or commercial vehicles, in a period of eight weeks. The drivers or participants were from the Greater Accra, Ashanti and Eastern regions of Ghana. The choice of the regions was due to their highest accident occurrence rate in the country (NRSC Report, 2013). Occupational drivers of some key driving institutions such as the Metro Mass Transit and the State Transport Company were interviewed as well. Commercial (taxi and tro-tro) drivers were visited at their lorry stations at their free time and were interviewed. Private vehicle drivers were also interviewed at places of work, schools and religious gathering, during their free times.

Data was collected from research participants on one-on-one basis and also in a group administration. The researcher explained the research questions to drivers that needed it. The researcher also translated the research questions to the Twi and Ga languages, to the drivers who had difficulty reading and understanding or found problems with some of the questions. The interview session took 40 minutes on average per person and about 55 to 60 minutes for the translated interview.

3.7 The Pilot Study

Prior to the conduct of the main study, the researcher piloted the whole survey process with fifty-six (56) sample. The pilot survey was conducted with participants (or drivers) in the Greater Accra region. Although the study took place in the Greater Accra, Ashanti and the Eastern regions, the researcher chose the Greater Accra region for the pilot study, because of the homogeneity of the sample characteristics from the other regions in the Greater Accra region (Patton, 2001). The Greater Accra region also has the highest road traffic crashes and accident in Ghana (NRSC, 2013). These reasons accounted for the choice of the region for the pilot study. The pilot was done in order to validate the survey instrument and approach, in the Ghanaian

context. The purpose was also to identify problems associated with the questionnaire: its content and design, understanding and administration process, data coding and data entry procedure, and strategies to analysis the data (Heppner & Heppner, 2004) and also to estimate the time it would take for students to complete the questionnaire. It was also to test the study procedures, validity of tools, and estimation of parameters such as the variance of the outcome variable to calculate sample size (Heppner & Heppner, 2004). The pilot was to assess the internal consistencies of all the scales and sub scales (using the Cronbach alpha). This reliability index is one of the most widely used reliability measures in research. Generally, a reliability value of 0.7 is considered satisfactory (Churchill, 1991; Litwin, 1995). Results of the pilot revealed favorable Cronbach's alpha coefficients for all the scales and sub scales. For instance, Cronbach's alpha coefficients of 0.93, 0.79 and 0.93 were found for risk perception, risk-taking attitude and risky driving behaviour respectively. These indices made the survey instrument applicable to the Ghanaian context. The study further revealed the mean, standard deviation, skewness as well as kurtosis of the scale and sub scale of the survey instrument. Theses indices revealed the suitability of the survey instrument as well as the problem areas in data collection. These were addressed in the larger scale experiment, thereby improving the overall quality of the main study. For instance, the pilot study revealed that the questionnaire items included some technical terms that needed explanation/clarification to participants. This clarification was offered in the large scale study whiles amending or changing some of the technical terms for easy understanding. Table 2 reveals detailed reliability indices for the survey instrument.

3.8 Inclusion/Exclusion Criteria

The participants, who were considered eligible for selection as sample, were drivers of a motor vehicle (not motor cycle). The drivers held a valid driving license provided by the Driver Vehicle and Licensing Authority (DVLA), which is the authorized body responsible for issuing and regulating driver's licenses in Ghana. These participants who had driven a motor vehicle for at least three months prior to the time of the study became a criterion for participation. Risk perception is a function of the personality or individual (Burns & Wilde, 1995). The driver can perceive a risk either right or wrong, just as there are accident prone personalities (Greenwood & Woods, 1919). The three months criterion for participation in the study is just to serve the purpose of, the driver easily remembering actions that he or she took in a given driving situation as outlined in the Manchester Driving Behaviour Questionnaire in the survey instrument, more quickly. Drivers who did not meet this criterion were excluded from the study.

3.9 Research Ethics

Participants for this study were approached through a face – to – face interaction. Relevant explanation on the survey: its nature, purpose, procedure, and requirements were given in detail. Anonymity and confidentiality of the participants regarding the study were assured to participants. All these were achieved during the face – to – face interaction with research participants. Participants were given the mandate to decide whether or not to participate in the survey. After they decided to participate in the study, participants were also permitted to withdraw from the survey or refuse to respond to any of the survey questions, at will. There was no monetary or any form of reward for participation in the survey. It took an average of 40 minutes to complete a questionnaire.

In the questionnaire, there was no information that was asked regarding personal identity. However, participants were asked to consent their volunteerism by signing the consent form. Although generally there was no sensitive or privacy related question, if participants felt some questions were not appropriate to answer, they had the right not to answer or draw out as they were told as part of the consent agreement. All the responses to questionnaire items of the participants have been kept confidential. Such responses have only been used for the analysis of this study. Thus, all participants and their responses are anonymous.

CHAPTER FOUR

RESULTS

4.0 Introduction

This section of the study is the presentation of the research findings including hypotheses testing. The study was aimed at finding out the relationship among Risk Perception, Risk-taking attitude and Risky Driving Behaviour among drivers. It further explored the moderating effects of demographic factors (including age, gender, education level, vehicle type operated and experience) on the relationship between Risk Perception and Risky Driving Behaviours. The entire data analyses were performed using the Statistical Package for the Social Sciences (SPSS). Data for the current study were gathered from self-reported surveys of sampled drivers from three major regional capitals in Ghana. Analyses were based on a screened data of 529 out of the about 700 questionnaires distributed. The analysis is in two main parts namely; preliminary analysis and hypotheses testing. Preliminary analysis which is the first part deals with summaries of the entire data into an interpretable form. Thus descriptive analyses are presented in preliminary analyses followed by statistical tests of the hypotheses proposed in the second part.

4.1 Preliminary Analysis

Preliminary analyses including descriptive statistics and tests of normality are conducted to check whether the assumptions for the use of parametric statistical tests are met. Parametric tests were mainly used for the analyses of the research data in the present study. Parametric tests make assumptions about ratio or interval scale of measurement, normality of distribution, homogeneity of variances and independent errors or residuals (Creswell, 2005). These assumptions ensure that the samples used in a study have the same characteristics as the population of concern. They consequently place constraints on the interpretation of research findings and strengthen

inferences drawn about the population on the basis of samples. The present study tested for normality and homogeneity. Test for normality using skewness and kurtosis was within the acceptable range of ±2 (Tabachnick & Fidell, 2001) for Risk Perception and its subscales (except the 'concern' component), Risk-taking attitude and its subscales and the main dependent or criterion variable, Risky Driving Behaviour (see table 2 below). These variables were analysed without any transformation because parametric tests are robust to minimal violations of these assumptions.

The first part of the preliminary analysis was frequencies of the demographic characteristics of the entire sample followed by the descriptive statistics. The result of this analysis is represented in Table 1. The researcher went on to determine some descriptives of the scales used in the study.

Table 2

Summary of Descriptive Statistics, Skewness, Kurtosis and Reliability Indices of the Key Variables in the Study (N=529)

Variables	**Mean**	**SD**	**Skewness**	**Kurtosis**	**Alpha (α)**	**Min**	**Max**
Risk Perception	**24.47**	**7.90**	**1.44**	**.84**	**.93**	**16.00**	**43.00**
Worry and insecurity	10.58	2.85	1.29	.88	.83	6.00	18.00
Likelihood of crash	10.83	3.85	.82	-.19	.85	5.00	19.00
Concern	3.06	1.86	2.00	2.51	.93	2.00	8.00
Risk-taking attitude	**44.98**	**7.74**	**1.27**	**.96**	**.79**	**32.00**	**63.00**
Rule violation &speeding	30.01	6.73	1.05	.99	.87	19.00	47.00
Careless others	9.88	1.27	-.36	.35	.84	5.00	13.00
Drinking and driving	5.09	1.93	.43	-.66	.85	3.00	9.00
Risky Driving Behaviour	**78.95**	**17.55**	**-1.73**	**1.40**	**.93**	**36.00**	**94.00**

From Table 2, average scores for the key variables are worth noting. With a maximum score of 50 for Risk Perception, average sample or participant score of 24.47 (SD = 7.90) indicates that

not too many drivers surveyed have high Risk Perception. Probably, it is just a little below 50% of them that have high Risk Perception. Also, an average sample or participant score of 44.98 (SD = 7.74) out of a maximum of 80 was obtained for the risk-taking attitude, which indicates that a little more than half of the sample surveyed had a positive attitude to risk. Furthermore, an average of 78.95 out of a total scale score of 135 for the outcome variable Risky Driving Behaviour shows that more drivers surveyed engaged in Risky Driving Behaviour than those that do not.

The final step in the preliminary analysis was the computation of Pearson Product Moment Correlations Coefficient (r) among demographic and key continuous study variables. This is in line with the assumption that at least there should be a relationship between the predictor and criterion variable before moderation analysis can be performed (Field, 2005).

Table 3
Correlation Matrix for key study variables

Variables	**Risk Perception**	**Risk-taking attitude**	**RDB**
Age	.13**	.12**	-.14**
Educational level	-.25**	-.31**	.27**
No. of years driving	-.31**	-.30**	.29**
Distance covered	.35**	.29**	-.26**
Type of vehicle	.57**	.57**	.56**
Worry and Insecurity	.92**	.93**	-.87**
Likelihood of Crash	.95**	.76**	-.87**
Concern	.88**	.81**	-.83**
Rule violation & Speeding	.85**	.98**	-.83**
Careless Others	-.22**	.04	.08**
Drinking & Driving	.80**	.59**	-.69**
Risk Perception	-	.90**	-.94**
Risk-taking Attitude	-	-	-.88**
Risky Driving Behaviour	-	-	-

*** = p< .01, age, no. of years driving and distance covered (numeric), gender (0=female, 1=male), educational level (below SSSCE/SHS/MSLC=0, above SSSCE/SHS/MSLC=1), type of vehicle (commercial/occupational=0, private=1)*

From the correlation matrix table (table 3), the correlation coefficient between any two research variables was statistically significant. Age did significantly relate positively with Risk Perception (r = .13, p<.01) and Risk-taking attitude (r = .21, p<.01) but negatively with Risky Driving Behaviour (r = -.14, p<.01), although the relationships were very weak in strength. Thus, with increasing age, Risk Perception also increases and risk-taking attitude becomes positive or favourable and this consequently reduces Risky Driving Behaviour. Gender however related negatively with Risk Perception (r = -.36, p<.01) and risk-taking attitude (r = -.39, p<.01) but positively with Risky Driving Behaviour (r = .37, p<.01). This implied that compared with females, males had lower Risk Perception with a negative attitude to risk-taking but had higher Risky Driving Behaviour. Interesting results were obtained for educational level and number of driving years (experience). Educational level as well as number of years driving also related negatively with Risk Perception and Risk-taking attitude but positively with Risky Driving Behaviour. The strengths of these relationships were moderate and implied that higher level of education and longer years of driving reduced Risk Perception and Risk-taking attitude but increased Risky Driving Behaviour. On the other hand, distance covered and type of vehicle positively related with Risk Perception and Risk-taking attitude but negatively with Risky Driving Behaviour. This implied that the more distance covered by a driver, the higher their Risk Perception and a positive risk-taking attitude and hence the lower their Risky Driving Behaviour. Compared with commercial vehicle, private vehicle drivers had higher Risk Perception and a more positive risk-taking attitude but lower Risky Driving Behaviour. Risk Perception strongly related positively and significantly with Risk-taking attitude (r = .90, p<.01); indicating that the higher the drivers perceived risk, the more their risk-taking attitude improves or becomes positive. Risk Perception (r = -.94, p<.01) and Risk-taking attitude (r = -.88, p<.01) however

related negatively with Risky Driving Behaviour. The strengths of the relationships were very strong, implying that higher Risk Perception and positive Risk-taking attitude significantly reduced Risky Driving Behaviour.

4.2 Hypothesis Testing

The study sought to investigate how Risk Perception–Risky Driving Behaviour relationship is strengthened or weakened by the intervening variables such as demographic variables. Hypotheses one and two were tested using hierarchical regression in order to find out whether Risk Perception on one hand and Risk-taking attitude on the other, predicted Risky Driving Behaviour significantly, controlling for demographic variables. Hypothesis three was analyzed using zero order correlation (Pearson r) (see Table 3). Hypotheses four and five tested the moderating effect of risk-taking attitude and demographic factors and hence hierarchical moderated regression was conducted using Baron and Kenny's (1986) procedures. Hypothesis six compared commercial drivers and private drivers on Risky Driving Behaviour and therefore, the Independent Samples t-test was used. The final hypothesis proposed the interaction effect of gender and age on Risky Driving Behaviour and the two-way ANOVA was employed.

Hypothesis One

The first hypothesis explored the extent to which Risk Perception predicted Risky Driving Behaviour. This was done to find out the variance accounted for by Risk Perception in Risky Driving Behaviour, controlling for the effects of age, gender, level of education, number of years driving, distance covered and type of vehicle. It was stated as follows:

1: *Risk Perception would significantly predict Risky Driving Behaviour; thus Risk Perception would account for a significant variance in Risky Driving Behaviour over and above the effects of socio-demographic factors*

The results are presented in Table 4

Table 4
Results of Hierarchical Multiple Regression Analysis on the relationship between Risk Perception and Risky Driving Behaviour.

		Unstandardized coefficient		Standardized coefficient				
		B	**SE**	**Beta (β)**	**p**	**F**	**R^2**	**ΔR^2**
1					.00	47.34*	.35	
	Constant	84.23	10.71					
	Age	-2.41	.86	-.10*				
	Gender	5.64	2.31	.14*				
	Educational level	1.20	2.48	.03				
	Experience of driving	.49	1.80	.01				
	Distance covered	.62	3.56	.02				
	Type of vehicle	-17.48	1.45	-.49*				
2					.00	547.33*	.88	.53
	Constant	126.09	4.69					
	Age	-.42	.37	-.02				
	Gender	-.07	1.00	-.00				
	Educational level	2.45	1.07	.07				
	Experience of driving	-.37	1.64	-.01				
	Distance covered	1.68	1.53	.05				
	Type of vehicle	-2.01	.70	-.06*				
	Risk Perception	-2.01	.04	-.90*				

*Adjusted R^2 = .35, .88 for steps 1 and 2, =*p< .001, age, experience of driving (numeric), gender (0=female, 1=male), educational level (below SSSCE=0, above SSSCE=1), type of vehicle (commercial/occupational=0, private=1)*

Table 4 shows that the demographic variables in step one combine to significantly influence Risky Driving Behaviour *[$F_{(6, 528)}$ = 47.34, p = .000]*. However, having controlled for their effects, Risk Perception significantly predicted Risky Driving Behaviour over and above the demographic factors R^2 change = .53, F change (1, 521) = 2297.50, p=000. Thus, the unique contribution of Risk Perception was significant(β= -.90, p=.000), explaining about 53% of the

variance in Risky Driving Behaviour over and above the 35% of the variance accounted for by all the demographic factors put together. This confirms the first hypothesis which stated that 'Risk Perception would significantly predict Risky Driving Behaviour'. It implied that without the effect of demographic variables, Risk Perception alone reduces Risky Driving Behaviour to a greater degree.

Hypothesis Two

The second hypothesis investigated the extent to which Risk-taking attitude predicted Risky Driving Behaviour. It was also done to determine the variance accounted for by Risk-taking attitude in Risky Driving Behaviour, controlling socio-demographic factors. It was stated as:

2: *Risk-taking attitude would significantly predict Risky Driving Behaviour; i.e. Risk-taking attitude would account for a significant variance in Risky Driving Behaviour over and above the effects of socio-demographic factors*

The results are presented in Table 5

Table 5

Results of Hierarchical Multiple Regression Analysis on the relationship between Risk-Taking Attitude and Risky Driving Behaviour.

	Unstandardized coefficient		Standardized coefficient				
	B	**SE**	**Beta (β)**	**p**	**F**	**R^2**	**ΔR^2**
1				.00	47.34*	.35	
Constant	84.23	10.71					
Age	-2.41	.86	-.10*				
Gender	5.64	2.31	.14*				
Educational level	1.20	2.48	.03				
Experience of driving	.49	1.80	.01				
Distance covered	.62	3.56	.02				
Type of vehicle	-17.48	1.45	-.49*				
2				.00	265.60*	.78	.43
Constant	154.02	6.61					
Age	-.76	.51	-.03				
Gender	2.08	1.35	.05				
Educational level	-2.69	1.45	-.07				
Experience of driving	4.56	2.22	.13*				
Distance covered	3.40	2.07	.10				
Type of vehicle	-2.46	.97	-.07*				
Risk-taking Attitude	-1.87	.06	-.83*				

*Adjusted R^2 = .35, .78 for steps 1 and 2, = *p< .001, age, experience of driving (numeric), gender (0=female, 1=male), educational level (below SSSCE=0, above SSSCE=1), type of vehicle (commercial/occupational=0, private=1)*

The table (Table 6) which sought to examine the extent to which risk-taking attitude predicted Risky Driving Behaviour revealed that having controlled for the effects of socio-demographic factors, Risk-taking Attitude significantly predicted Risky Driving Behaviour over and above their effects R^2 change = .43, F change (1, 521) = 2297.50, p=000. The unique contribution of Risk-taking Attitude alone was significant (β=-.83, p=.000), explaining about 43% of the variance in Risky Driving Behaviour over and above the 35% of the variance accounted for by all the demographic factors. This implies that risk-taking attitude by drivers alone; irrespective of the driver's age, gender, experience in driving, type of vehicle, distance covered, and educational level, accounted for a significant reduction in Risky Driving Behaviour. Therefore, the second

hypothesis which stated that 'Risk-taking attitude would significantly predict Risky Driving Behaviour' was supported by the data.

Hypothesis Three

The third hypothesis explored relationship between Risk Perception and-Risk-taking attitude. It was stated that:

3: *There would be a significant positive relationship between Risk Perception and Risk-taking Attitude.*

From the correlation matrix table (Table 3), the correlation between Risk Perception and Risk-taking attitude was statistically significant (r = .90, p<.01). The strength of the relation is very strong implying that drivers who have higher Risk Perception tended to also have a positive or favorable Risk-taking attitude. Therefore, the hypothesis as stated above was supported.

4.2 Moderation Effects of Risk-taking attitude and Socio-demographic Factors on the Risk Perception-Risky Driving Behaviour Relationship

The study further explored moderation effects of Risk-taking attitude and some socio-demographic factors that met the assumptions of Baron and Kenny's (1986) moderation analysis. Risk-taking attitude, age, gender, educational level and experience in driving and type of vehicle met the criteria for moderation analysis. The procedures proposed for moderation analysis are that firstly, the independent and moderator variables were centered or standardized using the standardization procedures by Aiken and West (1991). Standardisation is a linear transformation method which eliminates problems associated with multi-collinearity and it is achieved by subtracting the mean value for a variable from each score for that variable (Dawson, 2013). Next,

the interaction terms were created. This was performed by multiplying the centered independent and moderator variables. However, for socio-demographic factors which were dummy coded, there was no need to center them. In a hierarchical regression analysis, centered Risk Perception was entered in the first step, the main Risk-taking attitude and socio-demographic factors acting as moderators were entered in the second step and the interaction terms of Risk Perception and Risk-taking attitude and socio-demographic factors were entered in the third and final step. When a significant effect is obtained in the third step, then there is a significant moderation effect. Results are presented corresponding to each of the factors acting as moderators. The hypotheses were generally stated as:

4: *Risk-taking attitude would moderate the relationship between Risk Perception and Risky Driving Behaviour; so that higher Risk Perception would reduce Risky Driving Behaviour more for drivers who have a positive attitude towards risk-taking than for those who have a negative attitude towards risk-taking.*

5: *Socio-demographic variables (Age, gender, educational level, experience and vehicle type operated) would moderate the relationship between Risk Perception and Risky Driving Behaviour*

Analysis for the fourth hypothesis is presented in Table 6.

Table 6
Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Risk-taking attitude of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception	-91**	.88		-48.24	.00
Step 2					
Risk Perception	-.77**			-21.73	.00
Risk-taking attitude	-.16**	.88	.01**	-4.52	.00
Step 3					
Risk Perception	-.52**			-15.47	.00
Risk-taking attitude	.06ns			1.86	.06
Risk Perception × Risk-taking attitude	-.45**	.92	.04**	-15.20	.001**

[a] n = 529; ** $p < .001$; ns = not significant
[b] Control variables (age, gender, level of educ., driving experience, type of vehicle)

As indicated in previous results, Risk Perception and Risk-taking attitude significantly predicted Risky Driving Behaviour. This hypothesis was intended to find out whether Risk-taking attitude will interact with Risk Perception to influence Risky Driving Behaviour. From Table 6 above, the moderating effect of Risk-taking attitude on the relationship between Risk Perception and Risky Driving Behaviour was significant (t= -15.20, p<.001). Thus, a significant moderation occurred as the effect of Risk Perception on Risky Driving Behaviour reduced more significantly with the addition of the moderator factor, Risk-taking attitude. The moderation model explained about 4% of the variance in Risky Driving Behaviour. Thus, as predicted the decreasing effect of Risk Perception on Risky Driving Behaviour is dependent on whether the driver has high, moderate or low Risk-taking attitude. Risk-taking attitude plays a buffering role (where increasing the moderator would decrease the effect of the predictor on the outcome) in the relationship between Risk Perception and Risky Driving Behaviour. The graph in Figure 5 indicates that lower risk driving behaviour is associated with higher Risk Perception under

conditions of a positive Risk-taking attitude whereas higher risk driving behaviour is associated with lower Risk Perception under conditions of a negative attitude to risk-taking. Therefore, the hypothesis that '*Risk-taking attitude would moderate the relationship between Risk Perception and Risky Driving Behaviour'* was supported.

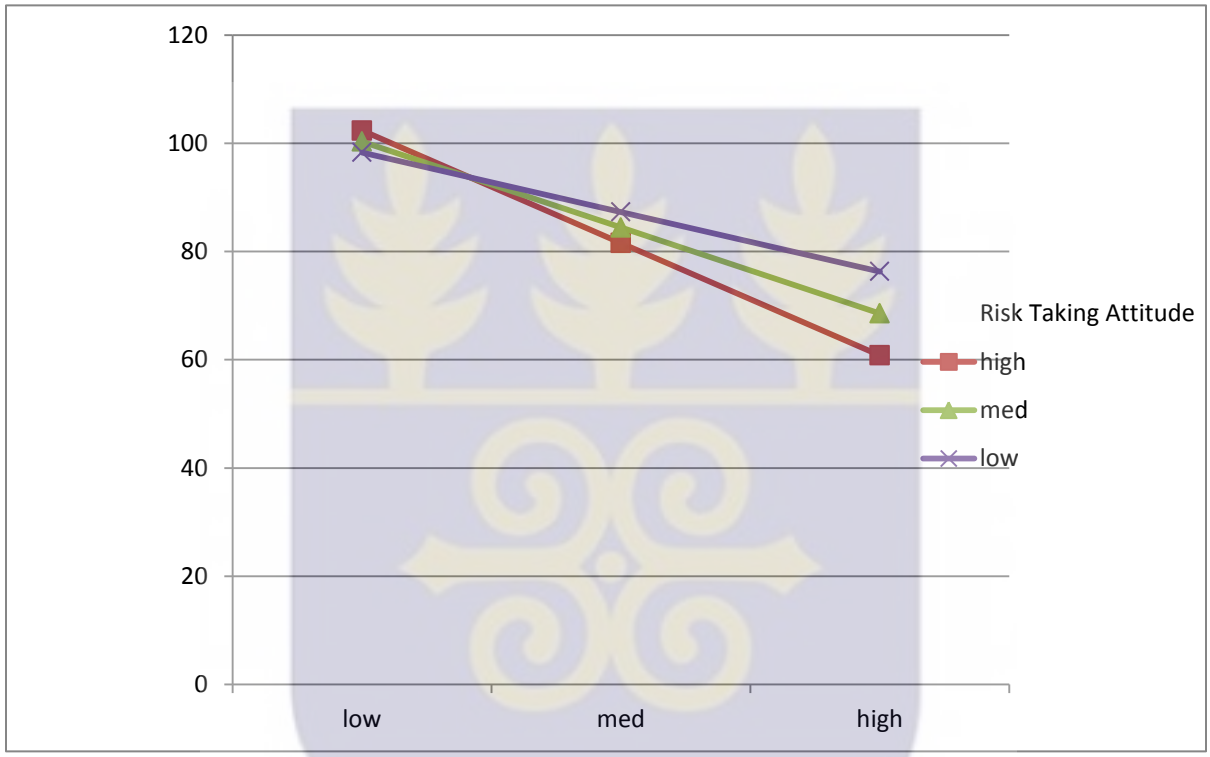


Figure 5: Moderation Graph for Risk-taking attitude

The first demographic factor explored as a moderator variable on the relationship between Risk Perception and Risky Driving Behaviour was age. It was predicted that Risk Perception would reduce Risky Driving Behaviour more significantly for older drivers than for younger drivers. The result of this analysis is presented in Table 7.

Table 7
Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Age of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception[b]	-.94**	.88		-60.94	.00
Step 2					
Risk Perception	-.94**			-60.86	.00
Age[c]	.00ns	.88	.00ns	.27	.79
Step 3					
Risk Perception	-.90**			-20.43	.00
Age	.01ns			.35	.73
Risk Perception × Age	-.04ns	.88	.00ns	-.83	.41

[a] n = 529; ** $p < .001$; ns = not significant
[b] Independent variable (Risk Perception)
[c] Age (numeric i.e. 1=18-30yrs, 2=31-50yrs and 3=51yrs and above)

The results presented in Table 6 indicated no significant interaction term for Risk Perception and age on Risky Driving Behaviour (t = -.83, p= .41). Therefore, no moderation occurred as the effect of Risk Perception on Risky Driving Behaviour did not reduce any more significantly with the addition of the moderator factor, age. In effect, the moderation model did not explain any variance in Risky Driving Behaviour. It was expected that increasing age would interact with Risk Perception to reduce Risky Driving Behaviour. The implication is that age does not contribute significantly to reduced Risky Driving Behaviour. Therefore, the hypothesis that '*Age would significantly moderate the relationship between Risk Perception and Risky Driving Behaviour* was not supported.

The moderating effect of gender on the Risk Perception-Risky Driving Behaviour was investigated. It was expected that Risk Perception would reduce risky behaviour differently for male and female drivers. The following table summarizes the moderating effect of gender.

Table 8
Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Gender of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception[b]	-.94**	.88		-60.94	.00
Step 2					
Risk Perception	-.92**			-56.32	.00
Gender[c]	.04**	.88	.001**	2.19	.03
Step 3					
Risk Perception	-.80**			-15.97	.00
Gender	.03ns			1.69	.09
Risk Perception × Gender	-.13**	.88	.001**	-2.50	.01**

[a] n = 529; ** $p < .001$; ns = not significant
[b] Independent variable (Risk Perception)
[c] Gender (dummy i.e. 1=male, 0=female)

The result in Table 8 shows the moderating effect of gender. The analysis indicated a significant interaction term for Risk Perception and Gender on Risky Driving Behaviour (t = -2.50, p=.013). Therefore, a significant moderation occurred as the effect of Risk Perception on Risky Driving Behaviour reduced more significantly with the addition of the moderator factor, gender. In effect, the moderation model explained a significant variance in Risky Driving Behaviour (1%). Thus as predicted, the decreasing effect of Risk Perception on Risky Driving Behaviour is dependent on whether the driver is a male or female. Gender plays a buffering role (where increasing the moderator would decrease the effect of the predictor on the outcome) in the relationship between Risk Perception and Risky Driving Behaviour. Thus compared with females, males with higher Risk Perception appeared to have higher Risky Driving Behaviour. This supports the nature of the interaction that the negative effect of Risk Perception on Risky Driving Behaviour was stronger for females than for males (see Figure 1). Simply put, female drivers compared with

male drivers had lower Risky Driving Behaviour as their Risk Perception also increase. Therefore, the hypothesis that '*Gender would significantly moderate the relationship between Risk Perception and Risky Driving Behaviour'* was supported.

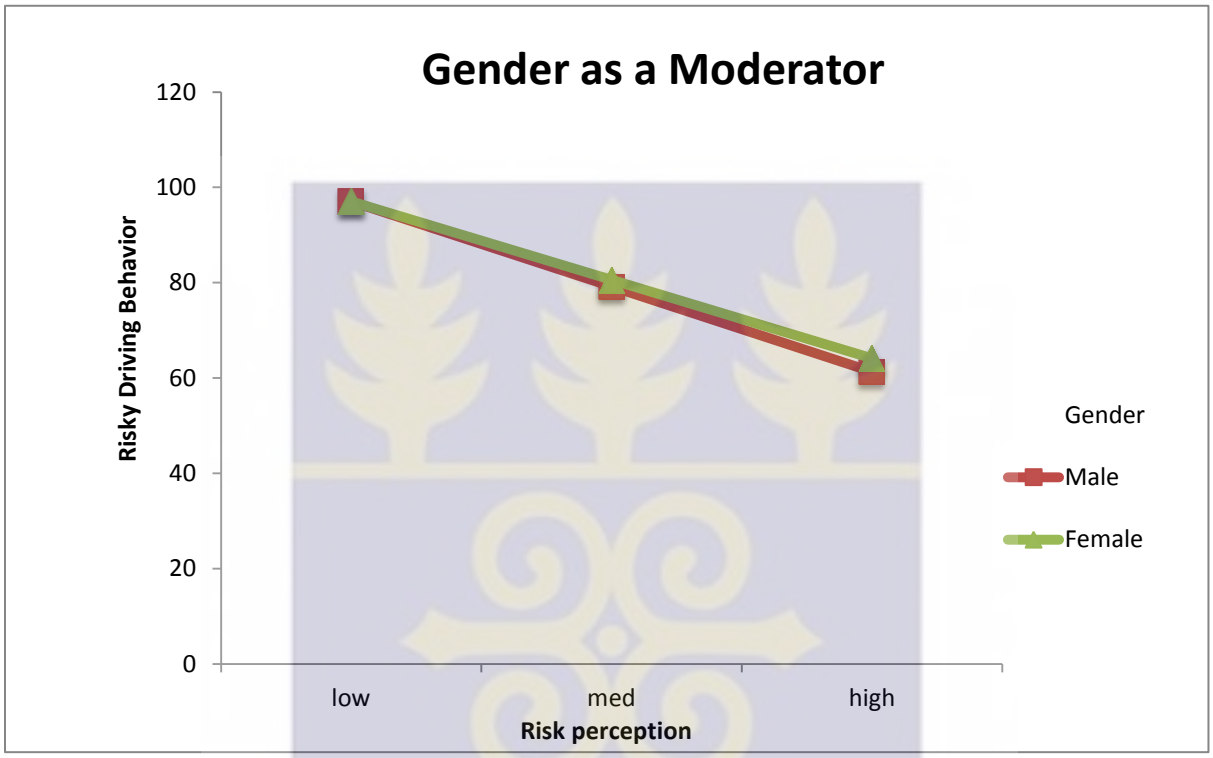


Figure 6: Moderation Graph for Gender

The next demographic factor explored as a moderator is educational level of the driver. It was predicted that the level of education of the driver would moderate between Risk Perception and Risky Driving Behaviour. Results are in Table 8:

Table 9

Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Educational level of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception[b]	-.94**	.88		-60.94	.00
Step 2					
Risk Perception	-.93**			-58.70	.00
Educational level[c]	.04**	.88	.001ns	2.24	.03
Step 3					
Risk Perception	-.84**			-16.75	.00
Age	.03**			2.09	.04
Risk Perception × Educ.Level	-.09ns	.88	.001ns	-1.88	.061

[a] n = 529; ** $p < .001$; ns = not significant
[b] Independent variable (Risk Perception)
[c] Educational level (dummy i.e. 1=above SSSCE, 0=below SSSCE)

The results presented above indicated no significant interaction term for Risk Perception and educational level on Risky Driving Behaviour (t= -1.88, p=.061). Therefore, no moderation occurred as the effect of Risk Perception on Risky Driving Behaviour did not reduce any more significantly with the addition of educational level. In effect, the moderation model did not explain any significant variance in Risky Driving Behaviour (1%). It was expected that level of education would interact with Risk Perception to reduce Risky Driving Behaviour; so that drivers with higher level of education would have lower Risky Driving Behaviour than those with lower level of education. The implication is that educational level does not contribute significantly to reducing Risky Driving Behaviour for the drivers sampled. Therefore, the hypothesis that '*Educational level would significantly moderate the relationship between Risk Perception and Risky Driving Behaviour* was not supported.

The other moderating factor explored was experience in driving. It was proposed that experience of the driver would moderate between Risk Perception and Risky Driving Behaviour.

Table 10
Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Experience of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception[b]	-.94**	.88		-60.94	.00
Step 2					
Risk Perception	-.92**			-57.91	.00
Experience[c]	.00ns	.88	.000**	.10	.92
Step 3					
Risk Perception	-.79**			-12.37	.00
Experience	.01ns			.50	.62
Risk Perception × Experience	-.15**	.88	.001**	-2.44	.015

[a] n = 529; ** $p < .001$; ns = not significant
[b] Independent variable (Risk Perception)
[c] Experience (numeric i.e. 1=5yrs & below and 2= above 5yrs)

The results in Table 10 to explore the moderating effect of experience of driver indicated a significant interaction term for Risk Perception and experience on Risky Driving Behaviour (t= -2.44, p=.015). Therefore, a significant moderation occurred as the effect of Risk Perception on Risky Driving Behaviour reduced more significantly with the addition of experience of the driver. In effect, the moderation model explained a significant variance (although a weak variance of effect is observed) in Risky Driving Behaviour (1%). Thus as predicted, the decreasing effect of Risk Perception on Risky Driving Behaviour is dependent on whether the driver longer or shorter experience in driving. Experience in driving plays a buffering role (where increasing the moderator would decrease the effect of the predictor on the outcome) in the relationship between Risk Perception and Risky Driving Behaviour. Thus compared with

drivers with long experience, drivers with short experience and higher Risk Perception appeared to have lower Risky Driving Behaviour. This supports the interaction that the negative effect of Risk Perception on Risky Driving Behaviour was stronger for drivers with short experience than those with longer experience (see Figure 7). Simply put, drivers with short experience compared with drivers with long experience had lower Risky Driving Behaviour as their Risk Perception also increased. Therefore, the hypothesis that '*Experience of driver would significantly moderate the relationship between Risk Perception and Risky Driving Behaviour* was supported.

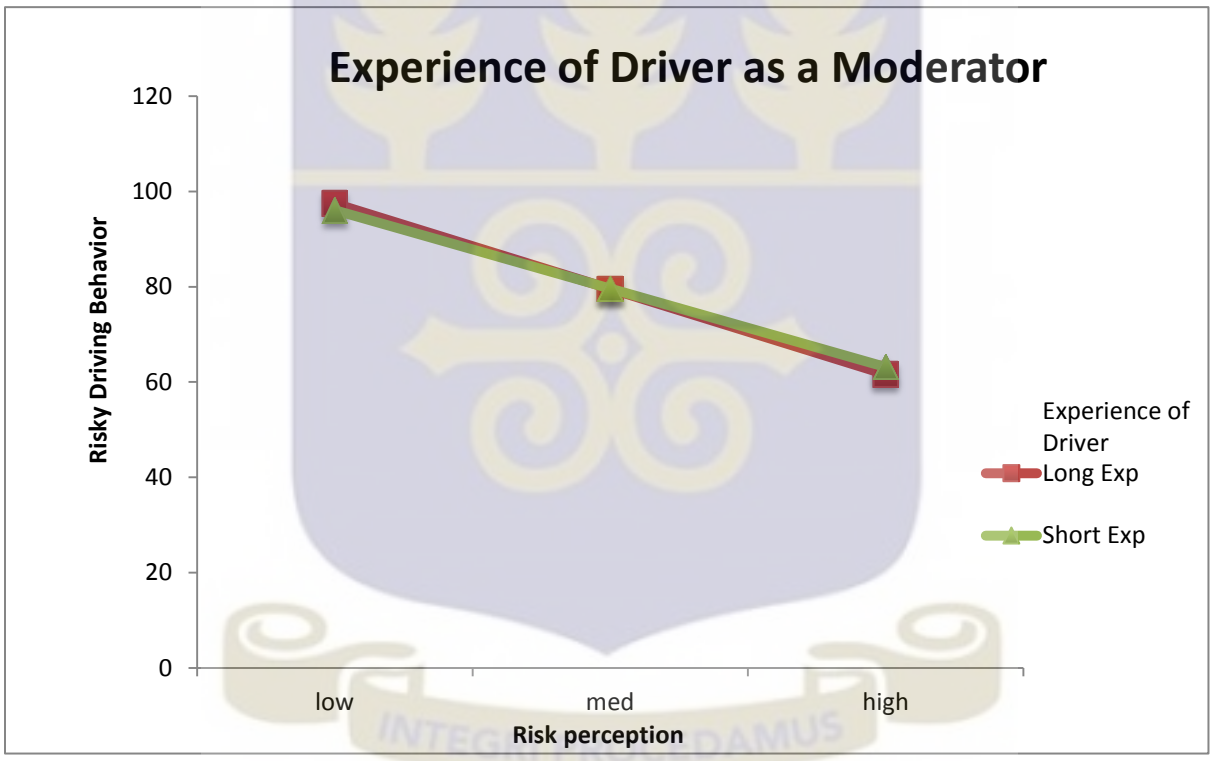


Figure 7: Moderation Graph for Experience of Driver

The next demographic factor explored was type of vehicle. It was predicted that type of vehicle would moderate between Risk Perception and Risky Driving Behaviour. Results are presented in Table 11.

Table 11
Results of Moderator Regression Analyses for Risky Driving Behaviour as a Function of Risk Perception and Type of Vehicle of Driver[a]

	Risky Driving Behaviour				
Predictors	***β***	***R^2***	***ΔR^2***	***t***	***p***
Moderator analyses					
Step 1					
Risk Perception[b]	-.94**	.88		-60.94	.00
Step 2					
Risk Perception	-.91**			-49.01	.00
Type of vehicle[c]	.05**	.88	.002**	-2.67	.01**
Step 3					
Risk Perception	-1.61**			-31.56	.00**
Type of Vehicle	-.14**			-8.22	.00**
Risk Percep × Vehicle	.78**	.91	.035**	14.50	.000

[a] n = 529; ** $p < .001$; [ns] = not significant
[b] Independent variable (Risk Perception)
[c] Vehicle (dummy i.e. 1=private and 0= commercial)

The moderating effect of type of vehicle was significant (t= 14.50, p=.000). It showed that as the effect of Risk Perception on Risky Driving Behaviour reduced, the addition of type of vehicle rather increased Risky Driving Behaviour. Thus type of vehicle plays an enhancing role in the relationship between Risk Perception and Risky Driving Behaviour (i.e. where increasing the moderator would increase the effect of the predictor on the outcome). In effect, the moderation model explained a significant variance in Risky Driving Behaviour (35%). Thus as predicted, the decreasing effect of Risk Perception on Risky Driving Behaviour is dependent on whether the vehicle is a private or commercial one. Thus, compared with commercial vehicles, drivers with private vehicles with higher Risk Perception tended to have lower Risky Driving Behaviour whereas drivers with commercial vehicles had higher Risky Driving Behaviour as their Risk Perception also increase. This supports the interaction that the negative effect of Risk Perception on Risky Driving Behaviour was stronger for drivers with commercial vehicle than those with private vehicles (see Fig. 8). Therefore, the hypothesis that '*Type of vehicle would significantly*

moderate the relationship between Risk Perception and Risky Driving Behaviour was supported.

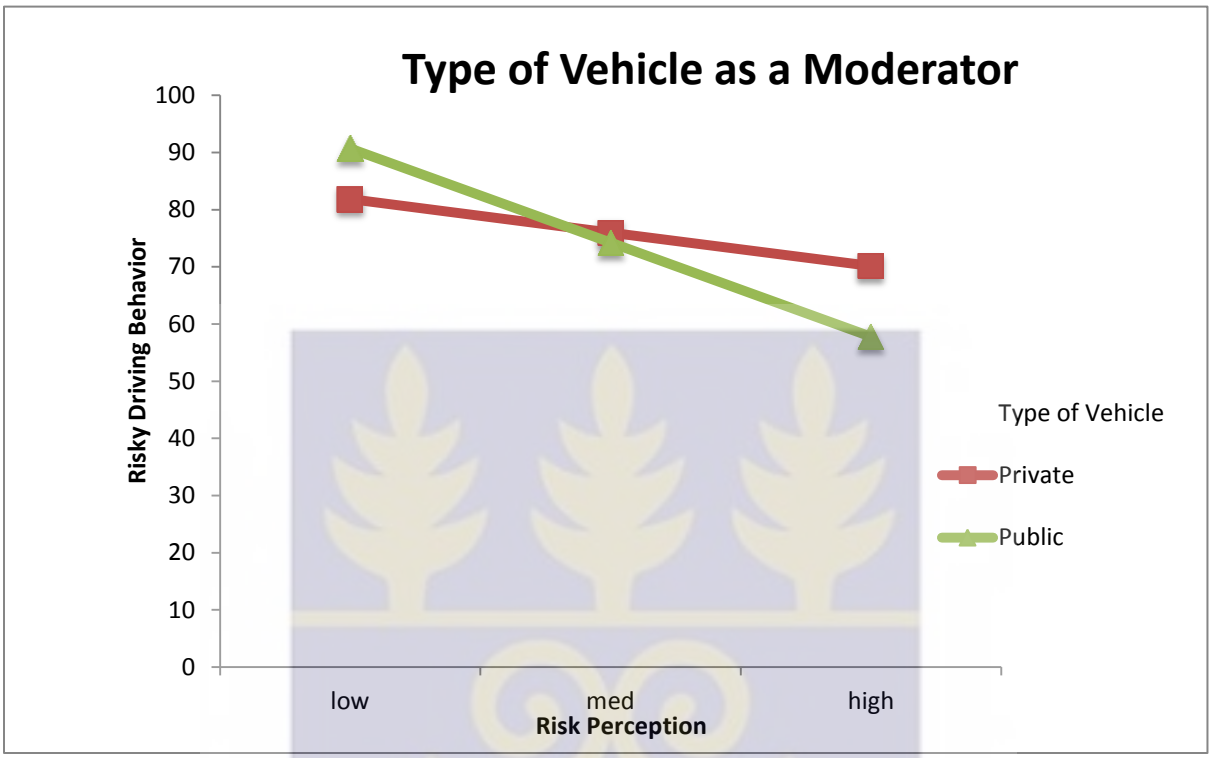


Figure 8: Moderation Graph for Type of Vehicle

Overall, the hypothesis that '*Socio-demographic variables (including age, gender educational level, experience and vehicle type operated) will moderate the relationship between risk perception and risky driving behaviour',* was partially supported. Only gender, experience and vehicle type operated moderated the relationship between Risk Perception and Risky Driving Behaviour. Age and educational level did not have any effect on the relationship.

Hypothesis six

Hypothesis six examined the influence of type of vehicle on Risky Driving Behaviour. It was stated that:

6: *Commercial vehicle drivers would exhibit higher Risky Driving Behaviour than private vehicle drivers.*

This hypothesis was tested using the Independent t-test. Table 11 is a summary of the results.

Table 12
Summary of Independent t-test showing the type of vehicle on Risky Driving Behaviour

Vehicle	**N**	**Mean**	**SD**	**df**	**t**	***p***
Commercial	300	87.58	5.21	527	15.66	.000
Private	229	67.64	21.24			

The t-test above was significant [$t_{(527)}$= *15.66, p<.001*]; indicating drivers with commercial vehicles (*M= 87.58, SD= 5.21*) had significantly higher Risky Driving Behaviours than drivers with private vehicles (*M= 67.64, SD= 21.24*). This implied that commercial drivers exhibit more risky behaviours than private vehicle drivers. Therefore, the hypothesis that 'Commercial vehicle drivers would exhibit higher Risky Driving Behaviour than private vehicle drivers' was supported by the data.

Hypothesis seven

The final hypothesis examined the interaction effect of gender and age on Risky Driving Behaviour (irrespective of other factors). It proposed that:

7: *Younger female drivers would exhibit less Risky Driving Behaviour than older male drivers*

Two-way ANOVA was used since gender and age are two independent variables whose influence is being measured on Risky Driving Behaviour. Age was re-categorized into two such that drivers between 18 to 30 years were considered younger drivers whiles those above 30 years were considered older drivers. This categorization was due to the fact that the researcher wanted a distinction between 'young' and 'old' drivers. Drivers below age 30 years were considered young because of the youthful exuberance exhibited most often during this period, whiles drivers above age 30 were considered old because youthful exuberance at these ages drops considerably. Results are presented in Tables 12 and 13 below:

Table 13
Summary of Means and Standard Deviations for Age and Gender on Risky Driving Behaviour

Age	***Gender***	***Mean***	***Std. Deviation***	***N***
Younger	Female	76.27	17.60	56
	Male	83.61	13.34	163
Older	Female	63.87	21.67	91
	Male	82.43	14.72	219
Total	Female	68.59	21.04	147
	Male	82.94	14.14	382

Table 14
A Summary of the 2-Way ANOVA for the effect of Age and Gender on Risky Driving Behaviour

Source	Sum of Squares	df	Mean Square	*F*	*p*	η^2
Age	4662.79	1	4662.79	18.09	.00	.03
Gender	16977.01	1	16977.01	65.86	.00	.11
Age x Gender	3183.24	1	3183.24	12.35	.00	.02
Error	135335.84	525	257.78			
Total	162640.72	528				

From the ANOVA table above, there was a main significant effect for age *[F (1, 528) =18.09, p<0.001]* with a small effect size of .03; indicating that younger drivers (*M*= 81.74, *SD*= 14.85) had higher Risky Driving Behaviour than older drivers (*M*= 76.98, *SD*= 19.01). This outcome confirms the strong negative correlation established between age and Risky Driving Behaviour in the previous correlation table. There was also a significant main effect for gender *[F (1, 528) = 65.86, p< 0.001]* with a medium effect size of .11; indicating that male drivers (*M*= 82.94, *SD*= 14.14) had higher Risky Driving Behaviour than female drivers (*M*= 68.59, *SD*= 21.04). This finding also is in support of the positive correlation between Gender and Risky Driving Behaviour; i.e. males having higher Risky Driving Behaviour than females. The interaction effect of age and gender was also statistically significant *[F (1, 528) =12.35, p < 0.001]*. It implied that older female drivers *(M*= 63.87, *SD*= 21.67*)* had lower Risky Driving Behaviour than younger male drivers *(M= 83.61, SD= 13.34).* Therefore, the last hypothesis stated that *'Older female drivers would exhibit less Risky Driving Behaviour than younger male drivers'* was supported by the data. Younger male drivers exhibited more Risky Driving Behaviours than older female drivers, irrespective of other factors.

In light of the results from the data analysis, a new model for the study was developed. This model is presented in figure 9.

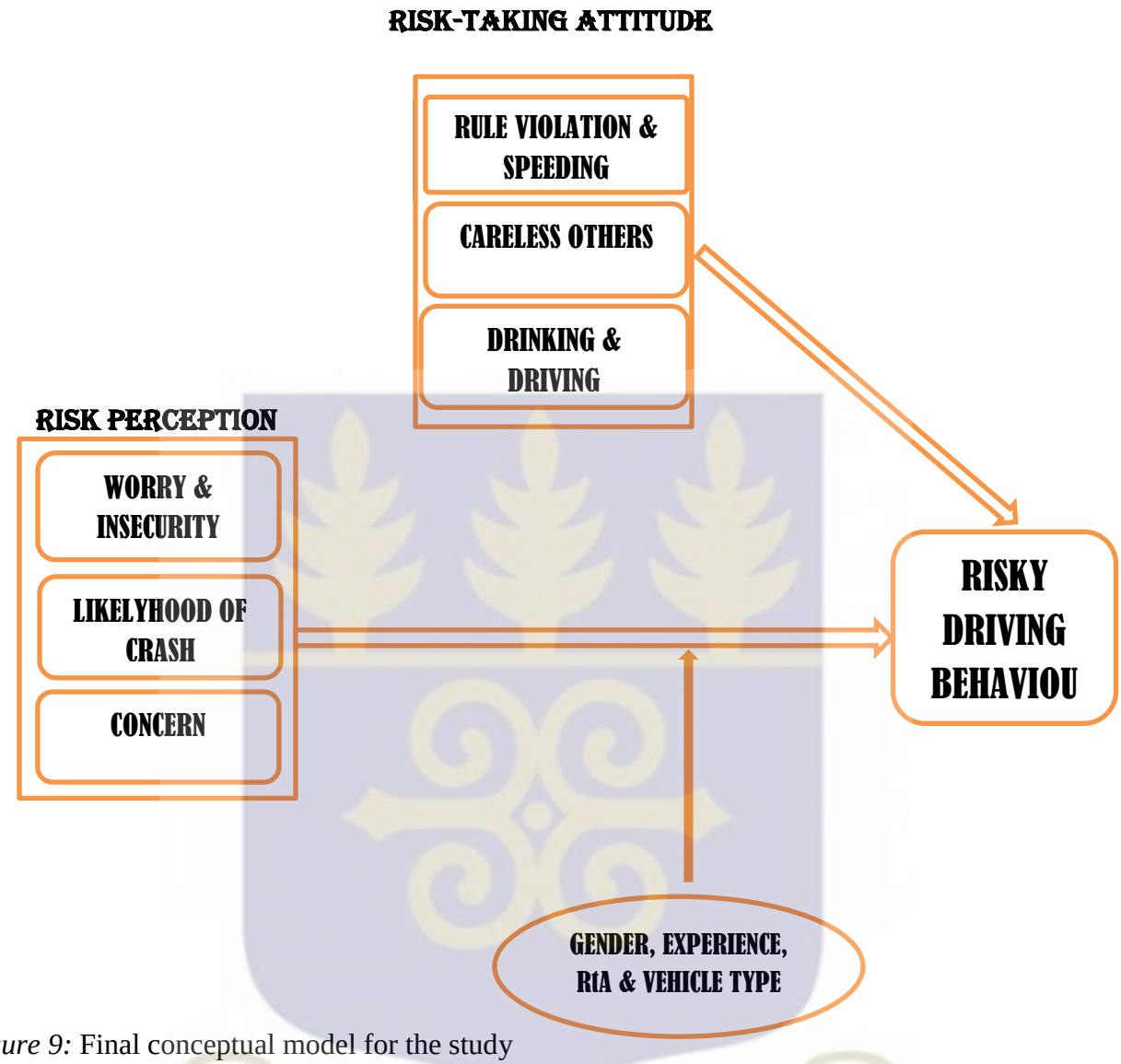


Figure 9: Final conceptual model for the study

4.3 Summary of Research Findings

Six main hypotheses were formulated and tested. The following findings were made:

- Risk Perception significantly decreased Risky Driving Behaviour over and above the effects of socio-demographic factors.
- Risk-taking attitude significantly decreased Risky Driving Behaviour over and above the effects of socio-demographic factors.

- Risk Perception related positively with Risk-taking attitude. That is drivers who had higher Risk Perception appeared to have more positive or lower Risk-taking attitude.
- Risk-taking attitude significantly moderated between Risk Perception and Risky Driving Behaviour in that higher Risk Perception reduced Risky Driving Behaviours under the conditions of higher Risk-taking attitude.
- Gender moderated between Risk Perception and Risky Driving Behaviour in that Risk Perception reduced Risky Driving Behaviours more for female drivers than for male drivers.
- Experience of driver also moderated between Risk Perception and Risky Driving Behaviour in that Risk Perception reduced Risky Driving Behaviours more for lowly experienced drivers than for highly experienced drivers.
- Type of vehicle also moderated between Risk Perception and Risky Driving Behaviour in that Risk Perception reduced Risky Driving Behaviours more for private drivers than for commercial drivers.
- The moderating effect of age and educational level on the Risk Perception-Risky Driving Behaviour relationship was not significant
- Commercial vehicle drivers exhibited higher Risky Driving Behaviour than private vehicle drivers.
- Older female drivers exhibited lower Risky Driving Behaviour than younger male drivers. Inversely, younger male drivers exhibited more Risky Driving Behaviours than older female drivers.

CHAPTER FIVE

DISCUSSION RECOMMENDATIONS AND CONCLUSIONS

5.0 Introduction

This chapter provides a summary of the research and conclusions drawn from the results obtained from the study. The themes covered in this section include Research Summary, Discussion of Results, Implications for Road Safety, Recommendations for Future Research Conclusions and Limitations of the Study.

5.1 Research Summary

The study used a non-experimental, cross-sectional and a survey design to examine relationships between two personality characteristics: Risk Perception (RP) and Risk-taking Attitude (RtA) on Risky Driving Behaviours (RDB) among the sampled drivers in Ghana. This design permitted the examination of the strength and direction of relationships among these variables and provided a better predictive understanding of the relationships among the variables (Chinn, 2006; Brown, 1992). This can offer a basis for future studies, as well as the development of research-based programs, interventions and policy. In doing so quantitative data collection techniques was applied to get as much information as is possible to find these associations and predictions (Babbie, 2010). A sample of 529 licensed drivers from three regional capitals whose regions have the highest number of accident cases in Ghana completed the questionnaires comprising three scales of RP, RtA and RDB.

The primary purpose of this study was to examine the relationships between RP, RtA and RDB using self-reported driving behaviours. The study wanted in particular, to examine the significant

variance in RDB as explained or caused by drivers' RP and RtA. Further, the study examined the moderating effects of some demographic variable (including age, gender, educational level, experience and vehicle type operated) on the relationship between RP and RDB.

5.2 Discussion of Results

The results of this study support past researches, demonstrating a clear association between the two personality characteristics of RP and RtA, and self-reported driving behaviour (Iversen & Rundmo, 2002; Sümer, 2003).

Risk Perception (RP) and Risky Driving Behaviour (RDB)

Risk Perception had a statistically significant negative relationship (r = -.94) with Risky Driving Behaviours. The negative relationship observed between risk perceptions and risky driving behaviour was very strong (Kline, 1998). The beta value, for the relationship between RP and RDB as seen in table 4, shows a strong negative relationship between RP and RDB. This relationship suggests that drivers or persons exhibiting low RP or perceives a particular road traffic risk to be low, will most likely engage in more risky driving behaviours. The study further revealed that controlling for the effect of all demographic variables, RP accounted for 53 % variance in RDB. This result of lowered risk perception and higher risky driving as well as the predictive influence of RP on RDB is consistent with previous research that suggests that young drivers for example do engage or indulge in risky driving behaviours due to their lower perceived risks of being involved in a crash (Deery, 1999; Finn & Bragg, 1986; Mathews & Moran, 1986; Williams 2003).

All the dimensions of RP were found to have this negative relationship to risky behaviour. Just as the other significant scale relates negatively to risk perception, 'Concern' for example has been reported that it made a significant contribution to the prediction of risky driving behaviour (McKenna & Horswill, 2006). This finding shows that drivers who lack concern for other road users including passengers and other drivers in road traffic risks and injuries tend to engage in driving behaviours, with consequences of crashes or accidents. Hence, this study suggests that more attention should be paid to the risk perception scale or the factors that make up the dimensions of 'Worry and Insecurity', 'Likelihood of Crash' and 'Concern' in interventions that try to change and reduce risky driving behaviour among the driving population.

Risk-taking Attitude (RtA) and Risky Driving Behaviour (RDB)

RtA has a statistically significant positive effect on RDB. The size of this RtAs' direct effect on RDB observed was very strong (r = .88) (Kline, 1998). The strong direct relationship between RtA and RDB agrees with previous research establishing the correlation between attitude and behaviour (Ajzen, 1988; Ajzen & Fishbein, 1977; Assum, 1997; Fishbein & Ajzen, 1972; Kraus, 1995; Parker, 2002; Ulleberg & Rundmo, 2002; Ulleberg & Rundmo, 2003; Whissell & Bigelow, 2003). It also shows that the appropriate corresponding measures for each dimension of RtA were utilized (Kraus, 1995). This positive relationship suggests that, a driver who has a lower attitude towards risk-taking will most likely avoid risky driving behaviours. The study also revealed that the beta value (.83) for the relationship between RtA and RDB indicates a strong predictive index and RDB variance (43%) as a result of RtA. The magnitude of the beta weight for RtA suggests that persons exhibiting high propensity for RtA will most likely exhibit Risky Driving Behaviours.

The factor loadings were acceptable and explained a significant RDB variance as accounted for by RtA. As already stated, the attitude scale accounted for 43% of the total variance in risky driving (i.e. aggressive violation and ordinary violation, errors and lapses). Thus, among the scales of risk-taking attitudes, drivers' careless driving of others' was the only scale having a weak relationship (r = .08) with the risky driving behaviour scale. The scales of 'rule violation speeding' and 'drinking and driving' had strong relationships (r = .83 and r = .69 respectively) with the outcome variable. This finding indicates that drivers who have a relatively high level of attitude with respect to rule violations and speeding in road traffic situations, and drunk driving (e.g., "Speed limits are exceeded because they are too restrictive", "I would never drive after drinking alcohol", "Traffic rules are often too complicated to be carried out in practice", "If you are a good driver it is acceptable to drive a little faster", etc.) tend to engage in risky behaviours such as aggressive violation and ordinary violation behaviours driving. Hence, a meaningful intervention would be to target these specific attitudes for changing risky driving behaviour (Forward, 2009a). In a previous study, Iversen (2004) also identified that these specific risk-taking attitude as an important attitude to consider in intervention in relation to risky driving behaviour.

It seems that a driver's attitudes about the social acceptability of risky driving may be the strongest influence on how likely that driver is to for example, take risks whilst driving. This social acceptability has been found to influence risky driving especially among teenage drivers (e.g. Simons- Morton, 2010).

In sum, this study indicated that risk perception and risk-taking attitude predicted driving behaviours. Consequently, drivers who perceive low risks in traffic situations also engage in risky driving behaviours. Similarly, risk-taking drivers (drivers who enjoy taking risks) also

engage in risky driving behaviours. The positive relationship that was observed between RP and RtA (see table 3) explains these RP-RDB and RtA-RDB relationships. Some of the driving behaviours considered in this study are but not limited to high-risk driving, tailgating, over-taking, distracted driving, over-speeding and drink-driving. These driving behaviours are known to contribute to road traffic accidents or crashes, and thus an intervention targeting these behaviours (Forward, 2009a) can go a long way to reduce road traffic accidents in Ghana.

The personality characteristics of RP and RtA that are associated and known to predict driving behaviour provide the opportunity to develop interventions that are designed to change the way a person reacts to these variables in a typical driving situation. Despite the many interventions carried out to at least reduce risky driving, little success has been achieved and the problem of the numerous road traffic crashes continues to persist. The little success may be due to poor targeting, or of using a homogeneous intervention to change complex and heterogeneous behaviours; which vary across individuals and that are person-specific (Iversen & Rundmo, 2002). Results of the current survey have identified specific individual characteristics of RP and RtA that are related to and which also predict risky driving. These personality characteristics could be used to match interventions to individuals, and then provide a link between intervention message and purpose, and the characteristics of the person receiving the intervention (Forward, 2009a). The development of interventions that are particularly tailored to address the specific characteristics of individual recipients is a possibility. Some of these have been used in some different settings to address many different behaviours (Ausems, Mesters, Breukelen et al., 2002; Carlson, Moore, Pappas et al., 2000; August, Realmuto, Winters et al., 2001; Chiauzzi, Green, Lord et al., 2005; Cummins, Prochaska, Driskell et al., 2003; Werch, Jobli, Moore et al., 2005).

This approach can also prove to be an important way of improving safety interventions and consequently, general safety on our roads.

The Influence of Gender and Age on RDB

The current study also found that younger male drivers exhibited more risky driving behaviours than older female drivers. This finding affirms previous studies that found the overrepresentation of these categories of drivers. Thus, the statement that 'young male drivers' crash fatality rates are as much as three times those of young female drivers, and remain much higher even when adjusted to factor in their higher rates of exposure' (ECMT, 2006) explains the current finding. Studies exist that confirm the finding of the current study that male drivers show a disproportionate risk of accident involvement (Farah, 2011; Vlahogianni, 2013; Elander, et al., 1993). A Latvijā report has stated that the highest risk group remains drivers aged 18 to 24, especially males under 20 years (Perepjolkina & Reņģe, 2011). Again, some studies conducted in the Ghanaian setting (e.g., Pelz and Schumann, 1971; Goldstein 1972) have similarly indicated that accidents involving vehicles driven by young men have increased greatly in Ghana. The reports indicated that generally, recklessness on the road was typical of this category of drivers.

Aside the effect of inexperience and the effect of, gender some possible reasons have been offered. Young people, especially men, are over-represented in crashes at high speed, at night, with similarly aged passengers, involving alcohol, and often when not wearing seatbelts (ECMT, 2006). Drug-driving, especially involving cannabis, among men, especially when mixed with alcohol also account for the problem. Similarly, men are presumed to drive more than young women do (in Ghana, more males have driving license than females -DVLA), and are therefore

likely to engage in risky driving behaviour per kilometre driven as compared to older female drivers.

Furthermore, research has revealed that males are generally more inclined toward risk-taking, sensation-seeking, and anti-social behaviour than their older female counterparts (ECMT, 2006). They are also more likely to over-estimate their driving abilities and more susceptible to the influence of their friends. While men engage in more risky driving behaviours than women irrespective of age, the impact of gender is particularly strong among the young drivers.

Important reductions in male driver risk will result from higher overall road safety levels, which require effective legislation, enforcement and standards, particularly dealing with speed, alcohol, drugs and seatbelts (ECMT, 2006). High levels of accompanied practice before licensing for solo driving, involving a variety of driving circumstances, can result in lower levels of fatalities. While at least 50 hours of pre-licensing practice are recommendable, experience in one country showed that increasing this to about 120 hours reduced crashes in the two years following licensing by about 40% (ECMT, 2006).

Exposure to risk is particularly great immediately following licensing for solo driving, and can be reduced by protective restrictions that are progressively lifted as the novice gains experience, as seen in graduated licensing (GDL) systems. Compared to the female, male drivers' crash risk increases at a much greater rate with the intake of alcohol. Restricting male's alcohol intake by subjecting them to some level of blood alcohol content (BAC) can prove worthwhile. Restricting night driving by young male drivers has been shown to greatly reduce risk (ECMT, 2006) and should be strongly considered.

Of the six demographic factors investigated, gender, experience and vehicle type operated had a statistically significant effect on the risk perception - risky driving behaviours relationship. There were significant differences between samples with regard to males and females (gender), long and short driving experience (experience) and whether the driver is a private or commercial vehicle driver (vehicle type operated). Age and level of education however were not found to have any effect on the relationship.

The Influence of Gender

The hypothesis that gender will significantly moderate the relationship between risk perception and risky driving behaviour was confirmed. This indicated that differences in risky driving behaviour among sample can be attributed to the interaction between gender and risk perceptions differences. In effect, the moderation model explained a significant variance (though the variance is small) in risky driving behaviour (1%); the decreasing effect of risk perception on risky driving behaviour is dependent on whether the driver is a male or female. Male drivers reported more risky behaviours and perceived them as less risky whiles female drivers compared with male drivers had lower risky driving behaviour as their risk perception also increase. Possible explanation to this finding is that female drivers relate more easily to emotions than men. Men have been studied to be sensation seekers (Machin & Sankey, 2008; Oltedal & Rundmo, 2005). Culturally, men in the Ghanaian context are expected to be 'masculine', 'hardworking' as well as those who should face the difficult challenges. This cultural understanding of maleness in Ghana explains the findings of this study. This finding provides an important boost to prevention intervention efforts. That risky driving behaviour differences is a function of gender and also of psychological factors like risk perception, intervention efforts to reduce risky driving can focus more on gender differences and risk perception factors than on any other variables (Forward,

2009a). These results are consistent with previous studies in Ghana (Akaateba & Amoh-Gyimah, 2003) and also with the dual process model of decision making (Chaiken & Trope, 1999; Smith & DeCoster, 2000). The finding that men reported more frequently engaging in much risky driving behaviour and had poorer risk perceptions than women supports findings of previous studies (DeJoy, 1992; Trankle et al., 1990). It is in light of this that the researcher supports the assertion that males in particular should be identified as target in interventions to reduce risky driving. However, since gender accounted for only 1% of the variance in Risky driving Behaviour, it means there are other potential predictors of Risky Driving Behaviour than need to be experimented further. The researcher implores future studies can take a look at them.

The Influence of Vehicle Type operated

Drivers who drove commercial or occupational vehicles reported to have engaged in more risky driving behaviours than the private car drivers. The hierarchical multiple regression results revealed significant influence of type of vehicle on risk perception - risky driving behaviour relationship among the sample surveyed. Thus, compared with commercial vehicles, drivers with private vehicles with higher risk perception tended to have lower risky driving behaviour whereas drivers with commercial vehicles had higher risky driving behaviour as their risk perception also increased.

The study established this effect of vehicle type operated when the researcher compared commercial and private drivers on their risky driving behaviour. The ANOVA results indicated that commercial drivers engaged in more risky behaviours (including speeding, tail-gating, distractive driving etc.) on the road than did their private counterparts.

The result of this study agrees with some studies conducted in the Ghanaian setting. For instance, Bediako (2004) noted that commercial drivers in Ghana have a high risk perception in relation to traffic but show negative or unfavourable attitudes towards taking risk. Afukaar et al., (2003) have also acknowledged that the 'tro-tro' system which provides a public mode of transport also offers a major threat to traffic safety in Ghana. Speeding, which is a common phenomenon among commercial drivers for example, is reported to be the reason for 50 per cent of all road traffic accidents in Ghana (Afukaar et al., 2003). The researchers explained that commercial drivers compete against each other on the road to pick up passengers. Again, from the case study carried out in the Manya-Krobo of Ghana, several reasons (e.g., lack of pension or retirement benefit, engagement procedure) can be attributed to this marked difference (Teye-Kwadjo, 2011). Other antecedent factors such as youth unemployment can be mentioned. It is the effect of unemployment that forces most youth into commercial driving in Ghana. They ply this trade without any formal driving training, except for being a 'driver's mate'/apprentice for sometime (Teye-Kwadjo, 2011). Furthermore, a publication by the NRSC has found that the desire of commercial drivers in Ghana to get their daily wage exposes them to intense pressure and as such sleep is never appreciated.

The challenges with their working conditions have to do with their job demands. These include job insecurity, lack of employment contract, and high sales target imposed on them by their car owners to meet. These drivers have to work long hours that result in stress. These conditions under which they work predispose them to inappropriate road behaviours. Also, meeting of physiological needs of the commercial driver serve as a major challenge to careful driving (Teye-Kwadjo, 2011). Again, a study by Bediako (2004) has indicated that commercial drivers in Ghana have a high risk perception yet show negative attitudes towards traffic rules. The study

concluded that factors such as religion and marital status have significant influence on commercial drivers' risk perception, attitudes and behaviour. Because of these, engaging in risky driving and making some money at all cost appears a better option to the commercial driver than going home empty-handed. The result of these is their higher level of risky driving and hence, RTAs.

Interventions directed towards commercial driving and that are geared towards encouraging the commercial driver (Forward, 2009a) to fully understand that their safety and lives are more important factors that supersede bread and butter needs is vital. Their tendency to adopt inconsiderate driving places the driver's life in danger is enough to make commercial drivers reconsider their driving behaviours on the roads. This is not to exclude the private driver from such interventions. However, the private driver like all other drivers should be encouraged to exercise enough care and think for and 'on behalf of' other drivers (including commercial drivers), when taking driving decisions on the road. Once again, road safety campaigns could stress on the value of human life and the need to preserve it.

The Influence of Experience

RP was associated with RDB. The results revealed a significant moderation effect of experience on the RP and RDB relationship. The effect of risk perception on risky driving behaviour reduced more significantly with the addition of experience of the driver. Thus, number of years of driving interacted with risk perception to determine the driver's driving behaviours. The current study found that self-reported risky driving behaviours among sample drivers with fewer driving experience can be associated with an increased risk of road traffic accidents through the effect of inexperience. Familiarity they say breeds commonality. The many years of driving

experience makes a driver 'too' familiar with road traffic risks and how to deal with it, a common phenomenon and hence the more experience the driver has, will possibly make the driver engage in less risky behaviours. Inexperience in driving implies little opportunity to practice and master the complex skills associated with driving and which proves to be crucial to safe driving. This skill deficit in driving can affect any driver irrespective of age (Brown, 1982). For example, Brown and Groeger (1988) found that inexperienced drivers tend to underestimate the risks in traffic and overestimate their own driving skills. Similarly, Benda and Hoyos (1983) noted that less experienced drivers assess risks by considering the details of the situation, whereas more experienced drivers take a broader view that incorporates different aspects of road traffic. However, some authors have found that accident history tends to lower risk-taking. For a novice or inexperienced, the driver might not perceive risk in some aspects of their driving behaviour, and on-road experience can be expected to enhance their risk perception and reduce the amount of risky driving behaviour. This is because, driving has been described as a skill based and expressive activity (Stradling & Meadows, 2000). These findings agree with other similar studies conducted in recent times. For instance, an Australian research (Palamara, Legge & Stevenson, 2001) reported an increased crash risk in the first year of driving for young drivers who reported risky driving. A cohort study of young drivers from Britain also reported that risk of a self-reported crash was higher in the first year of licensure among participants (Wells, Tong, Genderton, Grayson, & Jones, 2008). Other studies (e.g. Nayum, 2008) have also contributed to the literature with similar results. Intervention programs should therefore seek to address the effect of experience on driver's risk perception and driving behaviour.

The Influence of Age

The hypothesis that age would moderate the relationship between risk perception and risky driving behaviour was not supported. Age did not interact with risk perception to influence driving behaviour of samples in the current study, although several studies have found age differences in risky driving behaviour. Of the samples surveyed in the current study, only 87 (16.4%) were 51 years and above. 219 (41.4%) and 223 (42.2%) of the sample were within the age ranges of 18 and 30 years and 31 and 50 years respectively. Thus, there was no significant difference between the two age groups used in this study. This homogeneity of the sample in terms of age could explain the null effect of age on the risk perception – risky driving behaviour relationship in the current study. Meanwhile, young drivers who are exposed to risky driving behaviours also generally perceive driving risks as low, and those perceiving risk as high are less likely to undertake the behaviour (Ulleberg & Rundmo, 2003; Sarkar & Andreas, 2004). Furthermore, studies have shown that young drivers who perceive high driving risks can still engage in these behaviours (Pennay, 2006; Harre, Brandt & Dawe 2003) and hence the insignificant difference observed.

Whiles the result in this current study agrees with other study results involving young Asian-born drivers, (Ivers et al., 2009) the finding conflicts with other studies that have been conducted in this field (Bränström, Kristjansson & Ullén, 2005; Brown, 2005; Chambers & Windschitl, 2004; Deery, 1999; Dejoy, 1989; Harre, Foster, & O'Neill, 2005; Weinstein, 1987; 1989; 1998; 2003; Castella & Perez, 2004; McKenna & Horswill, 2006; Jonah, 1986 etc.). These researchers have explained that although young drivers recognized these traffic risks in relation to RTAs, their appraisal or interpretation of these risks may lead them to believe that they have perceived control over them.

The Influence of Education Level

Similarly, education level was not found to have a significant influence on risky driving behaviour among samples in this current study. The sample used in this study all had some form of driving education and holders of valid driver's license. At least they could read or interpret road traffic laws and signs; as this was one of the criteria for qualification for the issuance of driver's license in Ghana. Possibly, this similarity explains why there was a null effect of educational on the risk perception – risky driving behaviour relationship. This finding is consistent with other previous studies that did not find any significant influence of education on risky driving and hence, road traffic crash (e.g. Savage 1993; Rowe & Wright 2001; Ma et al., 2009; Peltzer, & Renner, 2003; Koh, Ong & Phoon, 1986; Lourens, Vissers & Jessurum, 1999). It however does not imply education is of no use to careful driving. Other studies have found a significant influence of education on the risk perception – risky driving behaviour relationship (e.g. Morowatisharifabad, 2009; Wanberg, 2010; Peräaho, Keskinen & Hatakka, 2003), which is an indication that education among drivers can be encouraged as one of the means to achieve a safer road.

5.3 Implications for Road Safety

The WHO has recognized the impact of road traffic accidents (RTAs) worldwide and declared the 2011 – 2020 a decade of action. This step is to promote awareness, encourage discussion and mobilize action to address RTAs, and to reduce the fatality rate to the barest minimum. The collection of data relating to road traffic accident (RTA) injuries in Ghana, as an integral part of research-based intervention programs, is prudent, in achieving the vision of a RTA single digit fatality rate of the National Road Safety Commission (NRSC). Currently, a systematized

approach for addressing injuries, especially those related to RTAs, in Ghana is not available. Most interventions applied in Ghana do not appear to be based on studies that provide necessary data or a theoretical basis for their application. The approach of implementing interventions without in-depth investigation as to whether they are relevant may not appropriately incorporate the factors affecting or impacting drivers' behaviour and other factors contributing to RTAs in Ghana. However, this trend is about to change. This study's result can be used to formulate interventions to decrease risky driving behaviours among drivers. The results can be used to provide direction to current road traffic education strategies.

Awareness programs may be included in driver education programs to encourage the driver to gain insight into how their driving preferences impact road safety in general. A driver's tendency to say seek excitement and the importance that he or she places on the welfare of other drivers, as well as the level of danger that the driver perceives in a situation, can affect his or her willingness to engage in risky driving. Rather than just emphasize on the importance of obeying road traffic rules, the driver can be assisted to reflect and understand the association between personality and decisions and thus take appropriate decisions that promote road safety. Public road safety campaigns could throw light on the development of safety interventions that strengthen the driver's appreciation of the impact of their actions on other road users, including pedestrians, children and other drivers. The driver can be taught to observe good driving practices through positive reinforcement of those good driving behaviours.

Instead of addressing perceived risk and risk attitudes, many road safety campaigns carried out in previous times have focused more on general attitudes towards traffic safety in general. These campaigns focused in particular on speeding and rule violations attitudes, driving tired and obeying road traffic rules. Granted that such programs are not bad in themselves, authorities have

over-relied on the belief of the usefulness of these safety promotion and accident prevention campaigns. Some literatures have questioned the effectiveness of such campaigns (Wilde, 1993; OECD, 2006a) for their failure to look at these personality characteristics in such campaigns. The need for intervention programs that targets risky driving behaviour, in relation to risk perception and risk-taking attitude, is evident and offers some explanation as to why drivers' education programs that focus on increasing awareness and knowledge of driving risks without seeking behaviour change have generally not succeeded in reducing crashes (Ivers et al., 2009). Since risk perception and risk-taking attitudes are good predictors of risky driving behaviour, road safety interventions should focus on improving the driver's risk perception and risk-taking attitude. This will have a ripple positive effect on the driver's general attitude to road traffic accidents through the lowering of the driver's risky driving behaviours. For instance, improved or high risk perception will make the driver recognize traffic dangers that are associated with low risk perceptions. A careful look at these personality characteristics may yield good results.

Recent 'secret filming' investigations have revealed malfeasance in driver license acquisition (http://omgghana.com on April 9, 2014). The researcher suggests that, a thorough scrutiny of the process of obtaining a driver's license must be carried out with the purpose of strengthening the criteria required to obtain a driver's license. Research supports licensing reforms as an effective way of reducing road traffic accidents through its influence on behaviour change (ECMT, 2006). In some places licensing measures that address speeding behaviour among young novice drivers include reduced demerit point thresholds and penalties for offending drivers although results of the impact of such interventions are mixed (Assailly, undated). Probation period of licensing in which new drivers have to satisfy, is a good call since such intervention improves behaviour change processes (Roberts, 2002). In order to effectively manage the change process (Durant,

1999), road safety managers should acknowledge the need for the change, involve stakeholders in the decision making process while formulating realistic interventions to the problem, one at a time. It is suggested that withdrawal of license from probationary drivers who would simply not observe driving provisions in the licensing document or road traffic regulations can provide an avenue for a reduction in risky driving behaviour.

Groeger (2006) has acknowledged that competence and driving skill can be acquired via continuous practice and also through instruction. Therefore, the duration or time spent in acquiring driving skills helps to improve experience and also shape road use behaviour (Groeger, 2000) as inadequate driver training will result into novice and inexperienced drivers (Martinez, 2005). The written examination can be reviewed and should include topics that assess the potential driver's risk perception as well as risk taking attitude, as well as a thorough assessment of the driver's training and training period.

Technology can provide a viable end to some of the problems associated with road traffic accidents. Technological applications, such as Adaptive Cruise Control, black boxes, Electronic Stability Control, alco-locks and Intelligent Speed Adaptation can reduce road traffic accidents associated with risky driving.

Finally, except the necessary steps are taken in the area of strong political leadership to address the challenge of risky driving and road traffic accidents, individual efforts cannot achieve the best. Governments, societies, groups and individuals must accept that the costs that come with road traffic accidents far outweigh the benefit of not taking an immediate action. The researcher therefore implore governments and government agencies to exercise political will and leadership,

take the bull by the horn and implement research based interventions to address the menace of road traffic accidents in Ghana and in the world.

5.4 Recommendations for Future Research

Some researches (e.g. Shinar, Bourla & Kaufman, 2004; Shinar & Compton, 2004) have given the evidence that suggests that risky driving might be decreased by altering the driving environment so that common triggers of risky driving behaviours are removed. Future research should therefore examine a broader context of the driving environments, and how that context interacts with other personality characteristics such as sensation seeking (e.g., Hansen & Breivik, 2001; Zuckerman, 1994), driving ability perceptions (e.g., Sarkar & Andreas, 2004), and a lack of driving experience (e.g., McKnight & McKnight, 2003), to result in risky driving behaviour. Identification of the associations, their variability across personality characteristics, and the likely triggers of risky driving would provide important knowledge that could then be used in road transport interventions, including policy, programs, road engineering, traffic flow controls, and enforcement.

The study was conducted using samples from three regional capitals of Ghana. Although the findings can be generalized to the general driving population, further research should be conducted to investigate whether similar findings will be obtained in the other seven regions of Ghana. Research that identifies the variables studied and their link to road traffic accidents (RTAs) is recommended. Such a study may be of key importance to any intervention strategies that are developed to address the risk of injury or death due to RTAs.

Meanwhile, research into whether changes in RP and RTA occur over time must be explored and conducted. These longitudinal studies would capture any changes or the stability of these

variables related to risky driving behaviours. Longitudinal studies would also capture any changes that may be attributed to research-based intervention programs and serve as a means of evaluating the effectiveness of these programs.

Furthermore, although this study only investigated human factors related to RTAs, other aspects that are related to RTAs also need to be investigated. Further research can go into road engineering, enforcement, legislative and road traffic educational factors that are related to RTAs in Ghana. The combined use of self-report and police-reported crash records (that provides official data) is recommended in future study to address the tendency of driver under-reporting his or her crash or accident involvement.

5.5 Conclusion

The outcomes of this study and the knowledge it brings can offer lasting solutions to the ever increasing road accident cases on our roads. The information can be helpful for government agencies to consider and possibly adopt in planning road safety interventions. The researcher thus implores the Ministry of Roads and Transport, National Road Safety Commission (NRSC), and the Motor Transport and Traffic Unit (MTTU) of the Ghana police service to align safety campaign measures to the recommendations of this study in order to reduce and possibly, prevent RTAs, making Ghana an accident-free nation.

Overall this study found that a significant relationship exists among the personality characteristics of interest (risk perception [RP], risk-taking attitudes [RTA] and risky driving behaviours [RDB]). These predictor variables accounted for the variance in risky driving behaviour. RP was a main predictor for risky driving behaviours than RTA. For instance, RP in the model accounted for 53% of the variance and helped to explain risky driving behaviours

while the finding is supported by previous research (Deery, 1999; Frick, Rehm, Knoll, Reifinger, & Hasford, 2000; Sagberg & Bjørnskau, 2006; Williams 2003). The second factor related to RDB was the factor RTA. The relationship between RTA and RDB was different than the RP - RDB relationship in that RP was negatively related to RDB. The influence of RTA is supported by previous research that explored this RTA – RDB relationship (Iversen, 2004; Parker, 2002; Ulleberg & Rundmo, 2002; Ulleberg & Rundmo, 2003; West & Hall, 1997). Gender, experience and type of vehicle were found to moderate the relationship between risk perception and risky driving behaviour. The interaction of age and gender differences was studied. Young male drivers reported more risky driving behaviours than older female drivers.

In conclusion, this current study showed that drivers had elevated risk-taking attitudes and low risk perceptions, which consequently resulted in risky driving behaviours. These findings suggest that interventions should focus on reducing risk-taking attitudes and on increasing risk perceptions. Such interventions may reduce the manifestation of risky driving behaviours and in turn, lower the incidence of RTA-related injuries and deaths.

5.6 Limitations

Before revealing the weaknesses and limitations identified in this study, the researcher wishes to bring to bear the strengths of the study.

Road Traffic Accidents (RTAs) have been one of the 10 leading causes of death in Ghana. However, only a scarce research into the psychological or personality factors that contribute to RTAs has not been carried out. This study that investigates the factors that contribute to RTAs in Ghana comes in handy. This study used scientific procedures to understand the factors related to behaviours that may increase the risk of RTAs. It also provides solid data that could be used to

develop interventions that seek to curtail the effects of RTAs. The results can be generalized to the driving population in Ghana.

Apart from being one of the few studies that have investigated the factors related to risky driving behaviour, and by extension, be at risk of injury or death due to RTAs, this study is the only one that has researched into differences in private and commercial/occupational drivers' RDB, and the factors that account for the differences. The differences revealed offer vital directions to intervention programs for these two groups of drivers. The strength of the study lies also in the fact that complete participant consent was sought prior to data collection on the variables of interest.

Notwithstanding, the following limits the study and interpretation has to be done with caution (Heppner & Heppner, 2004; Pyrczak & Bruce, 2000). First, since risk perception, risk-taking attitudes, and risky driving behaviour scores were obtained at the same time and the fact that the study was a correlational study, it becomes difficult infer causality of risk perception and attitudes to risky driving behaviour. Risk perception and risk-taking attitude predict risky driving behaviour and thus road safety has enough to draw from this.

Scores for all variables were obtained via self-reports. Self-reported data in researches seem unreliable, as research scores can suffer social desirability defects. Therefore, the strength of association that was observed between risk perception, risk-taking attitude and risky driving behaviour may be underscored or otherwise. But, as concluded, social desirability has a relatively small impact in traffic safety studies (Lajunen & Summala, 2003). Reliance on self-report would seem to be a problem if greater variance exists between self-reported information and actual ones (Mayhew, 2002). Most studies conducted with self-reported data do not reveal

any much variance. A number of studies reveal good agreements between self-reported driving behaviour and observed driving behaviour (e.g. West, French, Kemp & Elander, 1993; Brener, Billy & Grady, 2003) and also between reported road behaviour and actual crash rates (Mayhew, 2002).

A correlational cross-sectional design was employed for this study; the conclusions and the results are not appropriate for inferences of cause and effect of the variables of interest. Thus, this cross-sectional study is correlational in nature and any causal relationship cannot be inferred. The results of this study and others (Iversen & Rundmo, 2002; Sümer, 2003; Ulleberg & Rundmo, 2003) do suggest some underlying processes that occur over time; however, due to the cross-sectional nature of this research, one can only suggest what those processes are. Longitudinal research provides the opportunity to examine such processes leading from personality and psychological characteristics to attitudes, then to driving behaviour, and possibly to crashes or accidents. The information obtained from such research could offer valuable design of interventions that can assist people in responding to their individual preferences, with behaviour that does not place themselves and others at risk of road traffic injury or death.

REFERENCES

Aarts, L., van Schagen, I., (2006). Driving speed and the risk of road crashes: a review. *Accident Analysis & Prevention* 38, 215–224.

Afukaar, F.K., Antwi, P., Amaah, S.O. (2003). Pattern of road traffic injuries in Ghana: implications for control, *Injury Control and Safety Promotion*. DOI: http://dx.doi.org/10.1076/icsp.10.1.69.14107, 10(1-2): 69-76

afWåhlberg, A. E. (2001). The theoretical features of some current approaches to risk perception. *Journal of Risk Research*, 237, 250.

Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational behaviour and human decision processes*, Vol.50, No.2, pp. 179−211.

Ajzen, I., & Fishbein, M. (1977). Attitude-behaviour relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84, 888-918.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Prentice-Hall, Englewood Cliffs, New Jersey.

Akaateba, M.A., & Amoh-Gyimah, R. (2013). Driver attitude towards traffic safety violations and risk taking behaviour in kumasi: the gender and age dimension. *International Journal for Traffic and Transport Engineering*, 3(4): 479 - 494

Al-Seghayer, K. (2013). *Carnage on Saudi Arabia's roads.* Retrieved from www.saudigazette.com.sa: March 12, 2013

Amoah, A. K. (undated). When road accidents sweep away Ghana's resources. Retrieved from www.thechronicle.com/gh. June 21, 2011.

Anas A. (2014). Anas exposes the corruption that goes on at Ghana's DVLA. Retrieved from http://omgghana.com on April 9, 2014

Armsby, P., Boyle, A.J., & Wright, C.C. (1989). Methods for assessing drivers' perception of specific hazards on the road. *Accident Analysis and Prevention*, 21, 45-60.

Asiamah, G., Mock, C., & Blantari, J. (2002). Understanding the knowledge and attitudes of commercial drivers in Ghana regarding alcohol impaired driving. Injury Prevention: *Journal of the International Society for Child and Adolescent Injury Prevention*, 8(1), 53-56.

Assailly, J. (undated). *Driver training and green driving in Europe: where are we going to*? Presentation to AAMVA's annual Region I Conference in Québec City, Québec, July 24-29, 2008.

Assum, T. (1997). Attitudes and road accident risk. *Accident Analysis and Prevention*, 29 (2), 153-159.

Assum, T., Bjørnskau, T., Fosser, S. and Sagberg, F. (1999). Risk compensation – the case of road lighting. Accident Analysis and Prevention, 31, p. 545-553.

August, G. J., Realmuto, G. M., Winters, K. C., Hektner, J. M. (2001). Prevention of adolescent drug abuse: targeting high-risk children with a multifaceted intervention model—the early risers "Skills for Success" program. *Appl Prev Psychol*. 2001; 10:135–154.

Ausems, M., Mesters, I., van Breukelen, G., De Vries, H. (2002). Short-term effects of a randomized computer-based out-of-school smoking prevention trial aimed at elementary schoolchildren. *Prev Med*. 2002; 34:581–589.

Babbie, E R. (2010). *The practice of social research*. 12th ed. Belmont, CA: Wadsworth Cengage Learning.

Bandura, A. (1977). *Social learning theory*, Prentice-Hall, Englewood Cliffs, N.J.

Bandura, A. (1986). *Social foundations of thought and action*: A Social Cognitive Theory. Englewood Cliffs, NJ: 1–10.

Baron, R. A., & Richardson, D. R. (1994). Human aggression, 2nd edition. New York: Plenum Press, 399.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.

Bediako, F. (2004). *Commercial drivers perceptions, attitudes and behaviour in relation to road traffic accidents in Ghana: A case study of Accra*. Unpublished Master Thesis, Department of Geography, Norwegian University of Science and Technology.

Benda, H. & Hoyos, C. G. (1983). Estimating hazards in traffic situations. *Accident analysis and prevention, 15*, 1 – 9.

Bener, A., Özkan, T., & Lajunen, T. (2008). The Driver Behaviour Questionnaire in Arab Gulf countries: Qatar and United Arab Emirates. *Accident Analysis & Prevention, 40* (4), 1411-1417.

Bianchi, A., & Summala, H. (2002). Moral judgement and drivers' behaviour among Brazilians students. *Psychological Reports, 91* (31), 759-766.

Bianchi, A., & Summala, H. (2004). The 'genetics' of driving behaviour: Parents' driving style predicts their children's driving style. *Accident Analysis & Prevention, 36* (4), 655-659.

Bloomquist, G. (1986). A utility maximisation model of driver traffic safety behaviour. *Accident Analysis and Prevention*, 18, 371-385.

Bone, A. & Mowen, J. C. (2006). Identifying the traits of aggressive and distracted drivers: A hierarchical trait model approach. *Journal of Consumer Behaviour*, 5, 454–464.

Bränström, R., Kristjansson, S., & Ullén, H. (2005). Risk perception, optimistic bias, and readiness to change sun related behaviour. *European Journal of Public Health*. Retrieved January 10, 2006, from http://eurpub.oxfordjournals.org/cgi/rapidpdf/cki193v1

Brener, N. D., Billy, J. O. G. & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behaviour among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health; 33*:436–457.

Brookland, R., Begg, D., Langley, J., & Ameratunga, S. (2010). Risk perception and risky driving behaviour of adolescents and their parents. *Injury Prevention*, 16, A170.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions. *Journal of the Learning Sciences*, 2, 141–178.

Brown, I.D. & Groeger, J.A., (1988). Risk perception and decision taking during the transition between novice and experienced driver status. *Ergonomics* 31, 585–597.

Brown, I.D. (1982). Exposure and experience are a confounding nuisance in research on driver behaviour. *Accident Analysis and Prevention, 14* (5), pp. 345-352.

Brown, S. L. (2005). Relationship between risk-taking behaviour and subsequent risk perceptions. *British Journal of Psychology, 96* (Pt. 2), 155-164.

Burns, P.C., and G.J.S Wilde (1995). Risk taking in male taxi drivers: Relationships among personality, observational data and driver records. *Personality & Individual Differences,* Vol.18, No.2, pp. 267−278.

Caird, J., & Kline, T. (2004). The relationships between organizational and individual variables to on-the-job driver accidents and accident-free kilometres. *Ergonomics, 47* (15), 1598-1613.

Carlson, J. M, Moore, M. J, Pappas, D. M, Werch, C. E, Watts, G. F. and Edgemon, P. A. (2000). A pilot intervention to increase parent-child communication about alcohol avoidance. *J Alcohol Drug Educ*. 2000; 45:59–70.

Castella, J., & Perez, J., (2004). Sensitivity to punishment and sensitivity to reward and traffic violations. *Accident Analysis and Prevention*, 36, 947-952.

Chaiken, S., & Trope, Y. (1999). *Dual-process theories in social psychology*. New York: Guilford.

Chambers, J. R., & Windschitl, P. D. (2004). Biases in social comparative judgments: The role of nonmotivated factors in above-average and comparative-optimism effects. *Psychological Bulletin, 130* (5), 813-838.

Charlton, S. (2004). Perceptual and attentional effects on drivers' speed selection at curves. *Accident Analysis & Prevention, 36* (5), 877-884.

Chiauzzi, E. Green, T. C., Lord, S., Thum, C., Goldstein, M. (2005). My student body: a high-risk driving prevention web site for college students. *J Am Coll Health*. 2005; 53:263–274.

Chinn, C. (2006). The microgenetic method: Current work and extensions to classroom research. In J. L. Green, G. Cmailli, & P.B. Elmore (Eds.), *Handbook of complementary methods in education research* (pp. 439–456). Mahwah, NJ: Erlbaum.

Churchill, G.A. (1991). Marketing Research: Methodological Foundation, 5th Ed. *The Dryden Press*, New York

Clarke, D. D., Ward, P., & Truman, W. (2002). *In-depth accident causation study of young drivers*. Retrieved from http://www.trl.co.uk/static/dtlripdfs/TRl542

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York: John Wiley & Sons.

Cohn, D. L., Macfarlane, S. & Imai, K. W. (1995).Risk-perception: Differences between adolescents and adults. *Health Psychology*, Vol. 14, No. 3, pp. 217-222.

Colbourn, C.J. (1978). Perceived risk as a determinant of driver behaviour. *Accident Analysis and Prevention*, 10, 31-41

Creswell, J. W. (2005). Planning, conducting, and evaluating quantitative and qualitative research. *Upper Saddle River*, N.J.: Pearson' Prentice Hall.

Cummins, C.O., Prochaska, J.O., Driskell, M.M., Evers, K.E., Wright, J.A., Prochaska, J.M., and Velicer, W.F. Development of review criteria to evaluate health behaviour change websites. *J Health Psychol*. 2003; 8:55–62.

Currie, L. (1969). The perception of danger in a stimulated driving task. *Ergonomics*, 12, 841 849

Dawson, J. F. (2013). Moderation in management research: What, why, when and how. *Journal of Business and Psychology*.

Deery, H.A., & Love, A.W. (1996). The effect of a moderate dose of alcohol on the traffic hazard perception profile of young drivers. *Addiction*, 91, 815–827.

Deery, H.A., (1999). Hazard and risk perception among young novice drivers. *J. Safety Res*. 30, 225–236.

DeJoy, D.M. (1989). The optimism bias and traffic accident risk perception. *Accident Analysis and Prevention*, 21, 333-341

DeJoy, D.M. (1992). An examination of gender differences in traffic accident risk perception. *Accident Analysis and Prevention*, 24, 237-246

Delhomme, P., Verlhiac, J. F. & Martha, C., 2009. Are drivers' comparative risk judgments about speeding realistic? *Journal of Safety Research* 40, 333–339.

Dobson, A., Brown, W., Ball, J., Powers, J., & McFadden, M. (1999). Women drivers' behaviour, socio-demographic characteristics and accidents. *Accident Analysis and Prevention, 31*, 525-535.

Durant, M (1999). Managing organizational change. Retrieved from http://www.crfonline.org/orc/pdf/ref4.pdf#search='lack%20of%20incentives%20for%20change'

Eiksund, S. (2009). A geographical perspective on driving attitudes and behaviour among young adults in urban and rural Norway, *Safety Science*. DOI: http://dx.doi.org/10.1016/j.ssci.2008.07.034, 47(4): 529-536.

Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2004). Applications of the theory of planned behaviour to drivers' speeding behaviour. In Department of Transport (Ed.), *Behavioural Research in Road Safety* 2004: Fourteenth Seminar pp. 157-169. London: DfT Publications.

ETSC - European Transport Safety Council (2008a). *Tackling the three main killers on the roads: a priority for the forthcoming EU Road Safety Action programme*. PIN Flash 16. Brussels: ETSC. Retrieved from: http://www.etsc.eu/documents/05.05%20%20PIN%20Flash%2016.pdf

European Conference of Ministers of Transports. (2006). Young drivers: The road to safety. Paris: *Transport Research Centre*.

Field, A. P. (2005). Is the meta-analysis of correlation coefficients accurate when population effect sizes vary? *Psychological Methods, 10* (4), 444-467.

Fife-Schaw, C. (1995). Surveys and sampling issues. In G. M. Breakwell, S. Hammond and C. Fife-Schaw (Eds), *Research Methods in Psychology*. London, UK: Sage Publications.

Finn, P & Bragg, B.W. (1986). Perception of the risk of an accident by young and older drivers. *Accid Anal Prev*. Aug; 18(4): 289-98.

Forjuoh, S.N. (2003). Traffic-related injury prevention interventions for low-income countries. *Injury Control and Safety Promotion*, 10 (1-2), 109-118.

Forward, S.E. (2009a). An assessment of what motivates road violations, Transportation Research Part F: Traffic Psychology and Behaviour. DOI: http://dx.doi.org/10.1016/j.trf.2008.12.003, 12(3): 225-234

Frick, U., Rehm, J., Knoll, A., Reifinger, M., & Hasford, J. (2000). Perception of traffic accident risk and decision to drive under light alcohol consumption--a doubleblind experimental study. *Journal of Substance Abuse*, 11 (3), 241-251

Glik, D.C., Kronenfeld, J.J., Jackson, K., Zhang, W., 1999. Comparison of traffic accidents and chronic disease risk percpetions. *American Journal of Health Behaviour* 23, 198–209.

Goldstein, L.S. (1972). Youthful drivers as a special safety problem. *Accident Analysis and Prevention*, 4, pp. 153-184.

Green, S. D. (2000). Sleepy, Groggy, Angry: Drinking isn't the Only Road to Impairment. *Traffic Safety*. Number 1, 16 - 17.

Greening L, & Stoppelbein L. (2000). Young drivers' health attitudes and intentions to drink and drive. *J Adolescent Health*; 27:94–101.

Greenwood, M. & Wood, H. M. (1919). The incidence of industrial accidents upon individuals with special reference to multiple accidents. *Industrial Fatigue Research Board, Medical Research Committee,* Report No. 4. Her Britannic Majesty's Stationary office, London

Gregersen, N. P. & Bjurulf, P. (1996). Young novice drivers: towards a model of their accident involvement. *Accident Analysis and Prevention*, 28 (1996), pp. 229–241

Gregersen, N.P. (1996). Young drivers' overestimation of their own skill–An experiment on the relation between training strategy and skill. *Accident Analysis and Prevention*, 28, 243–250.

Groeger, J.A., (2000). *Understanding driving: applying cognitive psychology to a complex everyday task*. Hove, UK: Psychology Press.

Habibi, E., Haghi, A. & Maracy, M. R. (2013). Investigating the predictive of risk-taking attitudes and behaviours among Iranian drivers. *J Educ Health Promot. 3*: 19

Hansen, E. B. & Breivik, G. (2001). Sensation seeking as a predictor of positive and negative risk behaviour among adolescents. *Personality and Individual Differences 30* (2001) 627-640

Harre N, Brandt T, & Dawe M. (2000). The development of risky driving in adolescence. *J Safety Res;* 31: 185–194.

Hedlund, J. (2000). Risky business: safety regulations, risk compensation, and individual behaviour. Injury Prevention, 6, p.82-90.

Hennessy, D. A., & Wiesenthal, D. (2002). Aggression, violence, and vengeance among male and female drivers. *Transportation Quarterly*, 56, 65–75.

Hennessy, D. A., & Wiesenthal, D. L. (2005). Driving vengeance and willful violations: Clustering of problem driving attitudes. *Journal of Applied Social Psychology*, 35, 61−79.

Heppner, P. P., & Heppner, M.J. (2004). Writing and publishing your thesis, dissertation & research: A guide for students in the helping professions. Belmont, CA: *Thomson-Brooks/Cole Press.*

Horvath, P., & Zuckerman, M. (1992). Sensation seeking, risk appraisal and risky behaviour. *Personality and Individual Difference*, Vol.14, No.1, pp. 41−52.

International Organisation for Road Accident Prevention in (April, 2011). *Human factor in road accidents.* retrieved from http://www.alertdriving.com.

Ivers, R., Senserrick, T., Boufous, S., Stevenson, M., Chen, H., Woodward, M., and Norton, R. (2009). Novice drivers' risky driving behaviour, risk perception, and crash risk: findings from the drive study. *Am J Public Health*. 2009 September; 99(9): 1638–1644. doi: 10.2105/AJPH.2008.150367

Iversen, H. & Rundmo, T. (2004). Attitudes towards traffic safety, driving behaviour and accident involvement among the Norwegian public. *Ergonomics*, 47 (5), 555-572.

Iversen, H. (2004). Risk-taking attitudes and risky driving behaviour, *Transportation Research* Part F, Vol.7, No.3, 2004, pp. 135−150.

Iversen, H., & Rundmo, T. (2002). Personality, risky driving and accident involvement among Norwegian drivers. *Personality and Individual Differences, 33*, pp. 1251–1263.

Janssen, W. H., & Tenkink, E. (1988). Considerations on speed selection and risk homeostasis in driving. *Accident Analysis and Prevention, 20*, 137–142.

Jonah, B. A. (1986). Accident risk and risk-taking behaviour among young drivers. *Accident and Prevention, 18* (4), 255-271.

Kaptein, N. A. & Claessens, F. M. M. (1998). Effects of road classification on driving behaviour: a driving simulator study. (Report TM-98-C048). Soesterberg: TNO *Human Factors Research Institute*.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.

Koh, D., Ong, C. N. & Phoon, W.O. (1986). A psychophysiological profile of taxi drivers in Singapore. *Journal of Human Ergology*, Vol.15, No.2, 1986, pp. 147−154.

Kraus, S. J. (1995). Attitudes and the prediction of behaviour: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin, 21*(1), 58-75.

Lajunen, T. & Summala, H. (2003). Can we trust self-reports of driving? Effects of impression management on driver behaviour questionnaire responses. Transportation Research Part F: *Traffic Psychology and Behaviour*, 6, pp. 97–107.

Lawton, R., Conner, M. & Parker, D. (2007). Beyond Cognition: predicting health risk behaviours from instrumental and affective beliefs. *Health Psychology*, *26*, pp. 259 267.

Lawton, R., D. Parker, A. S. R., Manstead, & S. G. Stradling (1997b). The role of affect in predicting social behaviours: the case of road traffic violations. *Journal of Applied Social Psychology*, Vol.27, No.14, pp. 1258−1276.

Leedy, P. & Ormrod, J. (2001). *Practical research: Planning and design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.

Lewin, I. (1982). Driver training: a perceptual-motor skill approach. *Ergonomics, 25*, 917–924.

Litwin, M.S. 1995. How to measure survey reliability and validity. *Sage Publications, London.*

Lourens, P.F., Vissers, J.A. & Jessurum, M. (1999). Annual mileage, driving violations, and accident involvement in relation to drivers' sex, age, and level of education. *Accident Analysis & Prevention*, Vol.31, No.5, 1999, pp. 593−597.

Ma, M., Yan, X., Huang, H., & Abdel-Aty, M. (2010). Occupational driver safety of public transportation: Risk perception, attitudes, and driving behaviour. Proceedings of the *Transportation Research Board* 89th Annual Meeting (TRB 10-0600). Washington D.C.

Machin, M. A. & Sankey, K. S. (2008). Relationships between young drivers' personality characteristics, risk perceptions, and driving behaviour. *Accident Analysis & Prevention*, Vol.40, No.2, 2008, pp. 541−547.

Malfetti, J. L., Rose, P. R., DeKorp, N. A., & Basch, C.E. (1989). *Young Driver Attitude Scale: The development & field testing of an instrument to measure young driver risk-taking attitudes & some exploratory interventions.* New York: New York Teachers College, Columbia.

Marshall M.N. (1996).The key informant technique. *Fam Pract*; *13*: 92-97.

Martinez, R. (2005). Teen crash victims: who are these people and why are they here? *Annals of Emergency Medicine*, *45*, 155–156.

Mayhew, D. R., & Simpson, H. M., (1995). The role of driving experience: implications for training and licensing of new drivers. *Occasional report*, Insurance Bureau of Canada.

Mayhew, D., Simpson, H., & Donelson, A. (Eds.) (1985), Young driver accidents: of solutions. Ottawa: *Traffic Injury Research Foundation*.

McDaniels, T., Axelrod, L. J. & Slovic, P. (1995). Characterizing perception of ecological risk, *Risk Analysis*, *15*, 575–88.

Mckenna, F. P. (1985). Do safety measures really work? An examination of risk homeostasis theory. *Ergonomics*, *28*, pp. 469-484.

McKenna, F. P., Waylen, A. E., & Burkes, M. E. (1998). Male and female drivers: How different are they? *The University of Reading, A Foundation for road Safety Research.* Berkshire, United Kingdom.

McKenna, F.P., & Crick, J. (1997). Hazard perception in drivers: A methodology for testing and training. *Transport Research Laboratory*, Crowthorne, England.

McKenna, F.P., & Horswill. (2006). M.S. Risk taking from the participants' perspective: the case of driving and accident risk. *Health Psychology*, Vol.25, No.2, 2006, pp. 163−170.

McKnight, A. J. & McKnight, A. S. (2003). Young novice drivers: Careless or clueless? *Accident Analysis & Prevention*. Vol. 35, pp. 921-925.

Mearns, K. and Flin, R. (1995), Risk perception and attitudes to safety by personnel in the offshore oil and gas industry: a review, *Journal of Loss Prevention in the Process Industries*, 8(5), pp. 299-305

Mertens, D. M. (1998). Research methods in education and psychology. Thousand Oaks, CA, Sage.

Milech, D., Glencross, D., & Hartley, L. (1989). Skill acquisition by young drivers: *Perceiving, interpreting and responding to the driving* environment (Report No. MR4) Canberra, Australia: Federal Office of Road Safety.

Morowatisharifabad, M. A., (2009). The Health Belief Model variables as predictors of risky driving behaviours among commuters in Yazd, Iran *Traffic injury prevention* 10 (5), 436-440

Murray, C. J., & Lopez, A. D. (1996). Global health statistics, Cambridge, MA, Harvard School of Public Health, *Global burden of disease and injury series*, vol. 2.

Murray, C. J., & Lopez, A. D. (1997a). Global mortality, disability, and the contribution of risk factors: *Global Burden of Disease Study*. Lancet, *349* (9061), 1269-1276.

Murray, C. J., & Lopez, A. D. (1997b). Global mortality, disability, and the contribution of risk factors: *Global Burden of Disease Study*. Lancet, *349* (9063), 1436-1442.

Murray, C. J., & Lopez, A. D. (1997c). Global mortality, disability, and the contribution of risk factors: *Global Burden of Disease Study*. Lancet, *349* (9064), 1498-15

Näätänen, R., & Summala, H. (1974). A model for the role of motivational factors in driver decision-making. *Accident Analysis and Prevention*, 3⁄4, 243–261.

National Road Safety Commission *Statistics on road crashes*: Retrieved June, 28, 2013 from http://www.nrsc.gov.gh/statistics/statistics.htm

National Road Safety Commission, Annual road safety report, 2010: retrieved from *www.nrsc.gov.gh/site/publication*

Nayum, A. (2008). *The role of personality and attitudes in predicting risky driving behaviour*. Retrieved from https://www.duo.uio.no/bitstream

NHTSA - National Highway Traffic Safety Administration (2007). Comparison of Crash Fatalities by Gender and Year from 1996 to 2005 (DOT HS 810 780). *U.S. Department of Transportation, National Center for Statistical Analysis*, Washington, D.C.

NHTSA - National Highway Traffic Safety Administration (2009). Traffic Safety Facts, (2008). *U.S. Department of Transportation, National Center for Statistical Analysis*, Washington, D.C.

Nordfjærn, T.; Jørgensen, S. & Rundmo, T. (2011). A cross-cultural comparison of road traffic risk perceptions, attitudes towards traffic safety and driver behaviour, *Journal of Risk Research*. DOI: http://dx.doi.org/10.1080/13669877.2010.547259, 14(6): 657-684

Nordfjærn, T.; Jørgensen, S.; Rundmo, T. (2010). An investigation of driver attitudes and behaviour in rural and urban settlements in Norway, *Safety Science*. DOI: http://dx.doi.org/10.1016/j.ssci.2009.12.001, 48(3): 348-356.

Nordfjærn, T.; Jørgensen, S.; Rundmo, T. (2012). Cultural and socio-demographic predictors of car accident involvement in Norway, Ghana, Tanzania and Uganda, *Safety Science*. DOI: http://dx.doi.org/10.1016/j.ssci.2012.05.003, 50(9): 1862-1872.

Norris, F. H., Matthews, B. A., & Riad, J. K. (2000). Characterological, situational, and behavioural risk factors for motor vehicle accidents: a prospective examination. *Accident Analysis and Prevention, 32*, 505-515.

Odero, W.; Garner, P. & Zwi, A. (1997). Road traffic injuries in developing countries: a comprehensive review of epidemiological studies. *Tropical Medicine and International Health*. DOI: http://dx.doi. org/10.1111/j.1365-3156.1997.tb00167.x, 2(5): 445-460.

OECD - Organisation for Economic Co-operation and Development. (2006a): *Speed management*. OECD Geneva

Oltedal, S. & Rundmo, T. (2005). The Cultural Theory of Risk Perception. (pp. 17-29). In: T. Rundmo & B.E. Moen (Eds.). *Risk Judgement and Safety in Transport.* Trondheim: Rotunde Publ. no. 87.

Oltedal, S. & Rundmo, T., (2006). The effects of personality and gender on risky driving behaviour and accident involvement. *Safety Science 44*, 621–628.

Özkan, T., Lajunen, T., & Summala, H. (2006). Driver Behaviour Questionnaire: A follow-up study. Accident Analysis and Prevention, 38, 386-395.

Palamara, P. G., Legge, M. & Stevenson, M. R (2001). *An investigation of the relationship between years of licensing, traffic offences, and crash involvement: A comparison of first year drivers with drivers licensed for yen years and five years*, Report RR117, Injury Research Centre, The University of Western Australia, Crawley, WA

Parker, D. (2002). Changing drivers' attitudes to speeding: Using the theory of planned behaviour. In D. Rutter & L. Quine (Eds.). *Changing health behaviour: Intervention and research with social cognition* (pp 138-152). Buckingham, UK: Open University Press.

Parker, D., R. West, S. Stranling, & Manstead, A. (1995). Behaviour characteristics and involvement in different types of traffic accident. *Accident Analysis & Prevention*, Vol.27, No.4, pp. 571−581.

Parker, D., T. Lajunen, & S. Stradling (1998). Attitudinal predictors of interpersonally aggressive violations on the road. *Transportation Research* Part F, Vol.1, No.1, pp. 11−24.

Patton, M. (2001). Qualitative Research & Evaluation Methods. Thousand Oaks, CA: Sage Publications.

Peltzer, K., & Renner, W. (2003). Superstition, risk taking and risk perception of accidents among South African taxi drivers. *Accident Analysis & Prevention*, Vol.35, No.4, 2003, pp. 619−623.

Pelz, D.C. & Schumann, S.H. (1971). Are young drivers really more dangerous after controlling for exposure and experience? *Journal of Safety Research*, 3, pp. 68-79.

Pennay D. (2006). Community attitudes to road safety Wave 19. Canberra: *Australian Transport Safety Bureau*; 2006. ATSB report CR 229.

Peräaho, M., Keskinen, E. & Hatakka, M. (2003). *Driver competenceina hierarchical perspective; implications for driver education*. University of Turku/ Traffic Research, Turku.

Perepjolkina & Reņģe, (2011). Drivers' age, gender, driving experience, and aggressiveness as predictors of aggressive driving behaviour*: Signum Temporis* Volume 4, Number 1.

Posada, J., Ben-Michael, E., Herman, A., Kahan, E., & Richter, E., (2000). Death and injury from motor vehicle crashes in Colombia. *Pan American Journal of Public Health*, 7 (2), 88-91

Pyrczak, F., & Bruce, R. R. (2000). *Writing empirical research reports* (3rd ed.). Los Angeles, CA: Pyrczak Publishing.

Quimby, A. R. (1988). In-car observation of unsafe driving actions (Report ARR 153). Berkshire, England: *Transport and Road Research Laboratory*.

Rayner, S., & Cantor, R. (1987). How fair is safe enough? The cultural approach to societal technology choice. *Risk Analysis, 7*, 3-9.

Rhodes, N. & Pivik, K. (2011). Age and gender differences in risky driving: The roles of positive affect and risk perception. *Accident Analysis and Prevention, 43*, 923-931.

Road traffic injuries (2013) Fact sheet No. 358 March 2013 retrieved from http://www.who.int/mediacentre/factsheets/fs358/en/

Rosa, E. A. (2003). The logical structure of the social amplification of risk framework (SARF): Meta theoretical foundation and policy implications. In N. K. Pidgeon, R.E. and Slovic, P (Ed.). *The social amplification of risk.* (pp. 47-79). Cambridge: Cambridge University Press.

Rosenbloom, T., Shahar, A., Elharar, A., & Danino, O. (2007). Risk perception of driving as a function of advanced training aimed at recognizing and handling risks in demanding driving situations. *The Phoenix Road Safety Studies*

Rowe, G. & Wright G. (2001). "Differences in expert and lay judgements of risk: Myth or reality?" *Risk Analysis 21*: 341-355.

Rumar, K. & Wegman, F. (1999). Vers le zéro accident ? L'exemple de la Suède et des Pays-Bas. Actes du colloque 'La prévention des accidents de la route est-elle affaire de culture, de formation ou de dissuasion ?'. Paris : La Prévention Routière

Rumar, K. (1985). The role of perceptual and cognitive filters in observed behaviour. In: Evans, L., Schwing, R.C. (Eds.), *Human Behaviour and Traffic Safety*. Plenium Press, New York, pp. 151–165.

Rundmo, T., & Iversen, H. (2004). Risk perception and driving behaviour among adolescents in two Norwegian counties before and after a traffic safety campaign. *Safety Science*, Vol.42, No.1, pp. 1−21.

Sagberg, F., & Bjørnskau, T. (2006). Hazard perception and driving experience among novice drivers. *Accident Analysis and Prevention*, *38* (2), 407-414.

Sârbescu, P. (2013). Psychometric properties of The Manchester Driver Behaviour Questionnaire in Romania: Validation of a cross-cultural version. *International Journal of Traffic and Transportation Psychology*

Sarkar, S., & Andreas, M. (2004). Acceptance of and engagement in risky driving behaviours by teenagers. Adolescence, *39*(156), 687-700.

Savage, I. (1993) Demographic influences on risk perceptions, *Risk Analysis13*, 4

Shinar, D. & Compton, R. (2004). Aggressive Driving: An observational study of driver, vehicle, and situational variables. *Accid Anal Prev*. *36*:429–437.

Shinar, D., Bourla, M., & Kaufman, L. (2004). Synchronization of traffic signals as a means of reducing red-light running. *Human Factors*. *46*:367–372.

Short Jr, J. F. (1984). The social fabric of risk: towards the social transformation of risk analysis. Am. *Sociol. Rev*., *49*(Dec.), 711-725.

Simon, F. & Corbett, C. (1996). Road traffic offending, stress, age, and accident history among male and female drivers. *Ergonomics*. DOI: http://dx.doi. org/10.1080/00140139608964497, 39(5): 757-780.

Simons-Morton, B. G. (2010). The effect of passengers and risk-taking friends on risky driving and crashes/near crashes among novice teenagers. *Health Psychology* (Impact Factor: 3.83). 01/2014; DOI: 10.1037/a0034837 PubMed

Sivak, M., Soler, J., Tränkle, U. & Spagnol, J. M. (1989b). Cross-cultural differences in driver risk-perception. *Accident Analysis and Prevention, 21*, 355–362.

Sjöberg, L., Moen, B. E. & Rundmo, T. (2004). Explaining risk perception. *An evaluation of the psychometric paradigm in risk perception research (Report 84).* Norwegia University of Science and Technology, Trondheim, Norway,

Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battle. *Risk Anal*., *19*(4), 689-701

Slovic, P., Fischhoff, B. & Lichtensien, S. (1981). Perceived risk: Psychological factors and social implications. *Proc Research*. Soc. Lond. A374, pp. 17-34.

Smith, E. R. & DeCoster, J. (2001). Dual-process models in social and cognitive psychology: conceptual integration and links to underlying memory systems. *Pers Soc Psychol* doi: 10.1207/S15327957PSPR0402_01 vol. 4 no. 2 108-131

Soderlund, N., & Zwi, A. B. (1995). Traffic-related mortality in industrialized and less developed countries. *Bulletin of the World Health Organization*, *73* (2), 175-182.

Stanton, N. A. & Salmon, P. M. (2009). Human errortaxonomies applied to driving: A generic driver error taxonomy and its implications for intelligent transport systems, *Safety Science*. DOI: http://dx.doi.org/10.1016/j. ssci.2008.03.006, 47(2): 227-237

Stein, A. C., & Allen W. A. (1987). The effects of alcohol on driver decision making and risk taking. In P.C. Noordzij, & R. Roszbach (Eds.), *Alcohol, drugs and traffic safety*—T86.Proceedings of the Tenth International Conference on Alcohol, Drugs and Traffic Safety. Amsterdam, September 9–12, 1986 (pp. 177–182). Amsterdam: Exerpt a Medica.

Steinberg, L., (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental Review* 28, 78–106.

Stradling, S. G. & Meadows, M. L. (2000). *Highway Code and aggressive violations in UK drivers.* Global Web Conference on Aggressive Driving Issues, 16 October – 30 November 2000. Ontario Ministry of Transportation and the Traffic Safety Village. Available online at: www.drivers.com

Stradling, S. G., Parker, D, Lajunen, T., Meadows, M. L. & Xie, C. Q. (1998). Normal behaviour and traffic safety: violations, errors, lapses and crashes. In *Proceedings of the 4th annual conference on transportation, traffic safety and health*, Tokyo, Japan, 21-22 October.

Sumer, N. (2003). Personality and behavioural predictors of traffic accidents: Testing a contextual mediated model. *Accident Analysis and Prevention, 35*, 949-964.

Sundblad, E.-L., Biel, A & Gärling, T. (2007). "Cognitive and affective risk judgements related to climate change." *Journal of Environmental Psychology 27*: 97-106.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.). Boston, MA: Allyn and Bacon.

Tasca, L. (2000). A review of the literature on aggressive driving research. Aggressive Driving Issues Conference, 26. Retrieved from http://www.aggressive.drivers.com/paperslist.htm

Teye-Kwadjo, E. (2011). Risk perception, traffic attitudes and behaviour among pedestrians and commercial minibus drivers in Ghana: A Case Study of Manya Krobo District.

Tränkle, U., Gelau, C., & Metker, T. (1990). Risk perception and age-specific accidents of young drivers. *Accident Analysis and Prevention, 22* (2), 119 – 125.

Trimpop, R.M. (1996). Risk Homoeostasis Theory: Problems of the past and promises for the future. Safety Science, 22(1-3), p.119-130.

Ulleberg P. & Rundmo T. (2002). Risk-taking attitudes among young drivers: The psychometric qualities and dimensionality of an instrument to measure young drivers' risk-taking attitudes. *Scandinavian Journal of Psychology*. Vol. 43, 2002, pp. 227-234

Ulleberg, P. & Rundmo T. (2003). Personality, attitudes and risk perception as predictors of risky driving behaviour among young drivers. *Safety Science*, Vol.41, No.5, 2003, pp. 427-443.

Van Elslande, P., Naing, C. & Engel, R., (2008). Analyzing human factors in road accidents: TRACE WP5 *Summary Report*. Deliverable D5.5

Vassallo, S., Smart, D., Sanson, A., Harrison, W., Harris, A., Cockfield, S., & McIntyre, A., (2007). Risky driving among young Australian drivers: Trends, precursors and correlates. *Accident Analysis and Prevention*, 39, 444-458.

Vavrik, J. (1997). Personality and risk-taking: a brief report on adolescent male drivers. *Journal of Adolescence 20* (4), 461–465.

Vlahogianni, E. I. (2013). Modeling duration of overtaking in two lane highways, Transportation Research Part F: *Traffic Psychology and Behaviour*. DOI: http://dx.doi. org/10.1016/j.trf.2013.07.003, 20(2013): 135-146.

Wallén-Warner, H. & Åberg, L. (2008). Drivers' beliefs about exceeding the speed limits, Transportation Research Part F: *Traffic Psychology and Behaviour*. DOI: http:// dx.doi.org/10.1016/j.trf.2008.03.002, 11(5): 376-389.

Waller, M. W., Olk, M. L. & Shope, J. T. (2000). Parental views of and experience with Michigan's graduated licensing programs. *Journal of Safety Research, 31* (1) 9-15. Doi: 10.1016/s0022-4375(99)00025-0

Wanberg, K., W. (2010). Driving with care: Education and Treatment of the Underage Impaired Driving Offender. Center for Addictions Research and Evaluation.

Warren H. (2009). *Reliability of the Driver Behaviour Questionnaire in a sample of novice drivers*: *Australasian Road Safety Research, Policing and Education Conference*

Weinstein, N. D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioural Medicine*, *10* (5), 481-500.

Weinstein, N. D. (1989). Effects of personal experience on self-protective behaviour. *Psychological Bulletin*, 105, 31-50.

Weinstein, N. D. (1998). Accuracy of smokers' risk perceptions. Annals of Behavioural Medicine: a publication of the Society of *Behavioural Medicine*, *20* (2), 135-140.

Weinstein, N. D. (2003). Exploring the links between risk perceptions and preventive health behaviour. In J. Suls & K. Wallston (Eds.), *Social psychological foundations of health and illness* (pp. 22 53). Malden, MA: Blackwell.

Wells, P., Tong, S., Sexton, B., Grayson, G. & Jones, E. (2008). Cohort II: *a study of learner and new drivers*, vol. 1. Road Safety Research Report No. 81. Department for Transport, London.

Werch, C. E., Jobli E., Moore, M. J., DiClemente, C. C., Dore, H. & Brown, C. H. (2005). A brief experimental alcohol beverage-tailored program for adolescents. *j stud alcohol*; *66*:284–290.

West, R., & Hall, J. (1997). The role of personality and attitudes in traffic accident risk. Applied Psychology: *An International Review*, *46*(3), 253-264.

West, R., French, D., Kemp, R., Elander, J., (1993). Direct observation of driving, self-reports of driver behaviour, and accident involvement. *Ergonomics* 5, 557–567.

Whissell R. B, & Bigelow B. J. (2003). The Speeding Attitude Scale and the role of sensation seeking in profiling young drivers at risk. *Risk Analysis* 2003; 23:811–820.

White, M. P., Eiser, J. R. & Harris, P. (2004). Risk perceptions of mobile phone use while driving. *Risk Analysis*.

Wilde G J. S. (1982). The theory of risk homeostasis: implications for safety and health. Risk Analysis 1982; 2:209–25.

Wilde, G. J. S. (1986). Social interaction patterns in driver behaviour: An introductory review. *Human Factors*, *18*, 477-492

Wilde, G. J. S. (1993). Effects of mass media communications on health and safety habits: an overview of issues and evidence. *Addiction 88* (7): 983

Wilde, G. J. S. (2013). *The reduction of novice drivers*: Vol.9 no. 19. Retrieved from questionsvives.revues.org Vol. 9, number 19

Wilde, G.J.S. (1994). Target risk: dealing with the danger of death, disease and damage in everyday decisions. Toronto: PDE Publications, 1994.

Williams, A. F. (2003). Views of U.S. drivers about driving safety. *Journal of Safety Research*, *34* (5), 491-494.

Windschitl, P. D., & Wells, G. L. (1996). Measuring psychological uncertainty: verbal versus numeric methods. *Journal of Experimental Psychology. Applied*, *2*(4), 343-364.

Witte, K. & Donohue, W. A., (2000). Preventing vehicle crushes with trains at grade crossings. The risk seeker challenge.*Accident Analysis and Prevention 32* (1), 127–139.

World Health Organization (2013). *Global Status Report on road traffic accidents*. (WHO Country Profile Traffic Status Report. Retrieved from http://www.who.int/world-health

Yagil, D. (1998). Gender and age differences in attitudes towards traffic laws and traffic violations. *Transport Research Part F, 1*, 123-135.

Zuckerman, M. (1994). Behavioural expressions and biosocial bases of sensation seeking, *Cambridge University Press*, Cambridge.

Zuckerman, M. (1997). Sensation seeking and risk taking. In: C. E. Izard, Editor, *Emotions in personality and psychopathology*, Plenum, New York. pp. 163–196.

Zuckerman, M. (2004). *Behavioural expressions and biosocial bases of sensation seeking*. New York, NY: Cambridge University Press.

.

.

APPENDICES

APPENDIX A: Research Instrument

INSTRUCTIONS

Dear Participant,

My name is **Samuel Okoe Okwabi** and I am currently a graduate student at the Psychology department of the University of Ghana. My thesis, seeks to look at risk perception, risk-taking attitude and driving behaviour. I am using drivers for my sample and by this letter I am inviting you to participate in this research study by responding to the survey attached. The survey has cover four (4) sections.

Completing this questionnaire is voluntary. If you are not comfortable answering a question, just leave it blank. The first batch of questions that ask about your background will be used only to describe the types of drivers taking part in the research. Please do not write your name or provide any information about yourself on the survey.

The questionnaire will take approximately 35 minutes to complete. There is no known associated risk for participating. In order to ensure that all information will remain confidential, only the principal researcher would have access to questionnaires.

If you choose to participate, please sign the consent form provided and attempt to answer all questions as honestly as possible and return the completed questionnaires promptly to me or my research assistant. Participation is voluntary and you may refuse to participate at any time. Completion and return of the questionnaire will indicate your willingness to participate in this study. The data collected will provide useful information on driving behaviour, and thereby inform necessary interventions.Make sure you read every question and the instructions to all sections. When you are finished, follow the instructions of the person giving you the survey instrument.

If you require additional information or have questions, please contact me at the number listed. Please register your desire to have the results or outcome of the study. Also, If you are dissatisfied with the manner in which this study is being conducted, you may report (anonymously if you so wish) any complaints or weaknesses to the Department of Psychology at the University of Ghana on 233-0302 500381 Ext.375413310, 02895504 63.

Thank you for taking the time to assist me in my educational undertakings.

Sincerely,

(Samuel O. Okwabi)
(0246211036 / sookwabi@st.ug.edu.gh)

Section A: Socio-demographic Data:

Read each item carefully and fill in the blank space or circle the appropriate response.

Select from the range the one that bests describe your **age**.

1. 18 – 30
2. 31 – 50
3. 51 and above

What is your **gender**?

1. Male
2. Female

What is your highest **level of education?**

1. Senior Secondary/High and below
2. Senior Secondary/High and above

Do you currently have a valid driver's license?

1. Yes
2. No
3. Don't Know

How many **years** have you **been driving** e.g. car, pickup, or other?

1. 5 years and below
2. 5 years and above

During the past 12 months, how many times were you in a car accident while driving?

1. 0
2. 1 time
3. 2 times
4. 3 times
5. 4 or more times

During the past 12 months, how many times were you in a car accident when someone else was driving.

1. 0
2. 1 time
3. 2 times
4. 3 times
5. 4 or more times

During the past 12 months, how many times were you in a car accident in which you were injured and had to be treated by a doctor or nurse?

1. 0
2. 1 time
3. 2 times
4. 3 times
5. 4 or more times

Overall, how would you rate your driving skills?

1. Fair
2. Good
3. Very Good
4. Excellent

During the past 12 months, how much distance (in kilometers) have you driven a vehicle?

1. 10,000 kilometers and below
2. 10,000 kilometers and above

What **type of car** do you drive most often?

1. Private vehicle
2. Occupational/commercial vehicle

Section B: Risk Perception Scales*Rundmo & Iversen (2004).*

For each question, please circle or tick the response that best applies to you. You can use the guide below

1 Not Possible At All (0-20% of the time)
2 Not Possible (21-40% of the time)
3 Either Possible Or Not Possible (41-60% of the time)
4 Possible (61-80% of the time)
5 Very Possible (81-100% of the time)

Statements	Not Possible At all	Not Possible	Either Possible Or Not Possible	Possible	Very Possible
1. Feeling unsafe that you yourself could be injured in a traffic crash	1	2	3	3	5
2. Worried for yourself being injured in a traffic crash	1	2	3	3	5
3. Feeling unsafe that persons could be injured in a traffic crash	1	2	3	3	5
4. Worried for persons being injured in a traffic crash	1	2	3	3	5
5. How probable do you think it is for yourself to be involved in a traffic crash	1	2	3	3	5
6. How probable do you think it is for yourself to be injured in a traffic crash	1	2	3	3	5
7. How probable do you think it is in general for persons to be involved in a traffic crash	1	2	3	3	5
8. How probable do you think it is in general for persons to be injured in a traffic crash	1	2	3	3	5
9. How concerned are you about traffic risks and are thinking that you yourself could be victimized	1	2	3	3	5
10. How concerned are you about traffic risks and are thinking that others could be victimized	1	2	3	3	5

Section C: Risk-Taking Attitude Scales: *Iversen & Rundmo (2004)*

For each question, please circle or tick the response that best applies to you. You can use the guide below

1 Strongly Agree (0-20% of the time)
2 Agree (21-40% of the time)
3 Neither Agree nor Disagree (41-60% of the time)
4 Disagree (61-80% of the time)
5 Strongly Disagree (81-100% of the time)

To what extent do you agree or disagree with the following statements	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree

11. Many traffic rules must be ignored to ensure traffic flow	1	2	3	3	5
12. It make sense to exceed speed limits to get ahead of "Sunday drivers"	1	2	3	3	5
13. Traffic rules must be respected regardless of road and weather conditions	1	2	3	3	5
14. Speed limits are exceeded because they are too restrictive	1	2	3	3	5
15. It is acceptable to drive when traffic lights change from yellow to red	1	2	3	3	5
16 Taking chances and breaking a few rules does not necessarily make bad drivers	1	2	3	3	5
17. It is acceptable to take chances when no other people are involved	1	2	3	3	5
18. Traffic rules are often too complicated to be carried out in practice	1	2	3	3	5
19. If you are a good driver it is acceptable to drive a little faster	1	2	3	3	5
20. When road conditions are good and nobody is around driving at 160Km/h is ok	1	2	3	3	5
21. Punishments for speeding should be more restrictive	1	2	3	3	5
22. It is ok to ride with someone who speeds if that is the only way to get home at night	1	2	3	3	5
23. It is ok to ride with someone who speeds if others do	1	2	3	3	5
24. I do not want to risk my life and health by riding with an irresponsible driver	1	2	3	3	5
25. I would never drive after drinking alcohol	1	2	3	3	5
26. I would never ride with someone I knew that had been drinking alcohol	1	2	3	3	5

Section D: Risky Driving Behavior Scales: The Manchester Driving Behavior Questionnaire (Lawton et al., 1997; Parker et al., 1998)

For each question, please circle or tick the response that best applies to you. You can use the guide below

1 Almost never (0-20% of the time)
2 Seldom (21-40% of the time)
3 Sometimes (41-60% of the time)
4 Often (61-80% of the time)
5 Almost always (81-100% of the time)

During the past year, how often, did you do the following activities while driving?	**Almost Never**	**Seldom**	**Some-times**	**Often**	**Almost Always**
27. How often do you exceed the speed limit while driving within villages or towns or city limits?	1	2	3	3	5
28. How often do you exceed the speed limit while driving on the highway?	1	2	3	3	5
29. How often do you drive fast to show off?	1	2	3	3	5
30. How often do you worry that you will be caught speeding?	1	2	3	3	5

31. How often have you raced another driver on the highway?	1	2	3	3	5
32. How often do you talk to other passengers while driving?	1	2	3	3	5
33. How often do you read (such as a book, newspaper, mail, or notes) while driving?	1	2	3	3	5
34. How often do you eat or drink while driving?	1	2	3	3	5
35. How often do you talk on the phone while driving?	1	2	3	3	5
36. How often do you do personal grooming (such as, combing hair, shaving, putting on makeup) while driving?	1	2	3	3	5
37. How often do you change radio stations, CDs or tapes while driving?	1	2	3	3	5
38. How often do you cut in front of other drivers?	1	2	3	3	5
39. How often do you pass on the right of the road to overtake traffic?	1	2	3	3	5
40. How often do you make angry, insulting or obscene gestures toward other drivers that they see?	1	2	3	3	5
41. How often do you make angry, insulting, or obscene statements to other drivers that they hear?	1	2	3	3	5
42. How often do you pass vehicles on a curve?	1	2	3	3	5
43. How often do you pass vehicles on a hill?	1	2	3	3	5
44. How often do you pass buses letting off passengers without slowing down?	1	2	3	3	5
45. How often do you tailgate other vehicles?	1	2	3	3	5
46. How often do you drive through intersections without slowing down?	1	2	3	3	5
47. How often do you cruise through stop signs?	1	2	3	3	5
48. How often do you ignore traffic laws to get ahead in traffic?	1	2	3	3	5
49. How often do you break traffic laws because of peer pressure?	1	2	3	3	5
50. How often do you drive the wrong way down one-way streets?	1	2	3	3	5
54. How often do you stop for pedestrians in a pedestrian crossing?	1	2	3	3	5
52. How often do you use your turning signal indicator when making right and left turns?	1	2	3	3	5
53. How often do you blow your horn when you are upset at the driving behaviors of other drivers?	1	2	3	3	5

Appendix B

IRB Letter of Approval – Ethics Committee for Humanities (ECH)

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)
P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No.....

25th February, 2014

Mr. Samuel Okwabi
Department of Psychology
University of Ghana
Legon

Dear Mr. Okwabi,

PROTOCOL: ECH 019 13-14: RISK PERCEPTION, RISK-TAKING ATTITUDE AND RISKY DRIVING BEHAVIOR AMONG DRIVERS IN GHANA

This is to advise you that the above reference study has been presented to the Ethics Committee for the Humanities and the following actions taken subject to the conditions and explanation provided below:

Expiry Date:	14/01/15
On Agenda for:	Initial Submission
Description:	15/01/14
ECH Action:	Approved

UG/ISSER/ECH VALID UNTIL 14 MAR 2015 APPROVED DOCUMENT

Please accept my congratulations.

Yours Sincerely,

Prof. J. O. Y Mante
ECH Chair

CC: Director, ISSER

Tel: +233-244855638 Email: ech@isser.edu.gh

Appendix C

Introductory/Permission Letter from the University of Ghana

UNIVERSITY OF GHANA
DEPARTMENT OF PSYCHOLOGY
Tel: (233-0302) 500381 Ext. 3754/3310 028 955 04 63 P. O. Box LG 84, Legon Ghana E-mail: psychology@ug.edu.gh

Our Ref. No.....PSYC.2/33/01..... December 13, 2013

The Administrator
Ethics Committee for Humanities
Institute of Statistical, Social and Economic Research (ISSER)
University of Ghana
Legon

Dear Sir/Madam,

LETTER OF INTRODUCTION
SAMUEL OKOE OKWABI - 10260750

The above-named student is an M. Phil Industrial and Organization Psychology student in the Department Psychology, at the University of Ghana, Legon.

As part of the requirement, Samuel Okoe Okwabi has to write and submit an original thesis. The title of his thesis is **" Risk Perception, Risk-Taking Attitude and Risky Driving Behaviour Among Drivers in Ghana".** He is planning to conduct his study with drivers in Accra.

He is applying to your Board for institutional approval/clearance to enable him carry on with his Research Work.

He has received approval from our department.

Your assistance in reviewing his proposal is much appreciated.

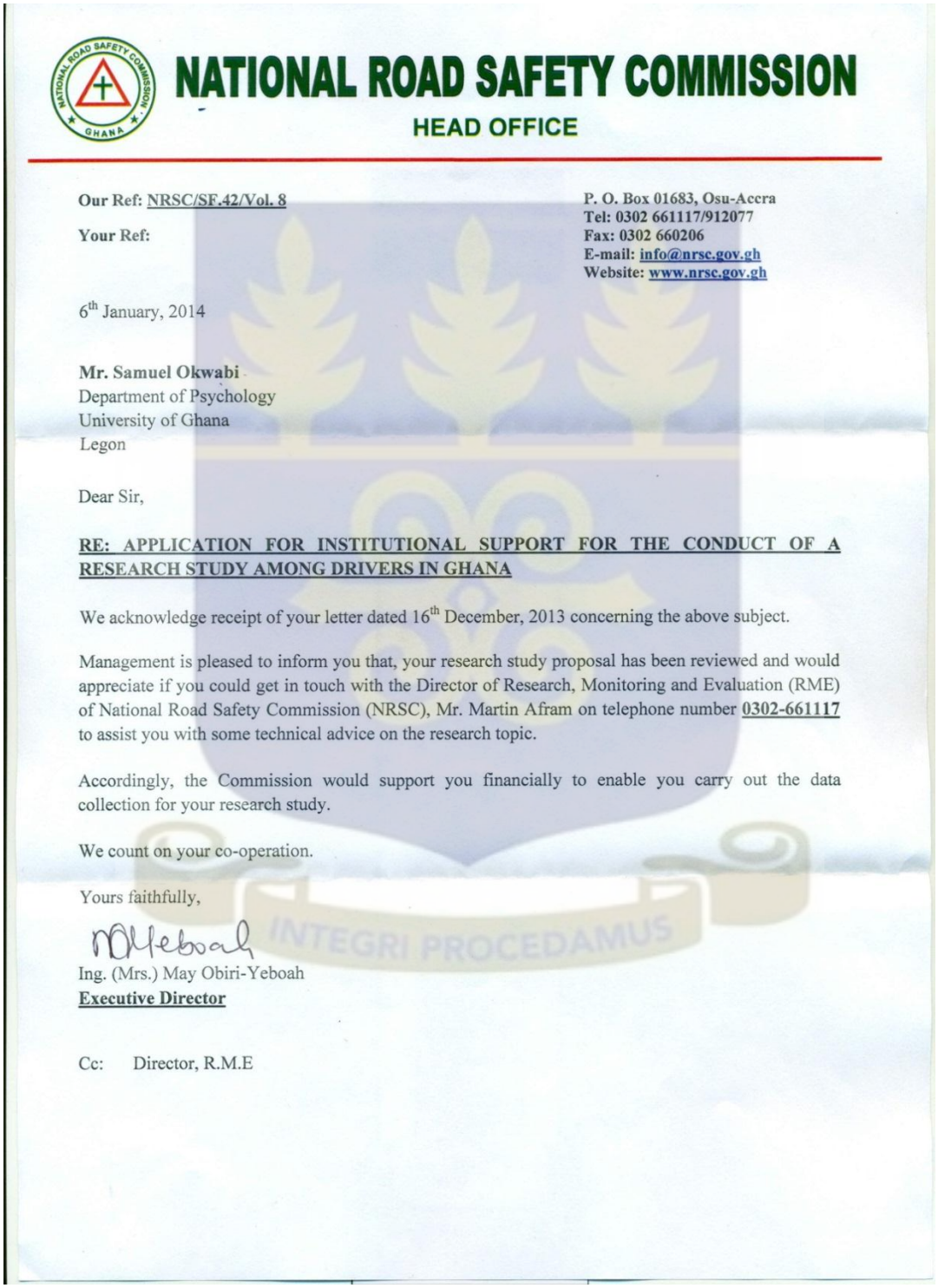
Yours sincerely,

Prof. Charity S. Akotia
(Head of Department)

Dr. Robert Akuamoah Boateng
(Supervisor)

Appendix D

Permission/Acceptance Letter from National Road Safety Commission



NATIONAL ROAD SAFETY COMMISSION
HEAD OFFICE

Our Ref: NRSC/SF.42/Vol. 8
Your Ref:

P. O. Box 01683, Osu-Accra
Tel: 0302 661117/912077
Fax: 0302 660206
E-mail: info@nrsc.gov.gh
Website: www.nrsc.gov.gh

6th January, 2014

Mr. Samuel Okwabi
Department of Psychology
University of Ghana
Legon

Dear Sir,

RE: APPLICATION FOR INSTITUTIONAL SUPPORT FOR THE CONDUCT OF A RESEARCH STUDY AMONG DRIVERS IN GHANA

We acknowledge receipt of your letter dated 16th December, 2013 concerning the above subject.

Management is pleased to inform you that, your research study proposal has been reviewed and would appreciate if you could get in touch with the Director of Research, Monitoring and Evaluation (RME) of National Road Safety Commission (NRSC), Mr. Martin Afram on telephone number **0302-661117** to assist you with some technical advice on the research topic.

Accordingly, the Commission would support you financially to enable you carry out the data collection for your research study.

We count on your co-operation.

Yours faithfully,

Ing. (Mrs.) May Obiri-Yeboah
Executive Director

Cc: Director, R.M.E

Appendix E

Permission/Acceptance Letter from Metro Mass Transit

28/02/14

Department of Psychology

University of Ghana

Legon.

28th February, 2014.

The Managing Director

Metro Mass Transport Limited

Ghana.

Dear Sir,

PERMISSION TO COLLECT RESEARCH DATA FROM FEMALE DRIVERS OF THE METRO MASS TRANSIT LIMITED.

I write to request your kind permission and support to enable me carry out a data collection exercise from your female drivers for my dissertation entitled***"Risk Perception, Risk-taking Attitude and Risky Driving Behavior among Drivers in Ghana".***

I belong to the Department of Psychology of the referred university above, undertaking a two year Master of Philosophy program in Industrial and Organizational Psychology. My interest in Organizational/Institutional Safety drives the intention to carry out this research, comprising both commercial and private vehicle drivers in Ghana.

Indeed, the consequences of road traffic accidents on the humanresources as well as the economic purse of the nation have received enough deliberation. Although efforts are in place to curtail the menace, psychological risk factors underlining the menace have received little attention. Research on this topic needs to pay attention to these psychological factors and hence, this study. The study will look at gender as a moderating variable and your institution offers a greater number of femalecommercial/occupational drivers than any other, making it the best research partner for this study.

This is therefore to seek your administrative assistance and permission to have access to your **female drivers** in the **Greater Accra, Ashanti** and **Eastern regions** of Ghana to help by filling out a survey questionnaire on the topic referred above. I wish to state that there is no or minimal participant risk associated with this research and that, you are assured of the ability to handle any unanticipated/adverse event. Anopportunity for a meeting to explain the research proposal would be greatly appreciated.

Looking forward to hearing from you. Thank you.

Yours faithfully,

Samuel Okwabi(Samuel_okwabi@yahoo.com: +233 (0) 246 211036)

(1) Depot Manager (Acting) to allow the bearer of this letter to interview the female drivers in your depot

(2) Head, PRS

PRS assistant 3/3/14

(3) Teikuttey kindly invite the gentleman over on 5/03/2014 @ 10:00am for a discussion. Thanks. Akwabo 4/3/2014

Appendix F

SPSS OUTPUTS

Statistics

		worry and insecurity RP	likelihood of crash RP	concern RP	rule violation and speeding RTA	careless others RTA	drinking and driving RTA	total risk perception IV	risk taking attitude IV	risky driving behavior DV
N	Valid	529	529	529	529	529	529	529	529	529
	Missing	0	0	0	0	0	0	0	0	0
Mean		10.5766	10.8280	3.0643	30.0132	9.8752	5.0907	24.4688	44.9792	78.9509
Std. Deviation		2.84883	3.84583	1.86465	6.72891	1.26862	1.92848	7.90111	7.73970	17.55083
Skewness		1.286	.822	1.966	1.046	-.759	.426	1.440	1.266	-1.729
Std. Error of Skewness		.106	.106	.106	.106	.106	.106	.106	.106	.106
Kurtosis		.883	-.194	2.510	.989	.346	-.663	.843	.958	1.400
Std. Error of Kurtosis		.212	.212	.212	.212	.212	.212	.212	.212	.212
Minimum		6.00	5.00	2.00	19.00	5.00	3.00	16.00	32.00	36.00
Maximum		18.00	19.00	8.00	47.00	13.00	9.00	43.00	63.00	94.00

Correlations

		age of respondent	gender of respondent	highest level of education	number of years of driving experiences	distace covered (exposure)	type of vehicle driven	total risk perception IV	risk taking attitude IV	risky driving behavior DV
age of respondent	Pearson Correlation	1	-.039	-.065	-.045	.044	.059	.126**	.123**	-.135**
	Sig. (2-tailed)		.368	.136	.297	.311	.174	.004	.005	.002
	N	529	529	529	529	529	529	529	529	529
gender of respondent	Pearson Correlation	-.039	1	.769**	.529**	-.492**	-.395**	-.358**	-.387**	.366**

	Sig. (2-tailed)	.368		.000	.000	.000	.000	.000	.000	.000
	N	529	529	529	529	529	529	529	529	529
highest level of education	Pearson Correlation	-.065	.769**	1	.687**	-.645**	-.238**	-.248**	-.305**	.265**
	Sig. (2-tailed)	.136	.000		.000	.000	.000	.000	.000	.000
	N	529	529	529	529	529	529	529	529	529
number of years of driving experiencs	Pearson Correlation	-.045	.529**	.687**	1	-.938**	-.381**	-.307**	-.295**	.289**
	Sig. (2-tailed)	.297	.000	.000		.000	.000	.000	.000	.000
	N	529	529	529	529	529	529	529	529	529
distace covered (exposure)	Pearson Correlation	.044	-.492**	-.645**	-.938**	1	.346**	.286**	.282**	-.262**
	Sig. (2-tailed)	.311	.000	.000	.000		.000	.000	.000	.000
	N	529	529	529	529	529	529	529	529	529
type of vehicle driven	Pearson Correlation	.059	-.395**	-.238**	-.381**	.346**	1	.566**	.572**	-.563**
	Sig. (2-tailed)	.174	.000	.000	.000	.000		.000	.000	.000
	N	529	529	529	529	529	529	529	529	529
total risk perception IV	Pearson Correlation	.126**	-.358**	-.248**	-.307**	.286**	.566**	1	.900**	-.936**
	Sig. (2-tailed)	.004	.000	.000	.000	.000	.000		.000	.000
	N	529	529	529	529	529	529	529	529	529
risk taking attitude IV	Pearson Correlation	.123**	-.387**	-.305**	-.295**	.282**	.572**	.900**	1	-.879**
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.000	.000		.000
	N	529	529	529	529	529	529	529	529	529
risky driving behavior DV	Pearson Correlation	-.135**	.366**	.265**	.289**	-.262**	-.563**	-.936**	-.879**	1

	Sig. (2-tailed)	.002	.000	.000	.000	.000	.000	.000	.000	
	N	529	529	529	529	529	529	529	529	529

**. Correlation is significant at the 0.01 level (2-tailed).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.875	6.19301
2	.936[b]	.877	.876	6.17088
3	.937[c]	.878	.878	6.14039

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, gender age of respondent

c. Predictors: (Constant), std risk perception, gender age of respondent, int RP*GENDER

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]
	Residual	20212.225	527	38.353		
	Total	162640.722	528			
2	Regression	142610.761	2	71305.380	1.873E3	.000[b]
	Residual	20029.961	526	38.080		
	Total	162640.722	528			
3	Regression	142845.943	3	47615.314	1.263E3	.000[c]
	Residual	19794.779	525	37.704		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, gender age of respondent

c. Predictors: (Constant), std risk perception, gender age of respondent, int RP*GENDER

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000	78.419	79.477			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-2.146	-2.012	-.936	-.936	-.936
2	(Constant)	80.742	.863		93.604	.000	79.047	82.436			
	std risk perception	-2.050	.036	-.923	-56.315	.000	-2.122	-1.979	-.936	-.926	-.862
	gender age of respondent	-1.403	.642	-.036	-2.188	.029	-2.664	-.143	-.366	-.095	-.033
3	(Constant)	80.579	.861		93.611	.000	78.888	82.270			
	std risk perception	-1.786	.112	-.804	-15.972	.000	-2.006	-1.566	-.936	-.572	-.243
	gender age of respondent	-1.096	.650	-.028	-1.686	.092	-2.373	.181	-.366	-.073	-.026
	int RP*GENDER	-.182	.073	-.128	-2.498	.013	-.325	-.039	-.905	-.108	-.038

a. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.875	6.19301
2	.936[b]	.877	.876	6.16963
3	.937[c]	.878	.877	6.15481

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, highest level of education

c. Predictors: (Constant), std risk perception, highest level of education, int RP*EDUC

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]

	Residual	20212.225	527	38.353		
	Total	162640.722	528			
2	Regression	142618.874	2	71309.437	1.873E3	.000[b]
	Residual	20021.848	526	38.064		
	Total	162640.722	528			
3	Regression	142752.867	3	47584.289	1.256E3	.000[c]
	Residual	19887.855	525	37.882		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, highest level of education

c. Predictors: (Constant), std risk perception, highest level of education, int RP*EDUC

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000	78.419	79.477			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-2.146	-2.012	-.936	-.936	-.936
2	(Constant)	80.700	.828		97.475	.000	79.074	82.326			
	std risk perception	-2.059	.035	-.927	-58.704	.000	-2.128	-1.990	-.936	-.931	-.898
	highest level of education	-1.309	.585	-.035	-2.236	.026	-2.458	-.159	-.265	-.097	-.034
3	(Constant)	80.709	.826		97.719	.000	79.087	82.332			
	std risk perception	-1.861	.111	-.838	-16.745	.000	-2.079	-1.643	-.936	-.590	-.256
	highest level of education	-1.225	.586	-.033	-2.092	.037	-2.375	-.074	-.265	-.091	-.032
	int RP*EDUC	-.132	.070	-.094	-1.881	.061	-.269	.006	-.901	-.082	-.029

a. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.875	6.19301
2	.936[b]	.876	.875	6.19883
3	.937[c]	.877	.876	6.16974

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, number of years of driving experiencs

c. Predictors: (Constant), std risk perception, number of years of driving experiencs, int RP*EXP

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]
	Total	162640.722	528			
2	Regression	142428.901	2	71214.450	1.853E3	.000[b]
	Residual	20211.821	526	38.426		
	Total	162640.722	528			
3	Regression	142656.217	3	47552.072	1.249E3	.000[c]
	Residual	19984.506	525	38.066		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, number of years of driving experiencs

c. Predictors: (Constant), std risk perception, number of years of driving experiencs, int RP*EXP

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000	78.419	79.477			

	std risk perception	-2.079	.034	-.936	-60.939	.000	-2.146	-2.012	-.936	-.936	-.936
2	(Constant)	79.037	.903		87.563	.000	77.263	80.810			
	std risk perception	-2.078	.036	-.935	-57.914	.000	-2.148	-2.007	-.936	-.930	-.890
	number of years of driving experiencs	-.058	.567	-.002	-.103	.918	-1.172	1.055	-.289	-.004	-.002
3	(Constant)	79.612	.929		85.719	.000	77.788	81.437			
	std risk perception	-1.744	.141	-.785	-12.370	.000	-2.021	-1.467	-.936	-.475	-.189
	number of years of driving experiencs	-.282	.572	-.008	-.494	.621	-1.405	.840	-.289	-.022	-.008
	int RP*EXP	-.194	.079	-.153	-2.444	.015	-.350	-.038	-.916	-.106	-.037

a. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.875	6.19301
2	.937[b]	.877	.877	6.15740
3	.955[c]	.912	.912	5.20836

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, type of vehicle driven

c. Predictors: (Constant), std risk perception, type of vehicle driven, int RP*VEHICLE

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]
	Residual	20212.225	527	38.353		
	Total	162640.722	528			
2	Regression	142698.168	2	71349.084	1.882E3	.000[b]
	Residual	19942.554	526	37.914		
	Total	162640.722	528			

3	Regression	148399.063	3	49466.354	1.824E3	.000[c]
	Residual	14241.659	525	27.127		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, type of vehicle driven

c. Predictors: (Constant), std risk perception, type of vehicle driven, int RP*VEHICLE

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000	78.419	79.477			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-2.146	-2.012	-.936	-.936	-.936
2	(Constant)	76.209	1.062		71.786	.000	74.123	78.294			
	std risk perception	-2.017	.041	-.908	-49.007	.000	-2.097	-1.936	-.936	-.906	-.748
	type of vehicle driven	1.748	.656	.049	2.667	.008	.461	3.036	.563	.116	.041
3	(Constant)	74.239	.908		81.742	.000	72.455	76.023			
	std risk perception	-3.583	.114	-1.613	-31.559	.000	-3.806	-3.360	-.936	-.809	-.408
	type of vehicle driven	4.895	.595	.138	8.220	.000	3.725	6.065	.563	.338	.106
	int RP*VEHICLE	1.337	.092	.782	14.497	.000	1.156	1.518	-.863	.535	.187

a. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.594[a]	.352	.345	14.20463	.352	47.344	6	522	.000
2	.938[b]	.880	.879	6.11303	.528	2297.499	1	521	.000

a. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.594[a]	.352	.345	14.20463	.352	47.344	6	522	.000
2	.938[b]	.880	.879	6.11303	.528	2297.499	1	521	.000

a. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs

b. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs, total risk perception IV

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57315.977	6	9552.663	47.344	.000[a]
	Residual	105324.745	522	201.772		
	Total	162640.722	528			
2	Regression	143171.423	7	20453.060	547.326	.000[b]
	Residual	19469.299	521	37.369		
	Total	162640.722	528			

a. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs

b. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs, total risk perception IV

c. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.594[a]	.352	.345	14.20463	.352	47.344	6	522	.000
2	.884[b]	.781	.778	8.26630	.429	1020.373	1	521	.000

a. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs

b. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs, risk taking attitude IV

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57315.977	6	9552.663	47.344	.000[a]
	Residual	105324.745	522	201.772		
	Total	162640.722	528			
2	Regression	127039.873	7	18148.553	265.595	.000[b]
	Residual	35600.850	521	68.332		
	Total	162640.722	528			

a. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs

b. Predictors: (Constant), type of vehicle driven, age of respondent, highest level of education, distace covered (exposure), gender of respondent, number of years of driving experiencs, risk taking attitude IV

c. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
1	(Constant)	84.230	10.711		7.864	.000			
	age of respondent	-2.406	.863	-.099	-2.788	.005	-.135	-.121	-.098
	gender of respondent	5.638	2.314	.144	2.437	.015	.366	.106	.086
	highest level of education	1.199	2.485	.032	.483	.630	.265	.021	.017
	number of years of driving experiencs	.485	3.810	.014	.127	.899	.289	.006	.004

	distace covered (exposure)	.616	3.559	.018	.173	.863	-.262	.008	.006
	type of vehicle driven	-17.478	1.449	-.494	-12.064	.000	-.563	-.467	-.425
2	(Constant)	154.020	6.605		23.318	.000			
	age of respondent	-.759	.505	-.031	-1.503	.133	-.135	-.066	-.031
	gender of respondent	2.082	1.351	.053	1.541	.124	.366	.067	.032
	highest level of education	-2.685	1.451	-.072	-1.850	.065	.265	-.081	-.038
	number of years of driving experiencs	4.558	2.221	.130	2.052	.041	.289	.090	.042
	distace covered (exposure)	3.404	2.073	.097	1.642	.101	-.262	.072	.034
	type of vehicle driven	-2.458	.965	-.069	-2.546	.011	-.563	-.111	-.052
	risk taking attitude IV	-1.872	.059	-.826	-31.943	.000	-.879	-.814	-.655

a. Dependent Variable: risky driving behavior DV

Group Statistics

	type of vehicle driven	N	Mean	Std. Deviation	Std. Error Mean
risky driving behavior DV	commercial/occupational	300	87.5833	5.20962	.30078
	private	229	67.6419	21.24240	1.40374

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
risky driving behavior DV	Equal variances assumed	871.400	.000	15.659	527	.000	19.94141	1.27351	17.43964	22.44318

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
risky driving behavior DV	Equal variances assumed	871.400	.000	15.659	527	.000	19.94141	1.27351	17.43964	22.44318
	Equal variances not assumed			13.891	249.016	.000	19.94141	1.43560	17.11395	22.76888

Between-Subjects Factors

		Value Label	N
gender of respondent	0	female	147
	1	male	382
age of respondent	1	18 - 30	219
	2	31 - 50	223
	3	51 and above	87

Descriptive Statistics

Dependent Variable:risky driving behavior DV

gender of respondent	age of respondent	Mean	Std. Deviation	N
female	18 - 30	76.2679	17.59596	56
	31 - 50	66.5231	22.57841	65
	51 and above	57.2308	17.92943	26
	Total	68.5918	21.03902	147
male	18 - 30	83.6135	13.33950	163

	31 - 50	82.0570	15.24210	158

Model Summary

	Total	82.9372	14.13940	382
Total	18 - 30	81.7352	14.85475	219
	31 - 50	77.5291	19.00848	223
	51 and above	75.5862	19.04374	87
	Total	78.9509	17.55083	529

Tests of Between-Subjects Effects

Dependent Variable:risky driving behavior DV

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	28989.017[a]	5	5797.803	22.688	.000	.178
Intercept	2005677.755	1	2005677.755	7.849E3	.000	.938
gender	23933.231	1	23933.231	93.654	.000	.152
age	5467.679	2	2733.839	10.698	.000	.039
gender * age	4655.805	2	2327.902	9.109	.000	.034
Error	133651.705	523	255.548			
Total	3460023.000	529				
Corrected Total	162640.722	528				

a. R Squared = .178 (Adjusted R Squared = .170)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.936[a]	.876	.875	6.19301	.876	3713.585	1	527	.000
2	.936[b]	.877	.876	6.17088	.001	4.786	1	526	.029
3	.937[c]	.878	.878	6.14039	.001	6.238	1	525	.013

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, gender of respondent

c. Predictors: (Constant), std risk perception, gender of respondent, int RP*GENDER

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]
	Residual	20212.225	527	38.353		
	Total	162640.722	528			
2	Regression	142610.761	2	71305.380	1.873E3	.000[b]
	Residual	20029.961	526	38.080		
	Total	162640.722	528			
3	Regression	142845.943	3	47615.314	1.263E3	.000[c]
	Residual	19794.779	525	37.704		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, gender of respondent

c. Predictors: (Constant), std risk perception, gender of respondent, int RP*GENDER

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part

1	(Constant)	78.948	.269		293.204	.000			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-.936	-.936	-.936
2	(Constant)	77.935	.535		145.585	.000			
	std risk perception	-2.050	.036	-.923	-56.315	.000	-.936	-.926	-.862
	gender of respondent	1.403	.642	.036	2.188	.029	.366	.095	.033
3	(Constant)	78.387	.563		139.327	.000			
	std risk perception	-1.786	.112	-.804	-15.972	.000	-.936	-.572	-.243
	gender of respondent	1.096	.650	.028	1.686	.092	.366	.073	.026
	int RP*GENDER	-.182	.073	-.128	-2.498	.013	-.905	-.108	-.038

a. Dependent Variable: risky driving behavior DV

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.875	6.19301
2	.936[b]	.876	.876	6.19080
3	.936[c]	.876	.875	6.19306

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, age of respondent

c. Predictors: (Constant), std risk perception, age of respondent, int RP*AGE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.936[a]	.876	.875	6.19301	.876	3713.585	1	527	.000
2	.936[b]	.876	.875	6.19848	.000	.071	1	526	.791
3	.936[c]	.876	.875	6.20032	.000	.688	1	525	.407

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, age of respondent

c. Predictors: (Constant), std risk perception, age of respondent, int RP*AGE

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142428.497	1	142428.497	3.714E3	.000[a]
	Residual	20212.225	527	38.353		
	Total	162640.722	528			
2	Regression	142431.210	2	71215.605	1.854E3	.000[b]
	Residual	20209.512	526	38.421		
	Total	162640.722	528			
3	Regression	142457.655	3	47485.885	1.235E3	.000[c]
	Residual	20183.068	525	38.444		
	Total	162640.722	528			

a. Predictors: (Constant), std risk perception

b. Predictors: (Constant), std risk perception, age of respondent

c. Predictors: (Constant), std risk perception, age of respondent, int RP*AGE

d. Dependent Variable: risky driving behavior DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-.936	-.936	-.936
2	(Constant)	78.886	.359		220.029	.000			
	std risk perception	-2.079	.034	-.936	-60.859	.000	-.936	-.936	-.935
	age of respondent	.069	.261	.004	.266	.791	-.028	.012	.004
3	(Constant)	78.894	.359		219.899	.000			
	std risk perception	-2.003	.098	-.902	-20.427	.000	-.936	-.665	-.314
	age of respondent	.092	.262	.005	.350	.726	-.028	.015	.005
	int RP*AGE	-.041	.049	-.037	-.829	.407	-.881	-.036	-.013

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	78.948	.269		293.204	.000			
	std risk perception	-2.079	.034	-.936	-60.939	.000	-.936	-.936	-.936
2	(Constant)	78.886	.359		220.029	.000			
	std risk perception	-2.079	.034	-.936	-60.859	.000	-.936	-.936	-.935
	age of respondent	.069	.261	.004	.266	.791	-.028	.012	.004
3	(Constant)	78.894	.359		219.899	.000			
	std risk perception	-2.003	.098	-.902	-20.427	.000	-.936	-.665	-.314
	age of respondent	.092	.262	.005	.350	.726	-.028	.015	.005
	int RP*AGE	-.041	.049	-.037	-.829	.407	-.881	-.036	-.013

a. Dependent Variable: risky driving behavior DV