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# **Risk Perception, Traffic Attitudes and Behaviour among Pedestrians and Commercial Minibus Drivers in Ghana: A Case Study of Manya Krobo District.**

Master thesis in Psychology

Trondheim, May, 2011





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Thesis for the degree of Master of Philosophy (M.Phil)

Trondheim, May, 2011

Norwegian University of Science and Technology

Faculty of Social Sciences and Technology Management

Department of Psychology





“What is our society willing to pay for safety?”

Chauncey Starr (1969, p. 1232)



Source: CECON Organization: Youth for road safety

**Declaration & approval**

I, Enoch TEYE-KWADJO, author of this thesis do, hereby, declare that except for references to the extant literature which have been duly acknowledged by way of citations, the work presented here is my account of the research conducted by me as a student of the Department of Psychology, Norwegian University of Science and Technology, 2011. This work has not been submitted in whole or in part for any degree of this University or elsewhere.

.....

Enoch TEYE-KWADJO  
(Student)

This work has been submitted for examination with my approval as supervisor.

.....

Prof. Birthe LOA KNIZEK  
(Supervisor)

## **Dedication**

To Franklin, Valerie, and Vida

&

To a safer people, safer vehicles, and safer roads in Ghana and the world

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## **List of papers**

This thesis is based on the following papers, which will be referred to in the text by their roman numerals.

**I        Survival of the Fittest: Attitudinal and Motivational Aspects of Aberrant Driving**

Teye-Kwadjo, E. (Manuscript)

**II        “And if you had hit me...”: Pedestrian-Motor Vehicle Crash Involvement**

Teye-Kwadjo, E. (Manuscript)

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## **Abstract**

Road traffic accidents have become ‘hidden epidemics’ across the world and have posed a substantial health and economic burden to many developing nations. In 2006, Ghana spent US\$ 165 million (1.6% of GDP) on accident management. On average, five (5) people die and several others are injured on the country’s roads daily. In about 95% of road traffic crashes in the country, human factors have been implicated. Available evidence indicates that the casualty rate is on the rise in many parts of the country. However, little attempts have been made to understand the individual and situational determinants of road traffic crashes among drivers and pedestrians. Employing a qualitative research methodology, this research investigated drivers and pedestrians’ opinions about their traffic risk perception, attitudes and behaviour and their relationship with motor vehicle crashes with the overall goal of identifying and describing the proximal and distal factors of accident causation in the Manya Krobo area. Two sub-studies make up the content of the present research: The first study explored the individual and situational determinants of aberrant driving and traffic crashes among commercial drivers of passenger-carrying minibuses. Challenging working conditions, road rage behaviours, inadequate driver training, bad road infrastructure and equipment, and passenger distractions were among the reasons described for dangerous driving. Other motivations were risk-taking propensity, fatalism, and ineffective traffic law enforcement.

In the second study, pedestrian road use attitudes and behaviour as well as their travel experiences in relation to pedestrian-vehicular crash involvements were investigated. 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. Given the importance these findings may have for central government, road planners, and safety officials; discussions have been made and recommendations for accident countermeasures have been put forward.

*Keywords:* Ghana; Pedestrians; Commercial drivers; Risk perception; Attitude; Behaviour; Street hawking; Driving apprenticeship

## **1 Introduction**

### **1.1 Background to the research**

*“Every day thousands of people are killed and injured on our roads. Men, women or children walking, biking, or riding to school or work, playing in the streets or setting out on long trips, will never return home, leaving behind shattered families and communities. Millions of people each year will spend long weeks in hospital after severe crashes and many will never be able to live, work or play as they used to do”* (WHO Report, 2004, p. vii).

Road traffic accidents have become the leading cause of death and disability in many countries across the world. Low-income and middle-income countries which have only 48% of the world's vehicles are reported to account for about 90% of these casualties. However, while the casualty rate is decreasing significantly in the developed world as a result of ambitious accident countermeasures put in place, in developing countries like Ghana limited attention has been paid to this growing threat. Hence, while traffic crashes are predicted to further decrease by 27% in countries of the developed world by 2020, they are estimated to increase by 83% in low income and middle income countries (WHO Report, 2004). The economic and psychosocial consequences of these crashes for the rural and urban poor, majority of whom make up the vulnerable road users such as pedestrians, cyclists, and occupants of passenger-carrying vehicles, are devastating.

### **1.1.1 Global impact of road traffic accidents**

About 1.2 million people die and 50 million others are injured on the world's roads each year. An estimated average of 3,242 people die daily from road accidents (WHO, 2004). The same report has ranked the worldwide leading causes of death by age as follows; 0-4 year olds (14<sup>th</sup>), 5-14 year olds (2<sup>nd</sup>), 15-29 year olds (1<sup>st</sup>), 30-44 year olds (3<sup>rd</sup>), 45-69 year olds (8<sup>th</sup>), and 70 + year olds (20<sup>th</sup>). These data suggest that globally, among 5-29 year olds, the leading cause of death is road traffic accidents. Official statistics from police reports suggest that in 2005 alone, 41,600 people were killed and over 1.5 million were injured in road traffic crashes in the European Union member countries (ETSC, 2007).

At present, road traffic fatalities are the 9th leading cause of death and disability in the world. The World Health Organization (WHO) has described them as 'hidden epidemics' and has forecast that they will be the 5th leading cause of death worldwide and the 2nd leading cause of disability-adjusted life year losses in many developing countries by 2030 (Murray and Lopez, 1996). These projections are expected to bring about 2.4 million fatalities annually. Also, the International Federation of Red Cross and Red Crescent has observed that the road traffic burden is "a worsening global disaster destroying lives and livelihoods, hampering development and leaving millions in greater vulnerability" (Cater & Walker, 1998; cited in Ameratunga et al., 2006, p. 1533).

**Table 1:** Leading causes of death, 2004 and 2030 compared

TOTAL 2004			TOTAL 2030		
RANK	LEADING CAUSE	%	RANK	LEADING CAUSE	%
1	Ischaemic heart disease	12.2	1	Ischaemic heart disease	12.2
2	Cerebrovascular disease	9.7	2	Cerebrovascular disease	9.7
3	Lower respiratory infections	7.0	3	Chronic obstructive pulmonary disease	7.0
4	Chronic obstructive pulmonary disease	5.1	4	Lower respiratory infections	5.1
5	Diarrhoeal diseases	3.6	5	Road traffic injuries	3.6
6	HIV/AIDS	3.5	6	Trachea, bronchus, lung cancers	3.5
7	Tuberculosis	2.5	7	Diabetes mellitus	2.5
8	Trachea, bronchus, lung cancers	2.3	8	Hypertensive heart disease	2.3
9	Road traffic injuries	2.2	9	Stomach cancer	2.2
10	Prematurity and low birth weight	2.0	10	HIV/AIDS	2.0
11	Neonatal infections and other	1.9	11	Nephritis and nephrosis	1.9
12	Diabetes mellitus	1.9	12	Self-inflicted injuries	1.9
13	Malaria	1.7	13	Liver cancer	1.7
14	Hypertensive heart disease	1.7	14	Colon and rectum cancer	1.7
15	Birth asphyxia and birth trauma	1.5	15	Oesophagus cancer	1.5
16	Self-inflicted injuries	1.4	16	Violence	1.4
17	Stomach cancer	1.4	17	Alzheimer and other dementias	1.4
18	Cirrhosis of the liver	1.3	18	Cirrhosis of the liver	1.3
19	Nephritis and nephrosis	1.3	19	Breast cancer	1.3
20	Colon and rectum cancers	1.1	20	Tuberculosis	1.1

**Source:** World Health Statistics, 2008.

Aside from the incalculable human and social costs, these crashes cost the world economy about US\$ 518 billion every year. Low and middle-income countries are estimated to account for about US\$65 billion of this global amount (Jacobs et al, 2000). This is far in excess of the total cumulative development assistance that these countries receive annually from donor countries. In 2004, the 15-member countries of the European Union spent more than €180 billion on treatment of traffic injuries alone (ETSC, 2007).

In many of the industrialized countries in Western Europe and North America (e.g., Canada, Sweden, Norway, Australia, the Netherlands, etc) the incidence of motor vehicle crashes is on a downward trend. However, Murray and Lopez (1996) have reported that the significant reductions in the traffic fatality rate in these Western countries have not seen a proportionate decline in non-fatal injuries. In Asia and Africa (e.g., China, India, South Africa, Kenya, Zambia, Uganda, Ghana, etc) there is an exponential increasing traffic casualty trend. A few examples backed by statistics will throw more light on the magnitude of the epidemic in the developing nations.

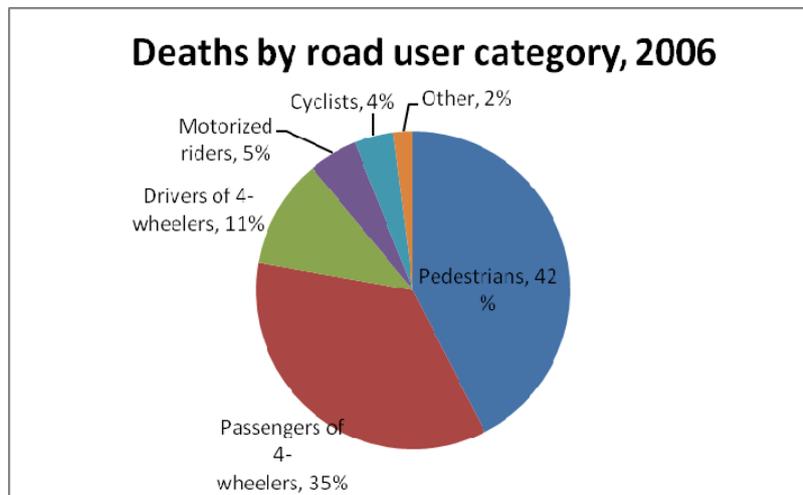
In the Africa region, ten out of the over 50 countries account for about 70% of all road traffic deaths. They include Ghana, Nigeria, Kenya, Ethiopia, South Africa, Republic of Congo, Tanzania, Madagascar, Uganda, and Mozambique (WHO, 2009). For instance, in Uganda between 2006 and 2007, 2,838 people perished and 12,058 others were injured in traffic accidents. In 2007, South Africa recorded 14,920 traffic fatalities with 219,978 injuries. In the same year Nigeria lost 4,673 of her citizens to motor vehicle crashes with 17,794 sustaining degrees of injuries in 2007. While 2,893 people died on Kenya's roads in 2007, 12,470 got injured.

The Asia region for example China, for 2006 alone there were 89,455 road traffic deaths and 431,139 non-fatal injuries. The year 2006 saw Chile losing 2,280 people to traffic crashes and as many as 50,010 injuries were reported for 2007 (WHO Country Profile Traffic Status Report, 2004). Research indicates that there is an anticipated increase of 67% in global road traffic crashes by 2020 in many of these low-income and middle-income countries. Consequently, the WHO has declared this decade (2011-2020) as a '*Decade of Action for Road Safety*'.

### **1.1.2 Magnitude of the road accident problem in Ghana**

Motor vehicle crashes (MVCs) are the leading cause of fatality and injury among adolescents and young adults in the country. The manpower age group of 16-35 has become highly susceptible to crashes. Between the period 1991 and 2008, road traffic accidents (RTAs) claimed 237,289 casualties, including 25,585 fatalities, 84,936 serious injuries, and 126,782 minor injuries (National Road Safety Commission [NRSC], 2008). As of 2010, Ghana has a total population of 24,233,431 and gross national income per capita of US\$590. 41.3% of the population is under 15 years and 53.4% of the population is between 15-64 years. The dependency ratio is 87.3% (Ghana Statistical Service, 2007). Population risk, that is, fatalities per 100,000 population stands at 8.3% as of 2006. But recent accident statistics show this percentage has increased tremendously. These RTAs are estimated to be costing the nation US\$165 million each year. This figure represents 1.6 percent of GDP. Research shows that vulnerable road users, especially pedestrians and occupants of passenger-carrying minibuses locally called 'trotro' are overrepresented in these traffic casualties. The chart below shows the road traffic deaths by road user class for 2006.

**Figure 1:** Road accident fatalities by road user category for 2006



**Source:** National Road Safety Commission, ‘Road Traffic Accident Statistics, 2006’.

Rapid motorization, urbanization and increasing population growth are among the factors driving this traffic problem in the country. Kopits and Cropper (2003) have observed that in low-income countries, the growth in motor vehicles that follows economic growth usually brings in its wake increased road traffic accidents. For instance, in 2006, a total number of 841,314 vehicles were registered in Ghana and 11,668 out these were involved in road traffic crashes. And in 2007 a total number of 932,540 vehicles were registered but 12,038 were crashed in road traffic accidents (Ghana National Road Safety Commission [NRSC], 2007). There was therefore an increase of 53% of motorization from 2000 to 2007. This percentage increase includes only registered vehicles. Several unregistered vehicles are known to be plying the country’s roads.

Ghana has ten administrative regions and fatality distribution by region indicates that the Ashanti region accounted for 22% of all traffic deaths between 2000 and 2007. The Eastern, Greater Accra, and Central regions followed closely with 16%, 11%, and 10% respectively. In 2007

alone fatality rate in the Eastern region had grown by 30%, second to Upper East region which grew by 59% (NRSC Report, 2007). The map below shows the ten regions of Ghana with the arrowhead pointing to the Eastern region where Manya Krobo district is located.

**Figure 2:** Map of Ghana



## 1.2 The study area

Manya Krobo area is one of the 21 districts in the Eastern region of Ghana. The Eastern region has the second largest road traffic casualty rate in the country. The total population in the area as of 2000 was 154,301. The district constitutes about 8.1% of the total 18,310 km of land in the Eastern region and covers an area of 1,476 km. It shares border with the following districts Yilo

Krobo, Asuogyaman, Fantekwa, and Kwahu West Municipal. The indigenes and predominant inhabitants of the area are Krobos. They speak Dangme. Other ethnic groups such as Ewes and Akans also form part of the population in the area. About 58.5% of the total population in the area is between ages 15 and 64. Farming, trading, sewing, teaching, and commercial vehicle operations are the major occupations of the people.

Rural-urban migration has led to congestion in the district capital and its environs. The housing pattern of the area is linear in nature. This is determined by the topography of the area. That is, houses line major roadways. This is locally referred to as ‘*huza*’ housing system. The major towns in the district are Odumase Krobo, Agormanya, Kpong, Akuse, and Asesewa. The district has about 55 kilometres of first class roads and 260 kilometres of third class roads. The first class roads comprise Odumase-Accra road, the Somanya-Akuse road, the Nkurakan-Asesewa road and the Somanya-Kpong-Akosombo road. Kpong-Accra, Kpong-Koforidua, Kpong-Asesewa roads are the busiest motorized routes in the area. The third class roads are mainly gravel roads and are in bad conditions. **Picture 2:** shows a glimpse of Manya Krobo



### **1.3 Problem statement**

The built environment poses risks to motorists because buildings are close to the edge of the major roadways as a result of the linear housing system. The roadways form the major peri-urban link in the area. Most of the feeder roads within the district are now undergoing face lifting without the corresponding road equipment. There are no speed humps on the roads and other road signage and signalization are lacking.

The major mode of mobility is via motorized transport and walking. Therefore, there is a large mix of vehicles and pedestrians using the narrow and major roads sandwiched along residential areas of the township. The commercial passenger-carrying vehicles operating in the district have more than tripled over the last decade. This rapid motorization has come with a price. Two people die on the district's roads daily and about 15 more are injured (Official police report, 2009). About 99% of the passenger vehicles are used and defective vehicles imported from Western countries. The parts used in maintaining them when they break down are also used ones or local ones manufactured by roadside mechanics. The operation of commercial vehicles is not well regulated by central government and transport unions. There are no formal driver training schools in the district where knowledge of traffic rules and practical experience are tested through standardized examination. Hence, commercial vehicles are driven by drivers who have learnt driving through driving/mate apprenticeship.

Many of the commercial drivers in this area are young people between the ages of 18-35. A significant number are school drop-outs from either Junior or Senior High schools. There are few employment opportunities in the area. Many young men take to commercial passenger vehicle driving as a last resort. The conditions under which they work are also challenging and

sometimes practically unimaginable. Thus, several studies have reported that accidents involving vehicles driven by young men have become countless in Ghana (see, Pelz and Schumann, 1971; Goldstein 1972; Karpf and Williams 1983; Williams and Karpf, 1984).

General road use recklessness on the part of drivers and pedestrians has become systemic. This has given rise to rampant motor vehicle crashes with dire consequences for vehicle occupants and pedestrians. District authorities lack the power to turn the situation around by way of planning and implementing accident countermeasures because the Road Traffic Act of 2004 (Act 683) does not vest power in district authorities to set lower speed limits to suit the road use characteristics of their respective areas. Speed limits are set nationally. The National Road Safety Commission (NRSC) has no district branches to deal with issues of education and intervention in a context-specific manner. The enforcement of traffic laws and regulations for example, speed limit, remains at its lowest ebb.

District authorities often turn their attention to other equally important challenges of the area such as HIV/AIDS, Tuberculosis and other communicable diseases. As a result many inhabitants of the area have become increasingly concerned about the likelihood of suffering traffic injuries and death. Despite these challenges, the risk factors influencing road traffic accidents in the district have not been studied and thus the character and magnitude of the traffic problem in the area remain unknown.

## **1.4 Aims of the study**

The general and specific aims of the present study were to:

### **1.4.1 General aim:**

- Identify and describe the personality and socio-environmental characteristics underlying the growing traffic crash problem in order to inform the planning of accident countermeasures.

### **1.4.2 Specific aims:**

- Investigate the individual and situational factors which influence the increased traffic crash risk among drivers of passenger-carrying commercial minibuses.
- Explore pedestrian road use attitudes and behaviour and their travel experiences in relation to pedestrian-vehicle crash involvement.
- Examine if risk perception has any relationship with road traffic accidents

## **1.5 Research questions**

- How do individual and situational factors influence unsafe road use and risk-taking among commercial drivers in Manya Krobo?
- What attitudes and behaviour influence pedestrian-vehicle crash involvement?
- In what ways do perceptions of risk impact road traffic accidents?

## **1.6 Delimitations**

For the purpose of generalization or transferability of the findings of this study, it is important to define its boundaries. The three key delimitations of this research have to do with the sample, data and methodology. The study site is a district capital with growing motorized transport. The thesis has as its main focus a case study of the traffic culture in this area. In the first place, the sample size is small and criteria for inclusion in the study were largely by convenience.

While it is known that several factors may lead to road accidents, this research primarily has focused on the perceptions and opinions of drivers and pedestrians only not for lack of appreciation of the opinions of other road users but rather because of their over representation in traffic crashes. This also helps to generate a manageable data. The data generated from this sample is therefore inhered with non-representativeness.

The research methodology employed is a qualitative one and thus the data collection strategy was by means of individual interviews, focus group discussions and field observation. The findings of this research would therefore be considered to be preliminary. The investigator's purpose is to use the findings generated as a catalyst for sensitization leading to the development of more effective safety interventions. These preliminary findings would form the basis of more definitive studies in the future. Though the findings of this study could be compared with similar cases in many parts of the country via extrapolation, in the light of the above-stated weaknesses any attempts at transferability ought to be exercised with utmost caution.

## **1.7 The rationale for the present study**

Age distribution of traffic casualties tilts towards the youth and the most active manpower age group. It appears the interest of central government and local authorities is geared towards HIV/AIDS and other communicable diseases much to the neglect of the growing threat of road traffic accidents.

In line with the WHO's declaration of this decade (2011-2020) as a decade of global action for road safety, I have chosen the locality where I come from as the starting point for this global action for traffic safety. My choice of Manya Krobo as my case study finds expression in the axiom that urges all of us to think globally and act locally. The thriving motorization, nature of road infrastructure, the walking behaviour and vibrancy of the people in the area provide a good context for this study. I am convinced that it is by studying the traffic problem and the attendant public health burden and economic consequences it poses to our collective future that we could draw the attention of central government and local authorities to it.

This is also a bold attempt to bring the challenge posed by this hidden epidemic to the public domain for public discourse to help de-politicize road traffic accidents so as to influence social action. Again, this study is this researcher's contribution to other works done in the area globally and locally. It is this researcher's sincere hope that its findings will add to knowledge on the subject and help fill, to a reasonable extent, the gap in our knowledge on the subject in the Ghanaian setting in general and the Manya Krobo area in particular.

## **1.8 Outline of thesis**

In line with the aims of this research, the thesis had been structured into two major sections. The first section and the main content of the thesis was sub-divided into two separate studies (papers). The first study focuses on the human and situational factors impacting drivers' unsafe road use attitudes and behaviour. The second study looks at the views of pedestrians on their travel experiences in relation to pedestrian-vehicle crashes. Then the second section presents the general introduction, methodology, theoretical framework, summary of results of papers I& II and ends with a general discussion of the findings.

## **2 Theoretical perspectives and models of the study**

### **2.1 Introduction**

Road traffic accidents are believed to have varying causes. Hence, the ultimate aim of all road traffic research and intervention is, to some extent, identify and reduce these causes as much as possible. These causes may be complex in nature and are often perceived to be impacted by science and politics (Elvik & Vaa, 2004). In attempting to understand why road accidents do occur and propose guidelines for researching their underlying causes, several theoretical frameworks and models have been put forward. Much of these have to do more with drivers than any other category of road users such as pedestrians, cyclists and vehicle occupants. While some have placed emphasis on individual characteristics, others have focused on the situational as well as the socio-ecological dimensions.

These theories and models have their strengths and weaknesses and none has complete scientific coverage of the scope of factors implicated in traffic crashes. Though no single theory or model

has gained universal acceptance among the traffic research community, they nonetheless have shaped our understanding of the road accident problem in significant ways. Given the above-stated reasons, three theories are used in this study. In accordance with the research focus and aims of the present study, the following theoretical perspectives and models that seek to explain accident involvement in relation to human factors and structural factors provide a good fit and have been selected to constitute the theoretical framework. They are systems theory, social cognitive theory, and risk theory. They support the case study approach to accident analysis which holds that the actual causes of each accident cannot be fully known when they are studied independent of the context in which they occur.

## **2.2 Systems theory**

The systems theory also known as the systems approach (Reason, 1990; Rasmussen, 1997; Dekker, 2002; Rothe, 2002) is the most predominant framework employed in safety research in recent decades (Salmon et al., 2010). Its advent dates far back to 1940s when Chapanis (1999) in a groundbreaking study in the 1940s on aviation safety and plane crashes found that ‘pilot error’ was essentially ‘designer error’. Since then the theory has engaged the attention of safety researchers over the years and it has received tremendous application in management as well as traffic domains (Johnson, 1999; Reason, 2008; Johansson, 2009).

The basic assumption of the systems theory is that road traffic crashes result from the interactional malfunctioning of the components of systems. Its main focus is on the person-environment interactional maladjustments (Muhlrad et al., 2005). Hence, human factors and vehicle factors conspire with physical and social environmental factors to bring about road traffic accidents. The interdependence of these factors in relation to accident causation suggests that in

trying to investigate the causes of motor vehicle crashes all the relevant factors within the system ought to be given equal attention. System theory does not only explain accident causation but also points to the key issues to be considered in planning any accident countermeasures. In other words, blaming the victim such as pedestrians for pedestrian-vehicle crashes and suggesting behaviour modification strategies alone to deal with the problem may be unsuccessful. However, success will come when behaviour modification goes hand in hand with the technical modification of the road infrastructure and equipment. This also means the modification of motor vehicle design will become a crucial component of the system to consider. Put another way, perhaps drivers of passenger-carrying commercial vehicles are over represented in road traffic accidents not because of person factors only but maybe because of the poor nature of the road furniture which combines with the defective and used vehicles used for motorized transport in the country.

The strengths of this theory are in its holistic approach to the road traffic problem. It is both a method and an intervention blueprint to accident management. It is also comprehensive because its tenets cover all categories of road users such as drivers, pedestrians, cyclists, and passengers. Inherent in this theory is the need for a political commitment in that policy makers, road engineers, vehicle manufacturers, road users, and safety professionals' actions and inactions are perceived to be important and complementary. Research indicates that already not only has the theory aided the understanding of most of the risk factors implicated in accidents, but also it has informed various safety interventions in many countries such as the Vision Zero in Sweden, Norway (Johansson, 2009) and other successful strategies elsewhere like Australia and the Netherlands (Wegman et al., 2008). Evidence suggests that these countries have made

significant reductions in their road crashes due to ambitious and holistic strategies that have been adopted.

As other theories which preceded it, systems theory does not account fully for all aspects of the traffic carnage. For instance, traffic law enforcement has not been given attention yet it is known to be another key factor in accident research. It is also considered by many safety researchers to be too generic in scope and thus lacks specificity when it comes to particular accident situations. These weaknesses notwithstanding, it stands tall among its counterparts for its universal appeal and interdisciplinary orientation or application.

### **2.2.1 Systems theory-based models**

These are models or frameworks inspired by the systems theory.

### **2.2.2 The Haddon matrix**

Systems theory has inspired the development of several models and accident taxonomies which aim at explaining the causal relationship of factors in road accidents. Some have focused basically on prevention assuming that the causes are already known. In principle, they point to the causal factors of road crashes because if the causes are not known, preventive measures to mitigate their effect cannot be proposed. A good example of these models is the Haddon Matrix of road accident prevention (Haddon, 1980: 1999; Runyan, 1998).

**Table 2:** The Haddon matrix and pedestrian-vehicle crashes

<b>Influencing factors</b>				
<b>Phase</b>	<b>Host</b>	<b>Agent/Vehicle</b>	<b>Physical environment</b>	<b>Social environment</b>
<b>Pre-crash</b>	Intoxicated driver Fatigued driver Pedestrian crossing street Elderly pedestrian	Speeding automobile Worn tires Worn brakes Momentum of automobile	Poor street lighting Slick pavement Potholes  Inadequate signage  Night time	Unenforced speed limit laws Inadequate investment in crosswalks
<b>Crash</b>	Pedestrian wearing headphones Hearing-impaired pedestrian Part of pedestrian's body struck by vehicle	Impact of automobile with pedestrian Portion of vehicle impacting pedestrian	Hospitals nearby with specialty in trauma care Part of body impacting ground	Good Samaritan laws
<b>Post crash</b>	Ability of victim to recover Post injury care received Psychological coping of victim in aftermath of event	Severity of physical injuries  Severity of post crash psychological impact	Rehabilitation facility	Health insurance Access to rehabilitation services Family and social support

**Source:** Barnett et al. (2005).

The Haddon Matrix was developed by William Haddon (1980). It aims at shaping our understanding of injury causation as well as providing guidelines for planning intervention measures. The matrix is in the form of a grid and categorized into four columns and three rows. The rows stand for the phases an injury can take e.g., pre-crash/pre-event, crash/event, and postcrash/postevent. These terminologies could be changed to suit the issue or social problem under study. For the present study the most relevant part is the pre-crash phase because it serves

to draw our attention to the causes of accidents. These risk factors Haddon names as host, agent/vehicle, physical environment, and social environment and represent the columns in the grid. It is the interaction among these factors that gives rise to road traffic crashes.

The first column named “host” stands for the individual who is at risk of suffering crashes. In other words, it indicates the road users such as the drivers, pedestrians, cyclists, passengers, etc. whose attitudes and behaviour precede motor vehicle crashes. Secondly, “agent” refers to the aberrant road use behaviour itself which predisposes road users to accidents such as speeding, dangerous overtaking, jaywalking, cell phone use, etc. Also, agent could be conceptualised as the defects in the vehicle system which cause accidents e.g., used tires, malfunctioning headlamps, etc. The third column depicts the physical shortcomings of the environment which lead to accidents e.g., bad road infrastructure, lack of sidewalks, etc. The “social environment” constitutes the cultural, religious, and superstitious beliefs, the values and regulations within the social context which influence accidents.

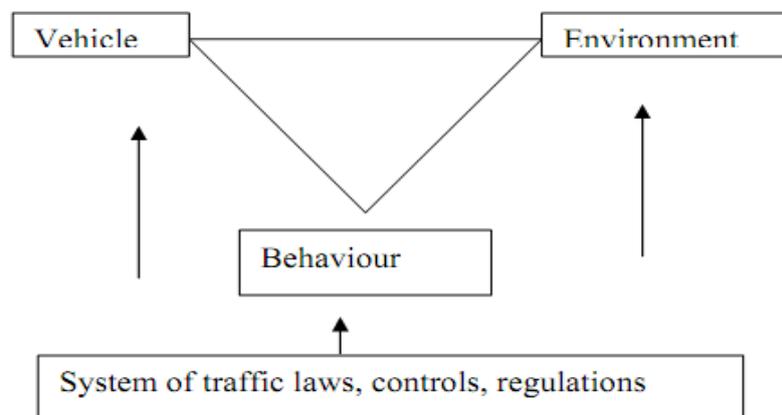
The strength of this model is that it could be applied in multidisciplinary domains and in several contexts. It is equally comprehensive in that it attempts to explain the causal factors responsible for traffic injuries and provides directions as to what should be done to prevent the injuries in the first place. It also serves as a guide to manage them if they do occur e.g., at the “crash/event”, “postcrash/postevent” levels.

### **2.2.3 The Jørgensen-Abane model of traffic accident causation**

Jørgensen and Abane (1999) proposed another model of accident causation. This model draws inspiration from the systems approach and the social ecological model. The model posits that

road traffic accidents are the result of the interaction of four key constructs. Jørgensen and Abane (1999) name these factors as ‘system of traffic laws, controls, regulations’, ‘behaviour’, ‘vehicle’, and ‘environment’. This model has path lines with arrow heads indicating the direction of their influence and the nature of the relationship among the constructs. Figure 3 below shows the framework.

**Figure 3:** A model of road accident causation



**Source:** Jørgensen & Abane (1999)

#### 2.2.4 System of traffic laws, controls, regulations

From the framework, the promulgation of traffic policy, laws, and their enforcement or otherwise plays a fundamental role in road crash causation. This is because it influences all the three remaining constructs of behaviour, vehicle, and environment. Passing traffic laws and enforcing them is an important factor in traffic safety research because just as the whole universe is guided by law and order, these laws guide behaviour and regulate the conduct of road users while on the

roadway. For example, a system of laws such as pedestrian right-of-way laws obliges motorists to yield right-of-way to pedestrians at zebra crossings. Again, a traffic policy like 'Vision Zero' has far reaching positive impact on traffic safety management as has been witnessed in Sweden. The lack of the controlling effect of traffic laws and regulations brings about chaos on the roadway. The consequence of this chaos is road traffic accidents.

### **2.2.5 Behaviour**

System of laws and regulations directly affect road user behaviour e.g, the behaviour of the driver, pedestrian, cyclist, and passenger. Also, the characteristics of the vehicle and the environment influence pedestrian and driver behaviour in ways that lead to accidents. Road user behaviour equally impacts the environment and the vehicle. For instance, a fatigued driver or a distracted driver can become involved in traffic crashes because his physiological or mental states are challenged. And the probability of crash is hastened when distracted driving combines with bad conditions of roads and non-enforcement of traffic laws. In much the same way, a pedestrian who crosses the roadway outside of the crosswalk or walks in lanes meant for vehicles as a result of non-availability of pedestrian facilities or even talks on a cell phone while crossing, will most likely be involved in pedestrian-vehicle collisions. In other words, a sensation-seeking driver who has risk-taking propensity will likely use the roadway in a manner that poses danger to other road users.

### **2.2.6 Vehicle**

The condition of the vehicle used on the roadway by drivers is responsible for a number of accidents. Examples of these vehicle conditions could be driving used cars, converting cargo

vehicles into passenger vehicles by tempering with their original make up, brake failure, tire burst, poor maintenance of vehicles or maintaining them with used car parts. The path lines in the framework above show that the vehicle is not only affected by behaviour and environment but also the system of laws, controls and regulations e.g., a law allowing used tires and car parts to be imported into the country like the case of Ghana may aggravate the accident problem.

### **2.2.7 Environment**

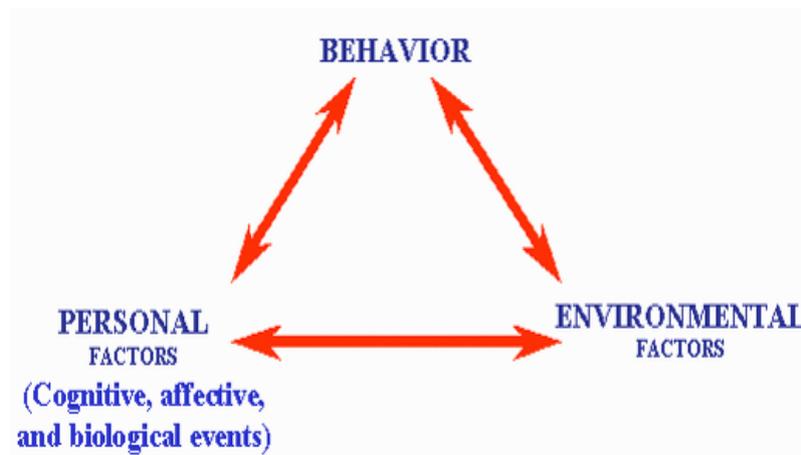
Both the physical and social environments are key risk factors in motor vehicle crashes. They influence road user behaviour and motor vehicles. For instance, potholed roads affect driving behaviour and condition of vehicles. Poor roadway lighting affects visibility of pedestrians. Weather conditions such as winter/snow make road use challenging. The values, cultural and religious beliefs within the social environment such as fatalism, or the belief that accidents are just punishments from the gods for wrong doers indirectly influence road user behaviour tremendously.

This model is all-encompassing because it has gone beyond the domain of behaviour, vehicle, and environment to include the systems of traffic policy and laws in general as a separate construct. In many other models this is often embedded in the environment construct. This is notable because the role of politics in traffic safety management cannot be overemphasized. The scientific research community may do all they can to research into the risk factors that bring about motor vehicle crashes. However, for their findings to be implemented political decisions may have to be taken. Where there is such a political will and commitment, vulnerable road users become the beneficiaries.

### 2.3 Social cognitive theory (SCT)

Albert Bandura's social cognitive theory also provides an important framework for this study. This is because the theory helps to explain other 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 an agentic orientation to human functioning. Its central assumptions are that three broad constructs i.e., personal factors, behaviour, and environmental factors are the foremost determinants of human behaviour. Figure 4 shows the constructs of the theory.

**Figure 4:** Bandura's triadic reciprocal model



**Source:** Bandura (2001) and Pajares (2002)

The bi-directional arrows in the model show the relationship among them. The triadic reciprocal framework of the theory's constructs demonstrates how they mutually interact with each other and also points to the fact that all the constructs are relevant when it comes to the explanation of behavioural outcomes. The agentic perspective it assumes shows the importance of the human agency in the scheme of things. Hence, the theory can be compartmentalized into two broad

constructs: human agency and structure. Personal factors and behaviour can be grouped under human agency category while environment can be put under structure. 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. The essence of the theory is that it enables us to describe and explain behaviour such as road user behaviour. It also provides guidelines for designing and implementing interventions (e.g., accident countermeasures, etc) to address the shortcomings of the behaviours described (e.g., speeding).

This theory provides a good fit for the present research because it addresses two key constructs (i.e., attitudes and behaviour) found in the title of this thesis. Under the personal factors, Bandura includes cognitive, affective, and biological events to show that personal agency is influenced by internal dispositions. These behavioural patterns interact with environmental processes and are both influenced by each other. This theory shares similarity with the nature-nurture debate 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. This is foundational because affective beliefs and cognition are integral components of attitudes. 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 and text while driving (Lawton et al., 2007). However, the role of affect in risk taking has been documented (Loewenstein et al., 2001; Lawton et al., 2007).

Again, the attitude-behaviour relationship has been the subject of intense debate in the social psychology literature. This has given rise to the theory of reasoned action (TRA; Fishbein & Ajzen, 1975; 1980) 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.

Environmental factors shape behaviour and personality characteristics (Bener & Jadaan, 1992). These factors represent both the physical and social aspects of the environment. Via observational and vicarious learning individuals (e.g., drivers) learn to speed because they may have observed similar behaviour go unpunished within their social environment. 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. And thus, this causal structure emphasizes the point that people are both producers and products of their social environment (Bandura, 2001).

The SCT is applicable in many disciplines and can be used to study varying behaviour patterns. It provides research methodology and integrates human agency and social structure by way of path lines of influence. However, some researchers have criticized it for placing too much emphasis on the human agency factor.

## **2.4 Risk theory**

Human beings take risks on a daily basis. The concept of risk in traffic safety has been widely studied. "Risk surrounds us, it envelops us. It is our personal and societal preoccupation and our

salvation. Without understanding it we risk everything, and without capitalizing upon it we gain nothing” (Breakwell, 2007, p. xi).

It is a concept that defies a single straight forward definition due to its multidisciplinary applicability. For instance, studies involving risk cut across the physical and social sciences by psychologists, sociologists, geographers, economists, nuclear scientists, environmentalists, etc. Because it is applicable in many domains, the term *risk* is sometimes used interchangeably with *hazard* although there might exist a nuance between them. Technically, risk is defined as probability multiplied by consequence (i.e., probability x consequence) (Drotts-Sjøberg, 1991). Breakwell (2007) defines risk as “the probability of a particular adverse event occurring during a stated period of time”, (p.2). Breakwell sees the word “probability” as the likelihood of some specific adverse events (e.g., road traffic accidents) that might result from being exposed to a hazard.

There is no doubt that human beings are interested in knowing the likelihood or probability of an adverse event happening to them and how bad or worse the effect might be. The search for understanding the nature of risk and how it is perceived by individuals has led to the development of risk theories and models such as the theory of risk homeostasis (Wilde, 1994; 1998), risk thermostat framework, the psychometric paradigm, etc. Social scientists have suggested that risk is socially constructed and have set out to investigate how people perceive and negotiate daily risks like road traffic crashes. It must be noted that these theories and models have not gone without criticisms.

### **2.4.1 Risk perception**

The degree of risk perceived determines the degree of actions to be taken (Adams, 1995). Risk perception (Slovic, 2009) and its relationship with road traffic accidents has been the subject of numerous studies in the traffic safety literature. It is assumed that there are individual and group differences in risk perception. Personality traits are known to influence risk perception (Vavrik, 1997; Ulleberg & Rundmo, 2003; Rundmo & Iversen, 2004; Oltedal & Rundmo, 2006; Gulliver & Begg, 2007). Douglas (1986) has indicated that risk perception is the result of personal dispositions and socio-cultural factors e.g., religious beliefs. This position has been well illustrated by the cultural theory of risk (Douglas & Wildavsky, 1982). This attribute has made risk perception a multidimensional construct. Hence, what one driver or pedestrian might consider to be risky behaviour on the roadway might be perceived differently by others. The concept of vulnerability is central to risk perception and has been defined by several writers to depict the human shortcomings that make certain individuals and groups prone to threats, risks or hazards. Indeed, it is seen as a 'state' existing within a system (e.g., personal dispositions of road users) before that system comes into contact with a hazard event.

It may therefore not be surprising that personality characteristics such as risk-taking propensity (Iversen & Rundmo, 2002; Oltedal, & Rundmo, 2006; Lund & Rundmo, 2009; Bingham et al., 2006); sensation-seeking (Zuckerman, 1997; Jonah, 1997), and other risky road use attitudes have been reported to play roles in road accidents. Deery (1999) has found that young drivers are more susceptible to impaired risk perception and others feel more invulnerable to traffic risks (Weinstein, 1984). Basically, risk perception is a subjective experience because risks are future events. Risk perception can therefore be described as the process by which individuals mentally

represent and assimilate the probability that negative events such as injury or death connected with motor vehicle crashes might occur to them in the future. Moller (2000) has also observed that risk perception has to do with one's opinion of the likelihood of suffering a health threat associated with either performing a certain activity or choosing a certain lifestyle (e.g., speeding or hawking in traffic). Understanding how individuals perceive and negotiate risk has the potential of forming the basis for planning more effective risk communication strategies. For example, risk willingness, risk tolerance and risk acceptability are important constructs to explore. Thus, a brief introduction here of a few of the models proposed to guide this understanding will be informative and instructive.

#### **2.4.2 The psychometric paradigm**

The psychometric paradigm dates back to the 1970s. Its origin is credited to the work of Slovic, Lichtenstein, and Fischhoff (1979). The paradigm holds that risk results from social construction and therefore it is subjective in nature and cannot be measured objectively (Slovic, 1992; 2000). Being subjective means risks are susceptible to social and environmental influences. 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. The basic characteristics of the paradigm are in its emphasis on the use of psychometric techniques e.g., rating scales and 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 et al., 1995). The model is also applicable in health research and other fields.

However, it has been criticized for putting on the cloak of a constructivist epistemology while its proposed methodologies are rooted in the quantitative and positivistic orientation that it seeks to reject. Wåhlberg (2001) criticizes it for being more of a descriptive model than an explanatory framework. Wåhlberg thinks this weakness limits its predictive power and therefore restricts its applicability. Other researchers equally criticize it for failing to distinguish between general risks and personal risks. It appears difficult to represent the model diagrammatically. Despite these weaknesses it still remains the dominant approach to safety research in psychology in the absence of a more robust, flexible, and all-encompassing model.

#### **2.4.3 Risk homeostasis theory (RHT) and risk compensation theory (RCT)**

These two theories are generally referred to as theories of behavioural adaptation (Elvik, 2004; OECD, 1990; 1997). They are both related in principle and practice although RHT deals more with partial compensation while RCT concerns itself with full compensation. Sometimes, both theories and terms are used interchangeably with risk compensation gaining more prominence (Elvik & Vaa, 2004). In effect, RCT is viewed as an extension of RHT. Both theories were popularized by Gerald Wilde (1976; 1982; 1994; 1992; 1998) but RCT was actually propounded by Sam Peltzman (1975). Their origins are in road traffic safety research (Taylor, 1964).

However, the concepts of compensation and homeostasis are credited to the early works of Claude Bernard (1813-1878) and Cannon (1929, 1932) respectively. The basic postulate of RHT and RCT is that human beings learn to change their behaviour as a result of risks perceived. For instance, individuals (road users) are likely to be more cautious when using rainy and snowy or icy roads because of the fear of accidents (high risk perceived). But as soon as these bad weather

conditions disappear, humans tend to modify their behaviour and will use the roadway with less caution (low risk perceived).

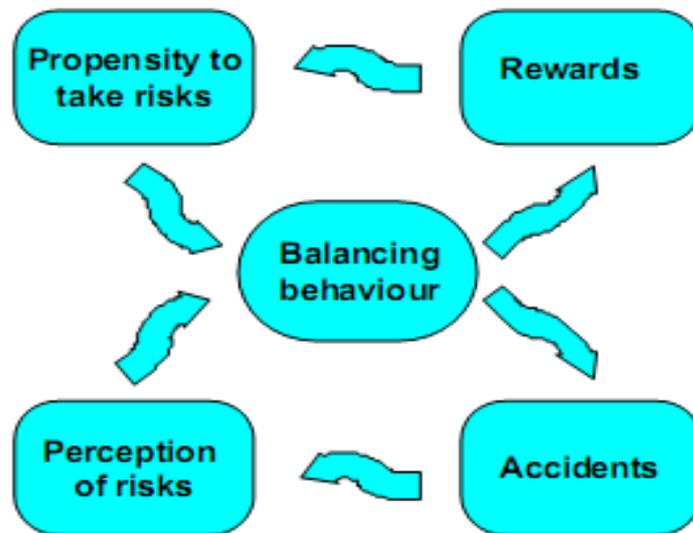
Technically, Wilde describes this behavioural adaptation as having in-built target level of risk which is constant and is accepted by individuals and operates on the principle of the functioning of the thermostat. That is, in the face of perceived high danger, human cautiousness and alertness rise but as the danger appears to go away the tolerable risk level of humans falls back to its normal position. Thus, Wilde and his colleagues (2002) argue that safety interventions will be meaningless unless they directly affect the amount of risk taking that individual road users are willing to accept (target level of risk). That is, contrary to the expectations of safety engineers and advocates, accident countermeasures put in place may rather have an offsetting effect on users. For example, driving on a first class road will make drivers feel that since the road is good there might not be any risks or even if there were risks they might only be minimal thus they may choose to speed instead. But if they were driving on a potholed gravel road, they might be more careful because of the known risks associated with driving on such roads. So the good condition of the road rather compensates for the risk to be perceived.

Gerald Wilde concludes that it is this propensity for risk acceptance which determines the actual accidents associated with any behaviour engaged in by humans. As a result of this Wilde again postulates that humans and communities will get the required number of accidents they wish to get unless the target level of risk is altered. This theory has received extensive debate among researchers. Empirical evidence both confirming and refuting its usefulness has been adduced. The often cited confirmatory examples involve the use of helmets as well as the unprecedented reduction in accidents emanating from the great caution exhibited by the Swedish people when

they changed from left hand drive to right hand traffic in the fall of 1967. On one hand, it has been praised for its contribution to the understanding of road user behaviour (Adams, 1983; 1988; Assum et al., 1999; Adams & Hillman, 2001; Hedlund, 2000).

On the other hand, it has also been criticized for lack of validity and for not showing the methodology for measuring the ‘target level of risk’.(Evans, 1986; Haight, 1986; O’Neill & Williams, 1998; McKenna, 1982; Thompson et al., 2000; Dulisse, 1997). The Organization for Economic Co-operation and Development (OECD) (1990) has found evidence confirming a large part of the theory. For the purpose of this research, Adams and Thompson’s (2002) and Adams’ (2003) diagrammatic representation of risk compensation and homeostatic model is presented other than that proposed by Wilde (2002) because it lends itself to easier explanations. The explanatory constructs of the model are presented below.

**Figure 5:** Risk thermostat model



**Source:** Adams (2003); Adams & Thompson (2002)

The model above shows that each individual has in-built risk-taking propensity but there are individual differences with regard to risk-taking. The arrowheads point to the directional influence. From the diagram, rewards of risk-taking (e.g., sensation seeking, speeding to get to a destination early or for the thrill which comes with it, etc) have a direct influence on the insatiable desire to take risks (propensity to take risks). Also, risk perception is determined by accidents. That is, if you have personally been involved in an accident before or some relatives of yours have been injured or killed in an accident, these negative events directly shape your risk perception. In general, risk-taking could bring both rewards and punishments (accidents). Thus, in perceiving the risk to be taken, a balancing act or in other words, a cost-benefit analysis has to be performed. This balancing act is represented by the box in the middle of the diagram.

Though the model may not be comprehensive enough to answer all questions relating to risk estimation, it does shed light on some important aspects of the motivations for risk-taking.

### **3 Methodology**

#### **3.1 Introduction**

The choice of a research methodology is an important decision to make in the research process. It is so because it is considered as the engine room on which the entire research is hinged. Thus, for the sake of the reader and future replication it is essential to be clear about the issues of methodology, ontology and epistemology. The researcher's beliefs about knowledge and the nature of reality being sought influence the choice of methodology. The research methodology chosen informs the techniques and tools to be used in the study. These tools and techniques provide the basis for the research design. The design embodies the linkages among theory,

research questions, research aim, methods, and sampling techniques (Robson, 2002). Ensuring a good match between the research methodology and research questions has implications for the meaningfulness of the study and its findings. In the light of the foregoing, the methodological underpinnings of the present study are described below.

### **3.2 Methodological considerations**

The literature shows that apart from the natural sciences, much of the research carried out in the social sciences has been heavily influenced by the positivist and objectivist epistemological paradigm. This holds that genuine and true knowledge could only come from claims that are verifiable by means of direct experience (Patton, 2002). The empiricist paradigm has influenced about 90% of the traffic safety literature. However, this epistemology has been challenged as far back as 1970s by many researchers including Kuhn (1970).

To this end, social constructionism (Burr, 1995; Gergen, 1985) has been advocated. Since its advent it has become a useful epistemological basis for various interpretive theoretical perspectives in the social sciences. This paradigm, unlike its predecessor, problematizes given constructs and questions their validity while exploring ways of connecting them to reality. Social constructionism and its attendant qualitative approach may not be meant to supplant their quantitative counterpart but to supplement it. Hammersley (1992) has argued that the choice of one methodology over another involves loss or gain trade-offs. However, the nature of the social phenomenon to study determines the adoption of a methodological position (Morgan & Smircich, 1980).

The present research locates itself within the constructivist paradigm and shares in the constructionist epistemological position which holds that “all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (Crotty, 1998, p. 42).

This position is congruent with the relativist ontology (Edwards, 1997; Gergen & Gergen, 2003; Rorty, 1991) which places emphases on the diversity of interpretations that could be generated from people’s accounts of the world. Indeed, it postulates that no foundational reality should stand in the way of the possible ways in which accounts of events such as motor vehicle crashes could be described. This demonstrates the view held by proponents of the social constructivist paradigm that the knower cannot under any circumstances attain knowledge of a reality that is independent of the knower.

### **3.2.1 Qualitative framework of study**

The qualitative research framework guides this enquiry. The choice of the qualitative paradigm for the present research finds support from the fact that road traffic crashes are context-dependent events. Therefore, any discourse aimed at exploring their root causes ought to be situated within their respective context. In other words, subjective experiences constitute individuals’ reality of events such as motor vehicle crashes and that the pursuit of objective reality alone in traffic research may be characterized by challenges.

The role of the researcher is therefore that of an active interpreter and observer (Sudweeks & Simoff, 1998). Qualitative research is not homogeneous. Different approaches have been put up

with varying theoretical and methodological considerations. The basic aims of these approaches are to explore, describe, and interpret the individual and social experiences of research participants (Smith, 2008). The description of accident causation from the socio-cultural perspective of participants has the potential of making us gain both preliminary and deeper understanding of the underlying risk factors (Roth & Elgert, 2003).

### **3.2.2 The choice of the case study approach**

This study used the vehicle of a qualitative case study approach (Yin, 1994; Creswell, 2002; Bassey, 1999). Noor (2008) describes the case study approach as "...an empirical inquiry that investigates a contemporary phenomenon within its real life context using multiple sources of evidence" (p. 1602). The case study approach was considered appropriate for this study because apart from its foundations in the constructivist paradigm, the focus of the present research also meets Yin's (2003) criteria for the use of a case study approach. Yin (2003) posits that a case study design becomes very useful when:

(i) the research focuses on answering 'how' and 'why' questions; (ii) the behaviour of the research participants cannot be manipulated by the researcher; (iii) the context of the participant is believed to impact the phenomenon under investigation; (iv) there is no clear line between the phenomenon and the context (Baxter & Jack, 2008). Besides, the aim of this study equally falls within the realms of intrinsic and instrumental case study approaches suggested by (Stake, 1995)

Added to these is the fact that the study site was a district capital and so the main focus was on the road traffic accident phenomenon within the real-life context of the participants (Yin, 1989) in order to gain thick descriptions and deeper understanding (Gummesson, 1991). The

ineluctable constitution of individuals as both social and cultural phenomena is known for long hence the cultural, religious and environmental context of road use is as important as the individuals and the resultant road traffic accidents themselves. Indeed, the context and the individual are mutually constituted because behaviour is believed to be conditioned by the patterns and processes of the social context (Markus & Hamedani, 2007).

The primary source of data was the respondents. And the case or unit of analysis in this study was the individual road use behaviour as well as the event of road traffic crashes. This approach enabled the researcher to explore the phenomenon of road crashes within the context of traffic culture, individual and situational factors in the Manya Krobo area. The case study approach offered the researcher the opportunity to seek respondents' opinions about the "how and why" questions (Anderson, 1993) regarding the determinants of unsafe road use vis-à-vis the current spate of traffic crashes.

Also, the use of the qualitative case study approach provided the advantage of accessing multiple sources of data such as individual interviews, focus group discussions, field observations, and documents to offset the shortcomings inherent in single data collection strategies (Yin, 1993). The qualitative case study approach became an indispensable research tool for this study because the focus of the study was largely both exploratory and descriptive (Yin, 1984, 2003).

### **3.3 Data collection and procedure**

Data for the present study were collected from four sources. These sources could be categorized as primary and secondary. The primary data were collected from drivers and pedestrians. The secondary data sources were the key informants, field observation, and documents. The main

motivation for this methodological triangulation was to ensure rigour and trustworthiness of the data in consonance with the guidelines provided by Padgett (1998). Padgett (1998) outlines six steps in ensuring rigour in qualitative research among which is triangulation.

Individual interviews were conducted with pedestrians and drivers. Focus group discussions were also held with groups of drivers. While pedestrians were contacted at home and in their offices, drivers were engaged at the two main lorry stations in the area. Key informants were approached in their offices. The aims of the study were explained to research participants and were told that participation or non-participation would not bring any financial rewards or punishments to them. They were included in the study only after they agreed to do so. The language used for the interviews was Dangme. Dangme is the local dialect spoken in the study area. All data were collected solely by the researcher.

### **3.3.1 Instruments**

Separate semi-structured interview schedules with open-ended items for drivers and pedestrians were developed for the study. A discussion guideline was used for the focus group discussions (FGDs) with drivers. A digital voice recorder was used to capture the interviews for analysis. Notepads and pen were used for note-taking.

### **3.3.2 Participants**

The main participants in this study were 13 drivers of passenger-carrying commercial minibuses and 10 pedestrians. They were recruited by the researcher from the study area. The sampling strategy used for selection was a purposive one. Then three key informants whose job responsibilities directly involved dealing with traffic safety issues were also interviewed to gauge

their opinions on the subject matter. They were from the National Road Safety Commission [NRSC], the Ghana Private Roads and Transport Union [GPRTU] of the Trade Union Congress [TUC], and the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service. The drivers were all male and their ages ranged between 20 and 57. Only males drive commercial vehicles in the study area. The pedestrians were made up of male and female adolescents and adults. The break down for the pedestrian sample included 3 women, 2 girls, 3 men and 2 boys. The selection of the sample was non-probabilistic because there was no intention to make any statistical generalizations to the larger Ghanaian society.

### **3.3.3 Practical challenges of data collection**

Death is often perceived as a taboo subject by most people in Ghana. There is a relationship between traffic crashes and death. Hence, given the superstitious and religious beliefs as well as the magical thoughts about traffic accidents, some respondents were a bit uncomfortable with certain questions. For example, the question “how probable is it that you could be involved and injured in a traffic accident?”. Occupational drivers had little or no time to spend on any other thing outside of their work schedules. The practical challenge of getting drivers to take part in the study was a daunting task initially. Also, drivers felt they had been subjects of victim-blaming for far too long as far as road traffic accidents were concerned without the willingness of their accusers to hear their (drivers) voice. And so when they got the opportunity by means of their participation in this present study, they almost turned the researcher into a journalist pressurizing him to go to the radio stations in the area to carry their concerns across to the powers-that-be whose actions and inactions they claimed were more responsible for road

accidents. From time to time, the researcher had to assert that the work was meant for academic purposes only so as to parry off their demand.

### **3.4 Data analysis**

A qualitative content analysis method was used to analyze the interview dataset. This method has its roots in the constructivist-interpretive paradigm (Denzin & Lincoln, 1994). It is thought to originate from the work of Krippendorff (1980). Qualitative content analysis is a research method that enables researchers to carry out a “subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005, p. 1278). The choice of this analytical strategy facilitated the analysis of the contextual meaning of the generated interview data while paying attention to the characteristics of the talk and text (McTavish & Pirro, 1990; Tesch, 1990; Cole, 1988). This is because it helps to obtain and provide simplified descriptions of data (Cavanagh, 1997). Its usefulness as a research tool for gaining knowledge and new insights into people’s experiences has been reported by Nandy and Sarvela (1997). Comparatively, it is a flexible method (Harwood & Garry, 2003) however, its flexibility or otherwise depends on the aim of the researcher (Neundorf, 2002).

Shannon and Hsieh (2005) distinguished between three approaches of qualitative content analysis. These are conventional, directed, and summative. It is said to be conventional when categories emerge from the text directly without any preconceived patterns. The conventional approach is synonymous with what other researchers call the inductive approach (Braun & Clarke, 2006; Mayring, 2002; Kondracki & Wellman, 2002; Elo & Kyngas, 2008). This was the

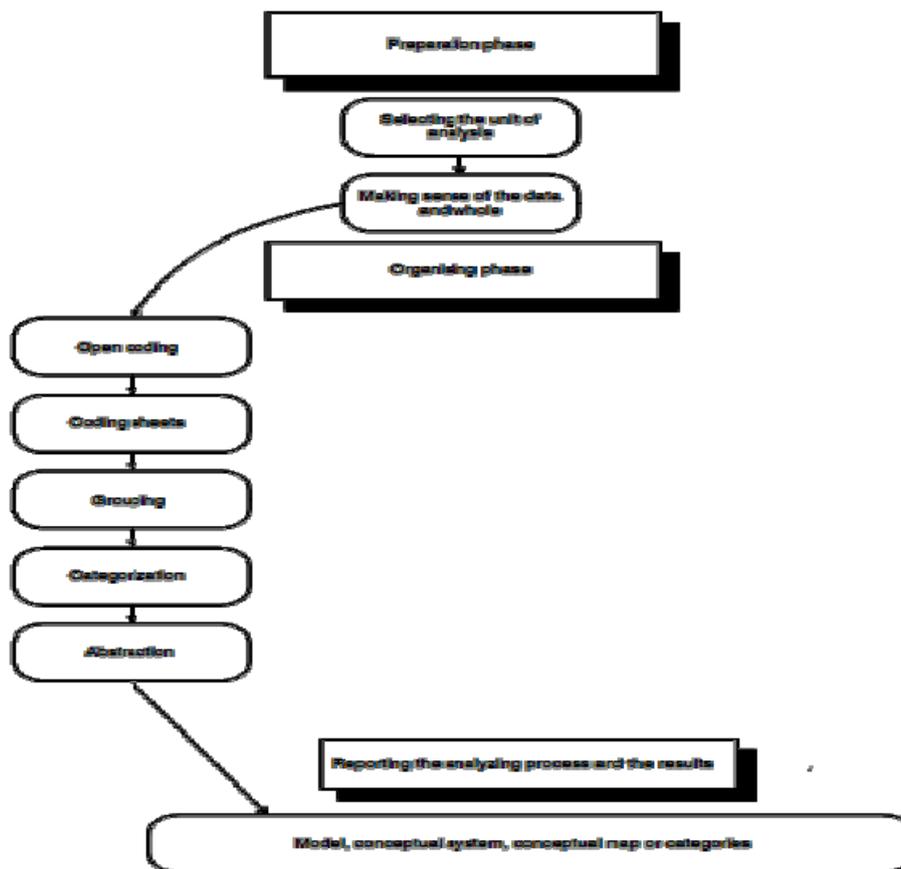
approach adopted in the present research because it suited the problem under investigation (Weber, 1990).

Since text data was collected with open-ended items on the interview guide, content analysis made the analysis less challenging. Downe-Wamboldt (1992) highlighted this advantage when he noted that the main focus of content analysis is to “provide knowledge and understanding of the phenomenon under study” (p.314). Sandelowski (1995) has noted similar descriptive advantages offered by this method. A step by step process was followed during the data analysis. This fits in well with the general qualitative paradigm which focuses on the inductive approach to analyzing interview transcripts by identifying patterns in the data and summarizing them into thematic codes and abstraction (Tonkiss, 2004; Patton, 1980).

First of all, the obtained dataset on determinants of unsafe road use among drivers and pedestrians which culminate in road traffic crashes was studied carefully. Secondly, the researcher read through each interview transcript from the beginning to the end to get the gist. Then he read the text again paying closer attention to keywords and highlighting portions of text that indicated instances of risky road use behaviour, individual and situational factors which impact traffic risk perception and risk-taking attitudes and behaviour (Miles & Huberman, 1994; Morgan, 1993). Keywords or phrases which appeared to sum up the individual or situational underpinnings of traffic crashes were noted. Afterwards, open codes were generated. Some preliminary codes were re-coded as the analysis process unfolded. Having coded all the data transcripts, information within particular codes was re-examined. Similar codes were merged or grouped into broader themes to achieve high levels of abstraction while others were split into sub-categories depending on their themes. This process is also called categorization. Once this

was done, the themes generated were organized into a hierarchical table to facilitate reporting (Morse & Field, 1995).

**Figure 6:** shows a conceptual model of the phases in the inductive approach to qualitative content analysis.



**Source:** Adapted from Elo & Kyngås (2008)

### **3.5 Ethical issues**

Ethical considerations are a major part of any research involving the use of human subjects. They were the first major steps taken by this investigator. Hence, in line with the regulations and guidelines of NTNU, this thesis had to pass an ethical test on health-related issues with the Norwegian Social Science Data Services (NSD). This was done and the content and focus of the study were approved by the NSD for it to go ahead. It also received approval from the Motor Traffic and Transport Unit (MTTU) of the Ghana Police. The police welcomed the study and suggested they could make headway in the fight against road traffic accidents if young people like this researcher put their shoulders to the wheel.

Again, for the purpose of obtaining an informed consent I designed a form containing the specific aims and procedures involved in the study and what the study meant to its participants in terms of their roles. The identity of the researcher, rights of participants to withdraw from the study at will and at any point in time as well as assurances of confidentiality were all contained in the informed consent form. This was read and translated into Dangme for the participants prior to interviews. The general feeling was that respondents especially the drivers were happy to have taken part in the study because as they claimed for once someone was ready to hear their side of the story. But both drivers and pedestrians expressed some doubt about signing the consent form given some experiences of others revealed through the mass media. The general apprehension and skepticism that less educated people have about 'book people' and what they are capable of doing with pen and paper also reinforced their fears. Only two of the students filled the form. Hence, verbal informed consent was obtained as they appeared to favour that option given to them by the researcher.

## **RESULTS (PAPERS I & II)**



# Paper I



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**Survival of the Fittest: Attitudinal and Motivational Aspects of Aberrant Driving**

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## **Abstract**

Motor vehicle crashes (MVCs) are a leading cause of disability and mortality in Ghana in general and the Manya Krobo district in particular. Especially drivers of commercially operated passenger-carrying minibuses locally called *trotro* have been the worst culprits. The purpose of the present study was to investigate the individual and situational determinants of aberrant driving among this group of drivers in the Manya Krobo area of the Eastern region of Ghana and how these impact road traffic safety. To investigate this, 5 drivers (all male) were interviewed on their traffic risk perception, attitudes and behaviour as well as their motivations for risk-taking. Then 2 FGDs made up of 5 and 3 participants each were held with groups of drivers. Three (3) key informants (i.e., a police officer, road safety official, and a road transport union official) were interviewed. A one-week non-participant observation was undertaken. Newspaper articles and magazine publications on RTAs were also obtained. A qualitative content analysis was employed to analyze the data. Participants described human error as the major cause of aberrant driving. They perceived aggressive and distracted driving, risk-taking propensity, optimism bias and fatalistic beliefs as some of the causes of dangerous driving. In their opinion, poor driving skills, bad road furniture and equipment combine with their challenging working conditions to make them vulnerable to traffic crashes. Other motivations for careless driving included ineffective traffic law enforcement, passenger distractions, and poor road signage and signalization. The implications of these findings are discussed and recommendations made.

*Keywords:* Aberrant driving; risk perception; fatalism; focus group; motor vehicle crashes (MVCs), road traffic accidents (RTAs); commercial driver; passenger-carrying vehicle; minibuses; driving apprenticeship; Ghana

## 1. Introduction

Motor vehicle crashes (MVCs) are a leading cause of disability and mortality in Ghana (Afukaar et al., 2003). These MVCs kill about 1,800 Ghanaians annually with an average of 5 deaths in a day. Indeed, for some decades now the once peaceful home environments of many Ghanaians have been turned into personal tragedies and perpetual mourning.

Over 95% of goods and passengers are conveyed via motorized transport from one point to another by road in the country. Thus, exposure to motor vehicle crash risk is very high. These roads reach many communities including the rural poor. Available evidence suggests that the major culprits of this carnage on the country's road transport system are drivers of commercially operated minibus vehicles locally called *trotro*. A study conducted by the Ministry of Transportation in collaboration with the Ghana Statistical Service has revealed that more than 54% of commuters in Ghana make up to five (5) trips on minibuses during the seven days that preceded their study. Findings from extant research indicate that human factors are implicated in about 90% of RTAs (Lewin, 1982a, 1982b, Shinar, 1978).

However, little is known about which individual and situational factors contribute to motor vehicle crashes among commercial drivers in Ghana. For instance, what remains unclear is how attitudinal and motivational factors influence aberrant driving among occupational drivers of commercially operated passenger-ferrying vehicles. Motivational factors influence what drivers ought to do with the driving skills they have acquired (Lajunen & Summala, 1995).

From the literature, several studies, largely from the Western world, have found factors such as personality and situational characteristics to be related to motor vehicle crashes. Examples of

these personality characteristics implicated in unsafe driving among adolescents and adults are; sensation-seeking (Zuckerman, 1994; Jonah, 1997), masculinity (Waldon, 1997; Courtenay, 2000; Lippa et al., 2000; Mast et al., (2008), thrill seeking (Costa & McCrea, 1992; Berg & Langley, 2001; Harre, 2006; McKenna & Horswill, 2006), risk-taking propensity (Iversen & Rundmo, 2002; Bingham et al., 2006), norms regarding speeding (Elander et al., 1993; Cooper, 1997; De Pelsmacker & Janssens, 2007), and affect (Loewenstein, Weber, Hsee, & Welch, 2001; Lawton et al., 2007).

Also, situational factors such as time pressure or inattention (Gabany et al., 1997), traffic congestion (Parker & Manstead, 1996), road design (Graham, 1993; Karlaftis & Golias, 2002), substance use e.g., alcohol (Harrington & McBride, 1970), aggressive or competitive driving (Åberg & Rimmo, 1998; Jessor, 1987; Blockley & Hartley, 1995), speeding (Parker, 2002; Carcary et al., 2001), seat belt non-use (Baker, Clarke & Brandt, 2000; Lundell, 2003; Zwerling et al., 2001), nighttime driving (Rice et al., 2003), cell phone use (Redeimer & Tibshirani, 1997; Beede & Kass, 2006, Kass et al., 2007), and distractions caused by passengers or loud music (Rolls & Ingham, 1991, Chen et al., 2000) have all been linked to the growing injury and fatality rate among drivers generally.

In a study on the “role of commercial drivers in motor vehicle related injuries in Ghana”, Mock et al., (1999) have concluded that “in Ghana, commercial drivers are an important group to target in road safety programs. They are also a potentially useful group to include in building coalitions to implement such road safety measures”, (p. 268).

Efforts to reduce the rate of motor vehicle crashes among commercial minibus drivers in the country have yielded only minimal successes. In Psychology, it is believed that human behaviour

has its attendant causes. For example, youth unemployment is pushing more youths into occupational driving. The identification and description of these underlying causes of unsafe road use and RTAs (direct and indirect) will be a major first step towards the formulation of appropriate intervention countermeasures to tackle them.

Reason et al., (1990) have classified aberrant driving behaviours into three main categories. These are; *errors, lapses, and violations*. While violations are said to be deviations from safe driving practices and behaviours, errors and lapses involve driving mistakes and challenges of inattention respectively (Parker et al., 1998; Stradling et al., 1998). Other researchers have subdivided violations into ordinary violations and aggressive violations (Chapman et al., 2000).

The aim of the present study was, therefore, to investigate drivers' perceptions of the individual and environmental characteristics which influence aberrant driving in the Manya Krobo district of the Eastern region of Ghana.

## **2. Method**

### *2.1. Design*

Several qualitative research strategies were employed in this study. These are individual interviews, focus group discussions (FGDs), key informant interviews, in-car non-participant observation, and document analysis. The study site is a suburban district capital in the Eastern region of Ghana with a population of over 154, 000 inhabitants. The interview schedule and discussion guidelines for this study were developed by the researcher. The items on the interview and discussion guidelines were in three categories. The first part covers background information

of drivers (e.g., “How long have you been driving?”, “How did you train for your driving license?”, etc.).

The second part focuses on road use attitudes and behaviour (e.g., “What do you think motivates drivers to speed, overload or double-park?”, “In what ways does the nature of your work affect the way you drive?”, “How do you perceive pedestrian and passenger attitudes to road use?”, etc.).

The third part assessed issues of perceived motor vehicle crash risks (e.g., “How probable do you think is it for yourself to be involved and injured in a traffic crash?”, “As a driver, do you feel unsafe that you could be involved in a traffic accident?”, etc.).

In all, there were five (5) individual interviews with drivers (all male) between the ages of 20-27 yrs, two (2) focus group discussions [FGDs] with the first comprising 5 participants and the second comprising 3 participants. Also, three (3) key informants were interviewed, documents (i.e., magazines, newspaper articles and statistical MVC data) on road traffic accidents were obtained, and a one week in-car observation was undertaken. These data were collected between June and July, 2010. The study was approved by the Norwegian Social Science Data Services (NSD) and the Ghana Police Service.

## *2.2. Participants*

The participants in this study were recruited by the researcher. For the occupational drivers, the criterion for inclusion was that one needed to hold a driver’s license. After meeting this criterion, selection was then made on a purposive basis sometimes using the snowball effect. Five (5) drivers (all male) between the ages of 20-27 yrs with driving experience ranging from 2-5 yrs

took part in the study. Then two (2) FGDs were held with groups of drivers. The first group discussion comprised 5 drivers (all male) between the ages of 23- 31 yrs (i.e., relatively young drivers) and the second discussion group was made up of 3 drivers (all male) between the ages of 36-57 yrs (i.e., relatively older drivers). The drivers are all male because only males engage in occupational driving at the study site as well as many parts of the country.

Three (3) key informants were interviewed. They were an MTTU officer from the Motor Traffic Transport Unit of the Ghana police service, a road traffic safety official from the National Road Safety Commission [NRSC], and a Union official from the Ghana Private Roads and Transport Union [GPRTU] of the Trade Union Congress [TUC]. They were included in the study because their job responsibilities involved dealing directly with road traffic safety issues in the country. Their opinions and views could therefore shed light on the findings and discussions of the study.

### *2.3. Data collection procedure*

As mentioned earlier, data for the study were collected from five different sources. The main reason for this methodological triangulation was to enable the researcher get a clearer picture of the drivers' perceived risk, attitudes and actual behaviour with regard to road use and how these impact road traffic safety in the country. Verbal informed consent was obtained after participants showed a willingness to take part in the study.

On average, the individual interviews lasted about 45mins each. The FGDs lasted 1 hour 30min each. Both the interview and the discussions took place at the two main "lorry stations" (i.e., bus terminals) in the Manya Krobo township.

Aside from two of the key informant interviews which were held in English language, the rest of the interviews and discussions were conducted in *Dangme* (i.e., the local dialect spoken by the people of the study area). The key informants were contacted in their offices personally by the researcher. Also, an in-car non-participant observation was carried out by the researcher for one week to get practical firsthand information of the road traffic situation at the study site.

#### *2.4. Data analysis*

Qualitative content analysis as described by (Graneheim & Lundman, 2004; Shkedi, 2004; Unrau & Coleman, 1997; Sikron et al., 2008) was applied to the interview transcripts, focus group discussions, observation notes, and motor vehicle crash (MVC) documents. The coding process was done manually and it was data-driven i.e., the inductive approach (Frith & Gleeson, 2004; Elo & Kyngas, 2008; Patton, 1990) to qualitative content analysis was used. The manual coding involved a four-stage process (Burnard, 1996; Braun & Clarke, 2006). The first stage involved the researcher reading the entire data set once again to familiarize himself with them.

The second stage involved reading the data more closely with the research questions in mind. Hence, the researcher read each of the dataset to identify emerging patterns that indicate instances of attitudinal and motivational characteristics of aberrant road use by drivers. At the third stage, the researcher proceeded from open codes, through preliminary codes to look for categories and emerging themes. All the preliminary codes were collated and sorted into meaningful units (i.e., categories) depicting possible themes.

The fourth and final stage of the analytic process was used to review and define themes as well as selecting data extracts which describe and support these themes. This procedure enabled the

researcher to refine any confusing themes and categories (Morse, 2008). Through this procedure some sub-themes were identified. The list of final themes arrived at and their respective sub-themes/categories and descriptions have been given in Table 1. The themes and categories/sub-themes largely represent opinions that give rise to aberrant driving and which ultimately do lead to road traffic accidents (RTAs).

### **3. Results**

The results presented here represent the nucleus of the dominant themes and categories/sub-themes identified from all the used data sources (i.e., field notes, individual and key informant interviews, FGDs, and magazines and newspaper articles on motor vehicle crashes in the country). There are no major differences in the issues raised by these magazines and articles and the transcribed data from the interview and FGD sessions. Again, the results as presented here do not necessarily distinguish between young drivers and older ones although there are slight differences in how they perceive each other and driving in general. Also, since the drivers are the main focus of the study, their opinions and views have been given more prominence than the opinions and views of other participants. Table 1 provides a summary of the dominant themes and sub-themes/categories.

**Table 1**

Examples of themes, Sub-themes/categories, and their descriptions

<i>Themes</i>	<i>Sub-themes/ Categories</i>	<i>Descriptions</i>
Working conditions of drivers	Challenging job demands & stress Poor remuneration system Employment procedure	Drivers don't get pay for their work Pressure from vehicle owners No social security benefits for drivers No formal employment contracts No instrumental social support Growing motorization posing danger to the driving profession Drivers brave the odds for the sake of their families Driving as only means of livelihood
Road furniture, road equipment and vehicles	Bad conditions of roads & vehicles	Narrow and potholed roads Poor road signage and signalization No bus stops Lack of speed calming devices on roadway Roadway not well lit at night  Used and old commercial vehicles Cargo vehicles converted to passenger cars Use of second hand car accessories to fix broken down cars
Traffic law enforcement	Inefficiency of police & conflict of interest	Police mount illegal road blocks and harass drivers Police corruption and bribery Some police officers also own commercial vehicles
Traffic risk perception & fatalism	Influence of culture, religion, & socio-economic status on perceived crash risk	Culture makes it a taboo to talk about accidents Religion teaches that what your mouth utters will come to pass Socioeconomic needs hamper risk perception Accidents are curse-inspired Accidents are just punishment for wrongdoing Some drivers are risk prone & don't know how to drive well Feelings of invulnerability
Driver training & road use behaviour	Poor driving skills Aggression & road rage Passenger effects	Driver training is by means of <i>mate</i> apprenticeship Distracted and aggressive driving

### *3.1. Working conditions of drivers*

This theme is the commonest one that runs through the entire dataset. Drivers generally appeared to show dissatisfaction with their working conditions. They expressed this dissatisfaction with almost every aspect of their working lives and this they considered to be a major determinant of recklessness on the roadway. This theme has sub-themes such as employment procedure (rules of engagement), job demands, and remuneration system.

*“Yeah, it’s challenging. You’re always under pressure from your master, union members and the police. You have to be “hard” to survive”. (24 years old driver)*

#### *3.1.1. Employment procedure*

From their narration, almost all commercial drivers who took part in the study seemed to express their displeasure about the mode of employment and the rules of engagement. They confessed that they had little or no say in how they were employed by car owners. They said since the mode of their employment was only by word of mouth, they remain at the mercy of car owners for as long as they work for them:

*“... the car owner will first check your license. If you qualify to drive he will tell you how much you should bring everyday as sales (e.g., GH¢ 40.00 per day), then if you agree he’ll give you the car keys. You can’t tell him how much you can bring, no”. (24 years old driver)*

Drivers appeared to be worried about the hire-and-fire-at-will attitudes of car owners. In a follow-up question as to whether any agreements are signed detailing the rules of engagement, a 31-year old driver replied:

*“I’m his fourth driver since he bought the car. You see, every car owner likes money and they know if they take their car from you the next day they’ll get a new driver”.* (31 years old driver)

### 3.1.2. Job demands

Closely tied to the issue of employment are the demands of the commercial driving occupation especially within the context of Ghana. Drivers pointed out that the nature of their work routine brings in its wake pressure and stress from all angles. There seemed to be consensus among them that the greatest pressure they face emanates from meeting the sales target of car owners:

*“But much of the pressure comes from car owners. They want their sales, they hardly will take any excuse. They don’t care what you go through to make the money; if you speed and commit other traffic violations, all they want is their money”.* (35 years old driver)

*“No, but I use my money to pay him or sometimes, I collect money from my wife or my brother. My master, if you don’t bring his sales he’ll take the car from you”.* (27 years old driver)

A 42 year old driver added:

*“It’s the same for me if I don’t get the sale I have to look for money from elsewhere to pay. On bad days, nightfall becomes your enemy. You worry, you become stressed and confused, you lose your temper with the slightest provocation. I mean it affects your driving”.*

According to drivers, the daily routine of their job is a source of stress and fatigue to them because majority of them are not allowed to keep the key or park the cars they drive at their own residences. There seems to be a confirmation of the fatigue factor in aberrant driving in the country. This is because out of 500 drivers interviewed in a study by the National Road Safety Commission;

*“75% of them admit that they often feel tired when driving. Some of them say they experience the fatigue as they drive, while others say they feel it after the day’s work”.* (Road Safety Dialogue, p.5)

According to them, by the nature of their work they are not entitled to a leave or a holiday. They said the only time they enjoy “*leave or holiday*” is when they are either sick and cannot go to work or the car is broken down and it is taken to the workshop. But even during this period, they said, they would not be entitled to any pay since their remuneration system appears more to be on commission basis:

*“The driving job is not a permanent one; you can be sacked anytime by your employer. It’s like you work on a commission basis-you some percentage of your day’s work. This means any day you don’t go to work because either your car is broken down or you’re sick, you don’t get any money from anywhere else and it doesn’t matter even if it takes a month or more”.* (31 years old driver)

This short inset story told by one of the drivers to buttress a point during the discussion appears to summarize the depth of the raw deal they think they receive at the hands of their employers:

*“Some of the car owners are wicked. When I was young and did not know how to drive, there was a popular saying that if a car was involved in accident, the car owner would normally ask of the state of the car first before enquiring about the state of the passengers and the drivers. Massa, it’s true, now I believe it, the car is their investment but not the humans in it so they want to know what happened to the car first. They can take their key from you any time, as a driver you’re not 100% certain that you might keep your job the next day”.* (40 years old driver)

### *3.1.3. Remuneration system*

Participants said another motivation for aberrant driving is the nature of the remuneration system used for drivers. This is how a 34-year old driver described their remuneration system. They say they call the amount of money they are entitled to after making their sales “*chop money*” (literally it means a day’s eating money):

*“I make GH¢30.00 (USD 42.6) sales every day then what I get afterwards is for me and my mate”.*

Another driver says:

*“It’s not every day that I get ‘chop’ money. If you do not get the sales for your master, how can you get your own chop money?”.* (27 years old driver)

Drivers maintained that the nature of their remuneration puts enormous pressure on them and this predisposes them to all sorts of risky road user behaviours. They appeared to suggest that the combination of remuneration system and ephemeral nature of their tenure seems to be an explosive motivation for carelessness on the roadway. Besides, the lack of social security (i.e., retirement pension) and social support serves as spark plugs for traffic law violations:

*“We have the same needs and wants as they do. Some don’t want to know whether you’ve made something extra for yourself and the mate. They need only theirs. Since the job is not a permanent one, we also engage in risky behaviours in order to make some money for ourselves”.*

(23 years old driver)

In the opinion of a GPRTU officer, it is the craze to get rich quickly that underlies the job insecurity among drivers which invariably culminates in the high attrition rate:

*“They’re too much in a hurry to make quick money. They don’t exercise patience so they’re always having problems with car owners. This is the reason why many car owners keep changing from one driver to another”.*

### *3.1.5. Growing motorization rate*

Participants equally perceived that the ever growing motorization rate in the commercial transport sector has a negative influence on driving attitudes and behaviour of drivers. They said these increases engender stiff competition among them for passengers as they have to engage in tailgating (i.e., bumper to bumper) or criss-crossing of one another:

*“We know it’s not good but we do it. As I was saying, to get passengers, you must be able to criss-cross and dash in front of other cars to reach the passengers first... otherwise the whole day you’ll use all your fuel and not get any money to fill your tank. You will forfeit your chop money too”.* (42 years old driver)

### 3.2. Traffic risk perception

From the description of their work routine, drivers seemed to recognize that there are risks involved in the work they do. However, their survival needs, cultural and religious beliefs appeared to mediate their perceived crash risk:

*“Of course, it’s possible but I don’t want to think about it. The Bible says whatever we say with our mouth shall come to pass...I think positive all the time. But I know accidents could be caused by spirits. Sometimes, it’s a curse from somewhere”.* (27 years old driver)

Others also seemed to suggest that thinking about crash risk as a driver means thinking about death. Death is a taboo subject in the culture of the study site. And this belief seems to have been given further boost by their religion-Christianity:

*“As for concerned I’m, but victim no, ‘tofiakwa’! What you think is what you get. Our mouth can curse and bless and whatever comes from your mouth comes from your heart. This is what the Bible says”.* (23 years old driver)

Some said they believed road traffic accidents are just punishments for wrongdoing. Drivers also seemed to believe that some accidents are caused by spiritual forces:

*“A lot of people die in accidents because they have offended someone. E.g., if you are a driver and you are dating someone’s wife”.* (37 years old driver)

### 3.2.1. Fatalism

According to them, this spiritual dimension has roots in fatalism and which is why some drivers hardly do anything to control their cars when accidents are imminent. Some said those who are destined to die through road traffic accidents will die irrespective of what men do:

*“Truly, some people will die irrespective of what men do. For some people it’s accident but for others it could be sleep or water, or anything”. (27 years old driver)*

On one hand, they emphasized that since men have little or no control over their destiny and fate, being too cautious on the roadway might not serve any useful purpose:

*“When drivers are involved in accidents, some die because of their past actions. E.g., engaging in ‘sikaduro’ (money mascot or blood money) or ‘sakawa’, or even dating someone’s wife. So in reality some accidents are not bad, they’re just punishments for wrong doers”. (42 years old driver)*

On the other hand, they perceived that if you are not fated to die through motor vehicle crashes, you will not die. However, from their descriptions, a few drivers seemed to hold the belief that lucky charms and amulets could help ward off accidents:

*“There are many causes of accidents including spiritual ones. And that is why they say many drivers protect themselves with charms, amulets or talisman against accidents. I know you are aware that when accidents occur and everyone dies some drivers escape unhurt...”. (42 years old driver)*

### *3.3. Driver training & road use behaviour*

Participants described how they learnt to drive and pointed out that their training has a bearing on road use. They said almost all commercial drivers learnt driving through *mate* apprenticeship (i.e., informal driver training):

*“I learnt driving as an apprentice mate under the supervision of a master for 3 yrs. When I graduated, I served my master for 6 months and he helped me get a driving license. Luckily within the same year I got someone’s car to drive”.* (42 years old driver)

They added that this training is only by observation and takes place on the job:

*“Yes, you can’t write anything because you’re training while on the job. I mean you’re supposed to be observing how your master is driving at the same time as you play your role as mate”.* (42 years old driver)

Some of them, especially the older drivers, seemed to recognize that the current spate of reckless driving on the part of young drivers stemmed from the inadequate training they underwent:

*“But in our time we used longer years to learn driving than present young drivers. Our time you had to spend 3 or more years to learn to drive but massa these young drivers of today they spend only a week or two then they say there’re drivers. You know what they do? They come to tell you they want to learn driving, you tell them it will take them 3 years, then they say ok, they will learn. When they start with you as soon as they know steer control, they leave to look for cars and start driving. They claim to be drivers”.* (56 years old driver)

In their opinion, the inadequacy of driver training especially among the young ones is assuming dangerous dimensions and appears to be a source of worry to them (older drivers):

*“...some even learn driving at the car washing bay. I know about 3 guys who were washing cars at Odumase, they’re now trotro drivers. Who taught them driving? No one, they just learnt to drive people’s cars when they’re washing them. Some started as car sprayers only to end up as drivers a few weeks later”.* (42 years old driver)

From their narration, older drivers also seemed worried about the road rage attitudes and behaviour of younger ones on the roadway:

*“There is competition for passengers, if you’re not fast and smart you can’t get any passenger to pick. You see we’re friends here but on the roadway we’re enemies”.* (25 years old driver)

Some of the young drivers appeared to recognize that they are more aggressive on the roadway because they tend to have feelings of invulnerability to road crashes:

*“It’s only natural. I believe in myself than any other driver. I think I’m more careful than others. When I board someone’s car I’m a bit more afraid than when I’m the one driving. I trust my skills better. Though accidents can happen to everyone I don’t think I can be involved in accident if I still drive the way I do now”.* (25 years old driver)

*“Personally I know I will one day die as every human being will do but I don’t think it will be through motor accident. That has never crossed my mind”.* (23 years old driver)

### *3.4. Nature & condition of commercial vehicles*

Generally, participants seemed to be unanimous in their perception of the nature and the conditions of commercial vehicles on the road. They said these vehicles which are largely used ones imported into the country from the West contribute in no small measure to the general reckless road use culture among drivers in several forms:

*“The cars are used ones and everything from tires to engine that are used to repair them when they break down are used imported ‘spare’ car parts from the West. No driver or car owner buys any new car parts. They can’t afford them. Period!”*. (31 years old driver)

Again, participants perceived the poor vehicle maintenance culture by car owners as a factor in accident causation:

*“As I was saying, there is general poor attitude to car maintenance. You’re the driver and know that this or that thing is not functioning well. If you complain and ask that a new one be bought the car owner becomes uncomfortable due to the cost involved. Most of the cars we drive are defective in one way or another”*. (35 years old driver)

Drivers described other risky practices where cargo vehicles imported into the country are converted locally to passenger cars:

*“I’m sure you know about the controversy surrounding the 207 buses when several of them were involved in traffic accidents in 2008. These cars are made for cargo or goods but when they’re imported into the country they are converted into passenger cars”*. (A GPRTU officer)

Some participants identified another motivational aspect of aberrant driving which they said indirectly brings about motor vehicle crashes. In their opinion, some drivers especially the young ones who drive slightly used or new vehicles tend to express their masculinity (i.e., superiority over other drivers) on the roadway. Drivers appeared to understand the occupational hazards that their work entails. Nonetheless, some of them seemed to enjoy the sensation that comes from speeding and overtaking bolstered by the horse power of their vehicles:

*“But when your car is very good as a driver you tend to engage in competition on the roadway by overtaking unnecessarily”. (27 years old driver)*

*“...But if you’re driving a new car, you can go all out you don’t fear anything. You can speed and overtake other cars easily, you know your car is good so you’re confident”. (23 years old driver)*

### *3.5. Nature of road network*

The road infrastructure is one of the principal themes which participants say is a major predictor of carelessness and accidents on the roadway. They described the sorry state of the road network on which they ply daily:

*“Look at the road network here, it’s not good it’s full of potholes. My friend, Kwesi (not real name) calls them ‘manholes’. And the district assembly is not doing anything about it”. (31 years old driver)*

In general, drivers seemed to understand that the lack of bus stops increases their exposure to risky driving situations as it means stopping almost everywhere and anywhere on the roadway:

*“I know you know our problems; one, there are “no stopping”, “no loading” and “no parking” signs but there’re no bus stops. Where on earth can this happen?”. (23 years old driver)*

Participants acknowledged that the apparent lack of speed calming devices in residential areas impacts driving behaviour and combines with poor road signalization to expose drivers and other road users to increased crash risks:

*“Often, there’re no speed limits posted on the road to alert us. We use our mind”. (27 years old driver)*

### *3.6. Law enforcement*

In general, participants described ineffectiveness in traffic law enforcement by the police and perceived it as a major motivation for aspects of aberrant driving:

*“The police too are not helping matters... . E.g., the police can do operation for one week during which they arrest some of the recalcitrant drivers. But as soon as the police stop the operation, the drivers start engaging in the same behaviours again. To be effective, the operations must be sustained all the time. However, the police always claim they’re understaffed and have other security matters to attend to”. (A GPRTU officer)*

In their opinion, the police rather seemed to be interested in extorting money from motorists who commit traffic offences and letting them go unpunished:

*“They’re the cause of many accidents here, they only know how to collect bribe from drivers. They’re not doing their work. They’ve turned drivers into their ‘cocoa farm’, that’s where they eat”. (25 years old driver)*

From their descriptions, drivers, especially the younger ones, perceived a conflict of interest situation and seemed incensed by the practice of police officers also owning and operating commercial minibuses. According to them this situation does not only lead to selective justice on the part of the police but also undermines the fight against unsafe road use behaviours:

*“They also own commercial cars now. Go to KTM (not real name) police station and see, all the policemen at the station there own minibuses. They don’t arrest their own drivers, their drivers just do anything on the roadway, if you complain they tell you their car owner is a police officer”. (27 years old driver)*

### *3.7. General unsafe road use behaviour of others*

Respondents were aware that the behaviour of other road users such as pedestrians, passengers, and cyclists influences driving behaviour in significant ways. They pointed out that the behaviour of passengers, whether they are on board the vehicle or they are waiting to board it, poses a lot of danger to the drivers by way of forcing them to make series of intermittent stops often at short notice and sometimes at dangerous spots.

*“Passengers just wait anywhere along the road including flash spots and expect the car to pick each one of them at the spot where they’re waiting. If you’re not ready to make these stops then you will lose them, that means losing money”. (27 years old driver)*

They perceived passengers as potential threats to safe driving because passengers, as they described them, cause lots of distractions to them while driving by either asking them (drivers) to speed or engage them (drivers) in arguments over sitting or transport fares:

*“Majority of them behave well but others engage in quarrels with drivers and their mate over transport fares and other things. In fact, some of them don’t respect drivers at all. Some ask you; is your car a snail? We’re in a hurry and you’re driving like a snail, step on the gas and let’s go”.* (42 years old driver)

#### **4. Discussion**

The aim of the present study was primarily to explore the individual and environmental characteristics influencing attitudes to road use and behaviour among commercial drivers in the Manya Krobo district of the Eastern region of Ghana. In doing so several qualitative data collection techniques have been relied upon to attempt to get as much information as is possible to answer the question “what aspects of individual and situational characteristics influence aberrant driving?”.

The major perceived factors responsible for careless driving in the study site identified by respondents are as follows; “working conditions of drivers”, “bread and butter needs”, “risk perception and fatalism”, “driver training and road use behaviour”, “nature and condition of road network”, “nature and condition of commercial vehicles”, and “traffic law enforcement”. In the opinion of participants, the above-mentioned themes which emerged from the dataset are equally the causes of many motor vehicle crashes (MVCs).

In Ghana, aberrant driving falls under two broad descriptions according to the Road Traffic Act (Act 683) of 2004 and Amendment Act (Act 761) of 2008. These are “*dangerous driving*” and “*careless and inconsiderate driving*”. Act 683, says a person drives dangerously if (a) “the way that person drives falls below what is expected of a competent and careful driver” or (b) “it is

obvious to a competent and careful driver that it would be dangerous driving the vehicle (i) in that manner, or (ii) in its current state” (p. 13-14). The same Act defines “careless and inconsiderate driving” as when “a person who drives a motor vehicle on a road without due care and attention, or without reasonable consideration for other persons using the road” (p. 14). The infractions of these two driving regulations attract penalties for the offenders.

Thus, in the discussion that follows, all attempts are made to discuss these themes in the light of aberrant driving and as precursors to accident causation. The discussion seeks to provide a vivid explanation of each of these emerged themes and to establish their relationships with the extant research findings in the area. Following from there, the limitations of the study are discussed. The conclusion involves a summary of the findings and their implications for safety countermeasures in the country.

#### *4.1. Working conditions of drivers*

First and foremost, the challenging working conditions of commercial drivers appear to be the dominant determinant of aberrant road use. This is because this pattern emerges in all the data collection strategies (e.g., interview, FGDs, field observation, etc.) used. The challenges with their working conditions have to do with the demands of the job which encompass job insecurity, lack of employment contract, and high sales target imposed on them by their car owners. Others include, long working hours per day, stress, as well as the surge in the rate of commercial motorization. From their descriptions, these conditions under which they work do not only predispose them to careless road use behaviours but also have indirect relationship with road traffic accidents (RTAs).

For example, the commercial transport sector is poorly regulated and as such everyone is able to enter the industry with ease. Officially the operation of commercial transport is supposed to be under the Ghana Road Transport Coordinating Council (GRTCC) which exercises oversight responsibility over transport unions such as the Ghana Private Roads and Transport Union (GPRTU), Progressive Transport Owners Association (PROTOA), and Cooperative. All these unions operate under the big umbrella of the Trades Union Congress (TUC) and thus their activities ought to be regulated by the guidelines of the TUC. However, this does not appear to be the case because car owners set their own rules of engagement with little or no bargaining power for drivers. Car owners hire and fire drivers at will. Employment procedures are usually by word of mouth as no paper contracts are signed. Car owners also seem to fix unrealistic daily sales target for their drivers.

There is consensus among respondents to the effect that achieving these daily sales targets brings intense pressure and makes them work for long hours without rest. This problem seems to be compounded by the increasing rate of commercial transport which gives rise to competition among drivers for passengers. All these culminate in stress and fatigue. There is no doubt at all that these shape their attitudes to road use. This may be one of the many reasons why driving commercially operated passenger-carrying vehicles is a male-only occupation in the country.

From the literature, stress and fatigue have been found to be the causes of many road traffic accidents (Tse et al., 2004; 2006; Brown, 1994). Gulian et al., (1989) say driver stress may be experienced at two levels. The first level deals with situational stress which results from event-specific demands (e.g., rushing against time to meet one's sales target before night draws nigh) that challenge drivers coping strategies to the core over which they have little or no control.

Under such conditions, drivers find it difficult to process complex information that will enable them to take timely safety decisions.

The other level of stress has to do with stress emanating from long hours of exposure to challenging traffic situations e.g., long hours of driving coupled with hot temperature and traffic congestion. This level of stress is said to affect drivers' cognitive, emotional and physiological states. In Israel, fatigue has been found to result in aberrant driving and RTAs among commercial drivers (Sabbagh et al., 1999) and among drivers of military trucks (Oron-Gilad & Shinar, 2000). Similar findings have also been reported in the United States (Carroll, 1998), Australia (McCartt et al., 1999; Arnold et al., 1997), and the UK (Maycock, 1997).

These risk factors are all human factors. Thus, the findings are consistent with the extant literature which has established that about 90% of motor vehicle crashes are due to human factors (Petridou & Mousaki, 2000; Evans, 1996; Berg, 1994; Lewin, 1982a, 1982b).

#### *4.2. Bread and butter needs*

Another major finding has to do with physiological needs of drivers. Drivers who took part in the study expressed their dissatisfaction with their remuneration system. They see this as a major hindrance to careful driving because their 'pay' system has implications for their survival and that of their family and other dependants. Their remuneration system is akin to working on a commission basis in that they have to meet set daily sales targets for their masters and after which whatever amount of money they get belongs to them and their mates. They say it does often happen that they are unable to meet their set sales targets let alone get what they will live

on. In such situations they have to go home empty-handed after working from say 4:00am to 9:00pm.

Many a time, the fear of going home empty-handed makes them resort to all forms of risk-taking in order to make some money at all cost. This includes overloading, speeding, and general driving recklessness. Aristotle (384 BC – 322 BC) indicated the power of ‘pay’ when he says that, “Money is a guarantee that we may have what we want in the future. Though we need nothing at the moment, it insures the possibility of satisfying a necessary desire when it arises”. Charles Lamb (1775-1834) emphasizes this point when he notes that, “Money is health, and liberty, and strength”.

This finding seems to be well grounded in Maslow’s theory of human needs. For instance, the humanistic psychologist, Abraham Harold Maslow (1954, 1968, and 1971) has theorized that needs are sources of motivation. Maslow, therefore, postulates that humans are born with five (5) needs: (1) *biological or physiological well-being*; (2) *safety and security*; (3) *belonging*; (4) *esteem*; and (5) *self-actualization* (Maslow, 1954). The needs are ranked in order of importance for survival with the first ones that is, *physiological needs*, etc. being most influential. According to this hierarchy, each level of need can be met only after needs below it are met. At the bottom of the hierarchy are biological needs, which Maslow felt were the most fundamental of all human requirements (Uba and Huang, 1999).

Hence, in the case of commercial drivers it is reasonable to expect that until they meet their physiological needs (e.g., food, shelter, clothing, etc) safety needs such as careful driving will not be an important consideration. Again, there appears to be more motivation for drivers to engage in careless and inconsiderate driving. This is because their ‘pay’ system does not make

room for retirement benefits. Thus, they work from hand to mouth. This means the day they fall sick or their vehicles are broken down and cannot go to work, they forfeit their 'chop' money for that day. And it does not matter if they are sick for say a month or more. Upon all these, the society too does not provide any social support for them. Therefore, it becomes extremely difficult to convince them that safety on the roadway matters more than what they will eat and drink. It is the insatiable need to keep body and soul alive which puts pressure on drivers to work from dawn to dusk in order to make their sales and 'chop money'. Of course they may be aware that the law does not permit them to drive continuously for four (4) hours a day. But practical reasons like those stated above often make them oblivious of these safety regulations.

From the forgoing, this finding is consistent with equity theory of motivation propounded by Adams (1963a, 1962, 1965b). The basic assumption of this theory is that people work in exchange for rewards. Hence, they wish for equitable treatment at work. Adams argues that job satisfaction and commitment stem from the perceived ratio of what one receives from the job such as pay, fringe benefits, recognition, etc. to what one puts into the job such as educational level, age, skills, competence and expertise. These outcomes have impact on the individual's attitudes and behaviour.

It may, therefore, not be surprising to learn that drivers who took part in the study indicated that accidents might be reduced significantly if they are entitled to retirement benefits and are paid fixed salaries irrespective of whether they go to work or not. And as they put it should that happen, they may no longer have any reason for taking risks to earn extra income to feed themselves and their families. For example, a study conducted by the National Road Safety Commission (NRSC) and reported in the *Road Safety Dialogue* (i.e., a newsletter published by

the NRSC) has found that commercial drivers' desire to get their daily wage exposes them to intense pressure and as such sleep is never appreciated.

#### *4.3. Risk perception and fatalism*

The issue of risk perception and fatalism and their relationship with road traffic accidents was raised by respondents during the interviews and discussions. Generally, risk perception has to do with how drivers of motor vehicles deal with the ever-changing driving situations on the roadway by adapting their actions both to the physical environment and the behaviours of other road users. Though drivers appear to understand that the driving occupation has inherent risk factors with dire consequences for all road users, they seem to describe them as mere occupational hazards. The extant literature supports this finding. Deery (1999) carried out a study on hazard and risk perception among young novice drivers and has observed that young drivers in general underestimate the risk of accidents in hazardous situations. Young male drivers also tend to rate dangerous traffic situations as less risky than older male drivers (Trankle et al., 1990). Trankle et al. suggested that educational measures designed for young drivers should focus on different aspects of their risk perception and risk tolerance.

Some participants explained that their culture makes it a taboo to talk about accidents and death. For others their religious practices do not encourage them to have negative thoughts about future events because as they explained; whatever you say with your mouth shall come to pass. And yet for another group, they are almost always pre-occupied with their challenging socio-economic status to the extent that these socio-economic situations compensate for their perceived driving risk. Drivers appeared evasive in their response to open-ended questions such as: "How

probable do you think it is for yourself to be involved and injured in a traffic crash?”, “How concerned are you about traffic crash risks and think you could be a victim?”

The resultant consequences of inaccurate risk perception are dangerous driving and motor vehicle crashes. This finding is supported by risk compensation theory (RCT) and risk homeostasis theory (RHT) proposed by (Wilde 1994, Adams 1995, Adams 1999). These theories hold the assumption that humans adapt their behaviours to the intensity (high or low) of risk as a function of their subjective perceptions. For example, if drivers see themselves to be in greater risk situations, they will try to behave with a lot more caution than when they perceive themselves to be in lesser risk situations (Wilde, 1998; Hedlund, 2000).

Lund (2006a) conducted a comparative study on the associations between risk perception, attitudes, driver behaviour and accident involvement in a high-income country (Norway) and a low-income country (Ghana) and has found that Ghanaian drivers were more ‘sensitive’ to traffic risks as well as to risks in general as compared to their Norwegian counterparts. This finding is consistent with the findings of the present study because for Ghanaian drivers traffic risk perception is not just an ordinary thing but rather a complex issue mediated by culture, religion and one’s socio-economic status.

Again, Bediako (2004) has observed that commercial drivers in Accra-Ghana possess a high level of traffic risk perception but they show negative attitudes towards traffic rules. She has noted that factors such as educational level, religion and marital status have significant influence on commercial drivers’ risk perception, attitudes and behaviour. Lund & Rundmo (2009) have conducted another study using the same data used by Lund (2006) entitled “Cross-cultural comparisons of traffic safety, risk perception, attitudes and behaviour” among Ghanaians and

Norwegians and they have reported that there were differences in respondents' rating of attitudes, risk perception, and behaviour and that perceived risk and attitudes were great predictors of risk behaviour and accident involvement.

Another finding closely related to risk perception which is associated with careless driving is fatalism and or superstitious beliefs. Some drivers perceived road traffic accidents to be caused by forces beyond the control of mortal human beings. For instance, they mentioned the issue of destiny and fate and explained that anyone fated to die through road traffic crashes will die irrespective of what men do. This may not be surprising after all because both experts and lay people make subjective judgments about risks and hazards (Slovic et al., 1981). Dake (1991) corroborates this by noting that mental models of risk are the results of personal cognition and deeply held socio-cultural beliefs and values.

Besides, some respondents also seemed to be convinced that accidents are just punishments for wrongdoing. With such mentality, it is clear that many a driver will resign to fate in circumstances where a little action on their part could help save accident situations. This may bring about learned helplessness (Seligman, 1975; Peterson et al., 1993). Available literature lends support to this finding. In Ivory Coast, Kouabenan (1998) has concluded that fatalistic beliefs influence how individuals perceive risks and explain the causes of accidents. Superstition has been found to correlate positively with accident involvement among South African taxi drivers (Peltzer & Renner, 2003).

In addition, both Leplat (1983) and Shaffer (1984) have made interesting conclusions about fatalistic beliefs. Leplat writes "our modern mentality is still impregnated with a fatalistic conception of accidents. How often do we hear accidents associated with bad luck, misfortune,

or chance. People sometimes say that “his time had come” when talking about an accident that someone has had” (p. 14; cited in Kouabenan, 1998).

#### *4.4. Driver training and road use behaviour*

Inadequate driver training has also been mentioned as being responsible for aberrant driving. The mode of training is 99% informal and driving knowledge is acquired through *mate apprenticeship*. This is the practice where anyone who wishes to learn driving does so by going to work with a driver (the master) for a maximum period of three years. Subsequently, he learns to drive on the job by observing the master. The training is purely by word of mouth and observation. Although the mode of training is the same for both young and older drivers, older drivers appeared to be uncomfortable with current training regimes undergone by the young ones. Older drivers say that the young ones are now using days or only weeks to learn driving. Some young ones are said to have learnt driving at the car washing bay just by washing people’s cars.

The fear is that a lot of these young ones are now driving passenger-carrying commercial vehicles now on the roadway. The threat they pose to driving safety cannot therefore be overemphasized. It is well known that driving skill and competence is acquired through serious instruction and practice (Groeger, 2006). Therefore, the number of years one spent acquiring driving skills helps to shape road use attitudes and behaviour in significant ways (Groeger, 2000; 2004). The result of inadequate driver training is novice and inexperienced drivers (Martinez, 2005).

Due to the fact that driver training in the district is just by observation and word of mouth under the supervision of a master, aberrant driving is passed on from one reckless driver to another. There is poor interpretation and comprehension of road signs. Thus, they are motivated to engage in aggressive driving, speeding, and general road rage behaviours. In Europe, aggressive driving is reported to be the cause of some motor accidents (Parker, Lajunen, & Stradling, 1998; Mizell et al., 1987; Lajunen et al., 2004; Åberg & Rimmo, 1998; Blockley & Hartley, 1995), and speeding (Parker, 2002; Carcary et al., 2001). In Ghana, Afukaar (2003) investigated the effect of speed on road traffic accidents and found that the dominant driver mistakes which traffic police have identified were loss of control of vehicles which emanates from extreme speeding. He has noted that speeding alone represented 50% of all road traffic accidents in Ghana between the period of 1998 and 2000.

Damsere-Derry, Afukaar, Donkor and Mock (2008) have corroborated this finding when they studied two dimensions of speed-mean and dispersion in Ghana. They used unobtrusively measures like speed guns to collect data on travelling speeds of 28,489 vehicles at 15 different urban locations on highways categorized into three. They found that 98%, 90% and 97% of vehicles which plied those routes exceeded the required speed limit of 50km/h posted on national, inter-regional, regional roads respectively. Thus, they have concluded that excessive speeding and wide speed dispersions were highly prevalent on highways in Ghana.

The inadequate driving is given further boost by the operations of illegal driver licensing contractors. The inexperience of these young drivers equally makes them have feelings of invulnerability or optimism bias (Cohn et al., 1995; Dejoy, 1989; Weinstein, 1980, 1982, 1984; Svenson, 1981). This reflects in their willingness to take risks and the decisions they take on the

roadway are error-laden. Martinez further argues that giving a 16-year-old teenager a license to drive is similar to giving an adult a 3000-pound weapon to kill.

#### *4.5. Passenger effect*

Participants also pointed out that other road users like pedestrians, passengers, and cyclists contribute to unsafe road use and road traffic accidents. But they were more emphatic with pedestrians and passengers. Drivers of passenger-ferrying commercial vehicles accuse their clients of urging them to speed any time the latter is in a hurry to reach their destination. Respondents admit that they sometimes speed to satisfy them (passengers) and to prevent passengers from calling them (drivers) names.

Besides, passengers determine where the cars should stop to pick them irrespective of the dangers that may be associated with the location where they may be standing on the roadway. Drivers have little or no option than to pick them at where they are standing. This forces them to make several abrupt stopovers along the roadway. Again, passengers are reported to distract their attention while driving by engaging them in arguments over little issues. This in-car fighting reaches breaking points when prices of petroleum products are increased and lorry fares have been upwardly adjusted. Other passengers, especially those who sit in front beside the driver, more often engage the driver in chatting and sometimes even discuss sensitive political or social issues with the driver while the car is in motion. Social influence and social facilitation are important sources for risk behaviours (Jaccard et al., 2005; Simon-Morton et al., 2004).

Indeed, the presence of passengers and how it increases motor vehicle crashes especially among young drivers has been well documented by previous research findings (see, e.g., Doherty,

Andry, & MacGregor, 1998; Preusser, Ferguson, & Williams, 1998; Baxter, Manstead, Stradling, & Campbell, 1990; Chen et al., 2000; Williams; 2001; William and Wells, 1995; Ulmer et al., 1997). For instance, in the UK the observed effect of passengers on young drivers has been reported by McKenna et al. (1998). In Australia, Regan and Mitsopoulos (2001) have noted that passengers increase the crash risk of drivers.

There is the recognition among respondents in Ghana to the effect that passengers equally could do much to prevent aberrant driving and RTAs by calling reckless drivers to order. In the literature, the fact that some driver-passenger combinations could help reduce the crash risk of drivers has been documented (Evans & Wasielewski, 1982; Black, 1978; Lawshe, 1940). In Germany, Vollrath et al. (2002) reports that while the presence of passengers serves as a protective cover for older drivers, for young drivers their presence rather enhances their crash risk. Similar passenger effect on older and young drivers has been observed in New Zealand (Lam et al., 2003).

#### *4.6. Nature and condition of road network*

The nature and condition of the road infrastructure was perceived as a great contributory factor to unsafe driving. They described the road network as very bad. First, the roads in the area are very narrow such that cars coming from opposite directions have challenges giving way on certain parts of the roadway. Second, the surface of the road is dotted with several pot-holes which they called “manholes”. Drivers suggested many a time, in their attempt to dodge these potholes, they are involved in head-on collisions or near misses with other on-coming cars which are equally dodging the holes. The situation is further aggravated with the poor signage and road signalization. The National Transport Policy report of 2009 has noted that the general road

condition in the country is only 36% good as compared to the desired 70% good. Graham (1993) and Karlaftis & Golias (2002) have reported that road design and its conditions have influences on driving. In Israel, Sikron et al. (2008) have found that the road infrastructure contributes to careless driving and motor vehicle crashes.

#### *4.7. Nature and condition of vehicles*

There is general consensus among participants about the significant impact of the condition of vehicles on accident causation. In a study among commercial drivers in Ghana, Mock et al. (1999) have concluded that drivers tend to place more emphasis on vehicular factors as causes of accidents than on driver behaviour. Commercial passenger-carrying vehicles in use in the country are used vehicles imported into the country from Western countries. Many of these vehicles were originally manufactured as cargo cars but are converted locally into passenger-carrying vehicles by local roadside mechanics. An example is the 207 minibuses currently in use in the country. Due the high price of new car parts, operators of commercial vehicles always rely on used imported car parts. These car parts range from tires to lamps. Those who drive 'newer' used cars also resort to road rage. Using or abusing the horse power of one's vehicle on the roadway, it is reported, constitutes another potential source of careless and inconsiderate driving (Waldon, 1997; Courtenay, 2000; Lippa et al., 2000; Mast et al., (2008). In the USA, Wasielewski (1984) has found a strong positive correlation between higher speeds and newer vehicles, heavier vehicles, and vehicles with no passengers.

#### *4.8. Traffic law enforcement*

The apparent lapses in traffic law enforcement have also been cited by respondents as factors sustaining the perpetuation of reckless driving. Drivers accuse the police of moving away from their core duty of enforcing road traffic regulations to the extortion of money from motorists. A very recent report on Ghana by the US State Department has made similar conclusions. Drivers of Manya Krobo area generally perceive the police to be milking them dry. For example, metaphors such as the following were used to describe their perception of the traffic police in the area: “they have turned us into their cocoa farm”, “they are drinking soup on our sweat”. These drivers pointed out that the police erect “no parking, no stopping” signs on almost every part of the roadway but the same police have failed to provide them with “bus stops”. They believe this to be a ploy to extort money from innocent motorists.

This comes against the backdrop that a lot of policemen now own commercial vehicles and are driven by other drivers whose infraction of traffic regulations the police turn blind eyes to. This conflict of interest situation of the police appeared to have created in some drivers the desire to also flout traffic rules with impunity. The power of observational learning (Bandura, 1977) in traffic safety is known for long. In a recent study, Factor, Mahalel, & Yair (2007) have indicated that ineffective traffic law enforcement sustains aberrant driving attitudes and behaviour.

Another recent study among Chinese and American drivers has concluded that unsafe driving attitudes and behaviour are resistant to change in areas where there is inadequate traffic law enforcement (Huang et al., 2006).

#### 4.9. Limitations

Just like any other qualitative research, the present study has inherent shortcomings. First, the sample size is small and includes respondents who were purposively selected. And although, the modus operandi of drivers of commercially operated passenger-ferrying vehicles at the study site is the same across the country, the sample is not representative enough. Therefore, any attempts at generalization or transferability of the findings ought to proceed with caution. However, attempts have been made by the researcher to collect data from several sources (triangulation) to minimize this shortcoming. The use of the focus group discussion also made vocal participants overshadow less vocal ones in terms of their responses. Clearly, some participants were seen to be trying to respond to almost all questions and issues.

Secondly, translating interview and FGD data from one language (i.e., *Dangme*) to another language (i.e., *English language*) has its own limitations. It was possible that some responses may not have been given their ‘accurate’ rendition in the English language especially so when appropriate and succinct local jargons and metaphors were used. But the researcher aside from being a native speaker of *Dangme*, has studied same for close to a decade. This knowledge coupled with his proficiency in the English language was brought to bear on the translation and transcription to minimize this limitation.

Thirdly, the study is a part of a master thesis and the fact that the researcher had to travel home (from Norway to Ghana) to collect the data and come back, it had not been possible to validate the findings by feeding the translated and transcribed dataset to a percentage of the respondents. If member checking had been possible, it would have added more credibility to the findings.

These notwithstanding, the findings do represent, to a large extent; the key perceived risk factors for careless and inconsiderate road use among many a commercial driver in the study area.

## **5. Conclusion and implications**

Respondents mentioned several risk factors which, in their opinion, constitute the major causes of aberrant driving and RTAs. The dominant causes cited could be grouped under two broad headings: individual characteristics and environmental/situational factors. The key driver characteristics described include but not limited to: poor traffic risk perception, fatalism, aggressive driving feelings of invulnerability, inadequate driver training, and risk-taking propensity. The situational factors raised include: challenging working conditions, bad road furniture and equipment, nature and bad condition of passenger-carrying vehicles, and ineffective traffic law enforcement.

This information may be useful for central government, e.g., the Ministry of Roads and Transport, National Road Safety Commission (NRSC), the Motor Transport and Traffic Unit of the Ghana police service (MTTU) to plan and implement appropriate safety campaign countermeasures to halt and, if possible, reduce the growing motor vehicle crash problem in the country. From drivers' descriptions, it seems clear that in pursuing any countermeasures to halt RTAs, a bottom-up approach where both planning and implementation stages of interventions actively involve drivers; successes are likely to be chalked.

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## Paper II



Source: Author's own shot taken during data collection



**“And if you had hit me...”: Pedestrian-Motor Vehicle Crash Involvement**

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## **Abstract**

This study primarily explored pedestrian mobility and travel experiences as well as driver-pedestrian perceptions of one another's road use attitudes and behaviour regarding pedestrian-vehicular crash involvements. Interview data are presented for 26 participants (i.e., 10 pedestrians, 13 drivers, and 3 key informants). Interviews and discussions sought pedestrian views about their travel experiences, traffic risk perception and behaviour, road infrastructure, and their opinions about drivers. In addition, discussions also focused on drivers' perception of pedestrian road use attitudes and behaviour, pedestrian law enforcement, and their role in road traffic accidents. Qualitative content analysis was used. Participants perceived the road furniture and equipment, built environment as important determinants of pedestrian-vehicle crashes. Person error and general risky road user behaviour were described as contributory factors to road accidents. From their descriptions, the general disinterest in prosecuting pedestrians for traffic violations seemed not to have gone down well with drivers. The implications of these findings for policy makers, traffic engineers, urban and feeder road planners, and road safety officials in relation to pedestrian safety interventions are discussed.

*Keywords:* Pedestrians; Drivers; Vehicular-Pedestrian crashes; Injuries; Fatalities; Perceptions; Attitudes; Behaviour; Ghana

## **1. Introduction**

One of the most vulnerable groups of road users and traffic victims are pedestrians (WHO, 2004). Their involvement in motor vehicle crashes (MVCs), the repercussions for them and the corresponding public health burden they pose to countries are well known (Ameratunga et al., 2006; Zwi, 1993). In Ghana, they are over-represented (60%) in road traffic accidents (RTAs) (Afukaar et al., 2008; NRSC, 2007). For example, accident fatalities by road user class from the National Road Safety Commission (NRSC) show that between 1991 and 2006, there were a total of 21, 626 fatalities with 9,376 representing pedestrians (43.4%), (NRSC, 2007).

A recent research in the country indicates that injuries and fatalities resulting from pedestrian crash involvements are on the rise (Damsere-Derry et al., 2010). In terms of fatalities, the recent trend between 2005 and 2007 is instructive. In 2005, out of a total of 1,782 deaths, pedestrians accounted for 41.1%; in 2006, out of a total of 1,856 deaths, pedestrians accounted for 42%; and in 2007, there were 43% of pedestrians among a total of 2,043 road users killed.

Despite this growing traffic crisis, limited consideration has been given to the problem.

Therefore, the risk factors influencing the alarming and ever-growing pedestrian casualties remain poorly understood (Mock et al., 1997; 1999; Salifu & Mock, 1998). There is very little information on pedestrian travel experiences as well as behavioural and road characteristics which predispose them to crashes. It is obvious from the literature in the country (Damsere-Derry et al., 2010; Abane, 2011; Abantanga, 2002) that pedestrian safety has not only received

the much needed attention from central government, road planners, and road safety officials, but also researchers.

It is possible, that the situation is further compounded by the lack of interest in reporting pedestrian accidents to the police (Salifu & Mock, 1998; London et al., 2002) by both pedestrians and drivers and the inadequate medical facilities and staff to deal with the post-traumatic complications associated with such injuries (Mock et al., 1997; Zwi, 1993). And it does not matter whether the pedestrians live in the urban or rural parts of a country (Mock et al., 1999; Ivan et al., 2001). The psychosocial consequences that come with these injuries are enormous for families and society (Mayou et al., 2002) especially, in most developing societies where both young and old play significant roles for the sustenance of the family income (WHO, 2004).

The aim of the present research was two-fold: First, to explore pedestrian mobility, travel experiences, and road use behaviour vis-a-vis motor vehicle crashes. Another aim was to investigate pedestrian-driver perceptions of one another's road use attitudes in relation to the attribution of crash responsibility. Hence, this study reports the findings of a qualitative investigation of the opinions of pedestrians about their travel experiences and drivers' perception of pedestrian road use behaviour from the Manya Krobo district of the Eastern region of Ghana.

## **2. Method**

### *2.1. Design*

Several qualitative research strategies were employed in this study. These are individual interviews, focus group discussions (FGDs), key informant interviews, in-car non-participant

observation, and document analysis. The study site is a suburban accident-prone district capital in the Eastern region of Ghana with a population of over 154, 000 inhabitants. It is accident-prone because the linear housing system practised in the area brings about homes lining major roads. There were separate interview schedules for drivers and pedestrians. The interview schedule and discussion guideline for the drivers were similar.

In the case of drivers, the items on the interview and discussion guidelines were in three categories. The first part covers background information of drivers, the second part focuses on road use attitudes and behaviour, and the third part assesses issues of perceived motor vehicle crash risks. But for this paper only one item from the second part was used: "How do you perceive pedestrian behaviour and their attitudes to road use?". The pedestrian interview schedule had three sections. The first and second sections deal with attitudes and behaviour (i.e., pedestrian mobility and road use experiences) and risk perception respectively. The third section has one item and asks for personal information. This personal information was about age range.

In general, a total of 26 participants (i.e., 10 pedestrians, 13 drivers, and 3 key informants) took part in interviews and discussions. Ten adult and adolescent pedestrians took part in individual interviews. The pedestrian sample comprised male and female. There were five (5) individual interviews with drivers (all male) between the ages of 20-27 yrs, two (2) focus group discussions [FGDs] with the first comprising 5 participants and the second comprising 3 participants. The choice of this sample was informed by the need to have a fairly balanced age and gender representations. Also, three (3) key informants were interviewed and documents (i.e., magazines, newspaper articles and statistical MVC data) on road traffic accidents were obtained. These data

were collected between June and July, 2010. The study was approved by the Norwegian Social Science Data Services (NSD) and the Ghana Police Service.

## *2.2. Participants*

The participants in this study were recruited by the researcher. On one hand, both male and female individuals who walk on the roadway in the district and who do not hold drivers' license were recruited by convenience as pedestrians. Drivers were sampled on the basis that they hold driving licenses and have driven vehicles two months prior to the interview. After meeting this criterion, selection was then made on a purposive basis sometimes using the snowball effect.

Five (5) drivers (all male) between the ages of 20-27 yrs with driving experience ranging from 2-5 yrs took part in the study. Then two (2) FGDs were held with groups of drivers. The first group discussion comprised 5 drivers (all male) between the ages of 23- 31 yrs (i.e., relatively young drivers) and the second discussion group was made up of 3 drivers (all male) between the ages of 36-57 yrs (i.e., relatively older drivers). The drivers are all male because only males engage in occupational driving at the study site as well as many parts of the country.

Three (3) key informants were interviewed. They were an MTTU officer from the Motor Traffic Transport Unit of the Ghana police service, a road traffic safety official from the National Road Safety Commission [NRSC], and a Union official from the Ghana Private Roads and Transport Union [GPRTU] of the Trade Union Congress [TUC]. They were included in the study because the researcher was convinced that since their job responsibilities involved dealing directly with

road traffic-related safety issues in the country, their opinions and views would shed light on the findings and discussions of the study.

### *2.3. Procedure*

The researcher approached, introduced himself and explained the study aims and procedures to the participants. He assured them of confidentiality and anonymity throughout the research process. Participants were a bit skeptical about signing the informed consent form. So a compromise was reached to obtain verbal consent. Interview and discussion items sought pedestrian views about their travel experiences, traffic risk perception and behaviour, road infrastructure, as well as their opinions about drivers. In addition, discussions also focused on drivers' perception of pedestrian road use attitudes and behaviour. On average, the individual interviews lasted about 45mins each. The FGDs lasted 1 hour 30min each. Both the interview and the discussions with drivers took place at the two main "lorry stations" (i.e., bus terminals) in the Manya Krobo township. Pedestrians were interviewed at their homes and offices.

Aside from two of the key informant interviews which were held in English language, the rest of the interviews and discussions were conducted in *Dangme* (i.e., the local dialect spoken in the area to provide rich descriptions of the issues under investigation).

### *2.4. Data analysis*

Qualitative content analysis as described by (Graneheim & Lundman, 2004; Shkedi, 2004; Unrau & Coleman, 1997; Sikron et al., 2008) was applied to the interview transcripts, focus group discussions, and motor accident statistics. The coding process was done manually and it was data-driven i.e., the inductive approach (Frith & Gleeson, 2004; Patton, 1990) to qualitative

content analysis was used. The manual coding involved a four-stage process (Burnard, 1996; Braun & Clarke, 2006). The first stage involved the researcher reading the entire dataset. The second stage involved reading the data more closely with the research questions in mind. Hence, the researcher read each of the dataset to identify emerging patterns that indicate instances of pedestrian travel experiences, behaviour, and risk perception as well as driver perceptions of pedestrian road use.

At the third stage, the researcher proceeded from open codes, through preliminary codes to look for categories. All the preliminary codes were collated and sorted into meaningful units (i.e., categories) depicting possible themes. This stage also involved re-coding and merging of similar codes which could combine under one thematic area. Tables were employed at this stage to help organize the categories into emerging themes. The use of the tables facilitated a visual inspection of the relationship between categories and themes.

The fourth and final stage of the analytic process was used to review and define themes as well as selecting data extracts which describe and support these themes. Then the entire collated data extracts were read to cross-check if they represent the themes to which they belong in a meaningful and coherent way. This procedure enabled the researcher to refine any confusing themes and categories (Morse, 2008). Through this procedure some sub-themes were identified. Some of the identified sub-themes were subsumed into the main themes while others were made to stand on their own. After this refinement, the final themes were interpreted in line with the research questions and the entire research focus. The list of final themes arrived at and their respective sub-themes and descriptions have been given in Table 1. The themes and sub-themes

largely represent both proximal and distal factors which bring about pedestrian-vehicular crashes.

### **3. Results**

In table 1, is a presentation of the prominent themes which emerged from the qualitative content analysis of the data. These themes constitute both proximal and distal factors which give rise to vehicular-pedestrian crash involvements resulting in the high incidence of injury and fatalities. However, the themes are presented here separately without any distinction as to which is a proximal factor and which is a distal one. The themes also represent both pedestrians' opinion of their own road use behaviour and travel experiences and drivers of commercial passenger-carrying vehicles perceptions of pedestrian traffic attitudes. Attempts are made to distinguish between pedestrian experiences and opinions and driver perceptions for the sake of clarity.

**Table 1**

Examples of themes, sub-themes/categories, and their descriptions

<b>Theme</b>	<b>Sub-themes/Categories</b>	<b>Description</b>
Design	Road infrastructure Pedestrian walkways & signalization	No walkways for pedestrians No foot bridges (overpass & underpass) Poor signalization at zebra crossings No pelican or toucan crossings
Environmental factors	Built environment Trading	Roads are narrow because they are sandwiched among residences Trading near the road Food items are sold close to the edge of the road & pedestrians turning back on road traffic when buying them
Human factors	Pedestrian & driver behaviour & risk perception Aberrant driving Negligence Cognitive deficiencies of children and the elderly	Pedestrians walk in the road & challenge drivers as to who has the right of way Pedestrians turning their face against traffic while walking on the roadway Pedestrians do not wear reflector vests or lights at night while using the roadway Cellular phone use Street hawking Some drivers don't know how to drive well Some drivers don't yield right of way to pedestrians Drivers speed and do dangerous overtaking School children use roadway without parental escorts
Traffic law enforcement	Laxity of police	No punishment for pedestrians who commit traffic violations

### *3.1. Design and road infrastructure*

The principal determinant of vehicular-pedestrian collisions identified by pedestrians has to do with the design of the road infrastructure in the area. They consider the road infrastructure to be pedestrian unfriendly.

*“It’s the road infrastructure that is creating these problems. It’s narrow and pedestrians don’t have a place to walk. Here there’re no traffic lights and speed limits”*. (Adult male pedestrian).

This consideration, they say, stems from several aspects of the design of the road. First, the road is very narrow such that it makes it difficult to be shared by pedestrians and vehicles. Secondly, there are no official designated pedestrian walkways or sidewalks for use by pedestrians. Hence, pedestrians have to put up with the risky situation of walking on the edge of the road in the lanes officially meant for vehicles:

*“Everyone knows the road is narrow and it can’t be expanded too because of the houses which line the roadway. If they want to expand the road then they have to pull down all those houses. I don’t think the owners will be happy so government can’t really do anything about it. It will cost a lot of money to do that, see pulling down all the houses from Somanya to Kpong”* . (Adult male pedestrian).

A 16-year old female pedestrian adds *“I try to walk close to the edge of the road because the road itself is not broad enough for the cars. Sometimes they stop right in front or behind you to offload passengers and I’ve got to stop and wait for them before I can move on”*.

Pedestrian participants also point to the lack of traffic signals for directing pedestrian crossing behaviour. They cite the absence of zebra crossing on the road as one such example.

*“The road to MAKROSEC is not broad so we have to be careful when walking to school. From Kodjonya where I live to the school there’re no traffic lights or zebra crossings on the road. So we have to use our mind to determine where to cross or walk”* (Adolescent male pedestrian).

And even in few places where some respondents say there used to be zebra crossing like the entrance of schools along the roadway, they maintain these markings have faded for years and remain unattended to.

*“Zebra crossings are only marked when the road is constructed for the very first time and from that when it fades away no one does anything about it. If you like go and walk on the roadway and see”* (Adult male pedestrian).

Due to the lack of traffic lights in many districts in the country (i.e., traffic lights can only be found in the national and regional capitals and very few districts). The Manya Krobo district does not have traffic lights. Participants seem not to know anything about pelican and toucan or foot bridge crossings. They have heard about ‘overpasses’ locally called “overhead bridges” but have not seen one. However, they have not heard about traffic light controlled crosswalks like touch-button pelican crossing. ‘Underpass’ is also a new word and a new thing altogether.

### *3. 2. The built environment*

Respondents also believe the nearness of residences as well as stores and supermarkets to the main road and streets in the area play significant roles in casualties involving pedestrians. In their opinion, the nearness of residences to the roadway makes people cross the road anywhere in front of their houses.

*“Drivers fail to recognize that people will cross the road anytime and anywhere depending on where they’re coming from, what they want and where they’re going. They’ll cross to their homes or to stores to buy items or food”* (Adult male pedestrian).

*“So there’re as many unofficial crossings as there’re houses lining the roadway”* (Adult male pedestrian).

They equally think that trading by the roadside as a result of the nearness of provision stores or supermarkets and cooked food joints force pedestrians to turn their back on traffic as they purchase food or other items.

*“The road is also littered with kiosks and shops”* (Adult male pedestrian).

*“Then I buy items from the roadside when I need something or when my parents send me. This means crossing the road or walking along it because the provision stores (supermarkets) are by the roadside”* (Adolescent male pedestrian).

Another pedestrian is of the opinion that the lure of some special food items patronized by both young and old attracts people to the roadside. He names some of the said foods items.

*“Others sell just too close to the roadway especially “koko”, “waatse”, “keneky” and the like. Anytime you’re buying say “koko” or “waatse” by the roadside, you’ve to stand close to the road with your face against traffic. E.g., look at Odumase junction, people stand in the road to buy items or to buy recharge phone cards or credit”* (Adult male pedestrian).

A female adolescent student seems to suggest that buying items by the roadside is almost an unavoidable undertaking. *“Yeah, I can’t avoid it because even if I am going to board a car I*

*have to walk to the roadside. Many of the items I use on a daily basis too are sold by the roadside so I walk or cross the road to buy them” (Adolescent female pedestrian).*

They point out that trading by the shoulders of the road makes pedestrian movement more risky.

*“The situation is worse on market days because sellers of used clothing and market women also display their wares on the shoulders of the road so there’s nowhere to walk” (Young adult female pedestrian).*

### *3.3. Human factors*

Another dominant theme which runs through the dataset is pedestrian behaviour. This has two dimensions. The first has to do with drivers’ perception of pedestrian behaviour and the second deals with pedestrian perception of their own road use habits. Driver participants seem unanimous in perceiving pedestrian road use attitudes and behaviour as unsafe. According to them not only do pedestrians show no signs of fearing vehicles plying the roadway, but also they (pedestrians) challenge them (drivers) as to who has the right-of-way. They feel so strong about this. Here is what one driver says when asked “how do you perceive the traffic behaviour of us pedestrians?”

*“You don’t respect vehicles at all. You people walk in the roadway as though you were walking in your room. I don’t know maybe they forget that the car can kill. They occupy the roadway and don’t show any sign of giving way to the car when you even alert them by honking. And what I hate about it all they tell you ‘and if you had hit me’. What can you do if I hit you? They rather fear rain more than vehicles” (A driver).*

It appears clear they have pent-up anger about pedestrian road use habits. Thus, their comparison of pedestrian traffic attitudes to rain seems to sum up their negative perception of pedestrians.

Listen to their explanation of the comparison:

*“It’s true if it’s raining do you see any pedestrian stand in the roadway? They run away but not when a car is coming so we kill them and will continue to kill them. Yes, some even challenge us by saying ‘if you like, hit me” (A driver).*

From their descriptions, they demonstrate their understanding of the fact that the road as it is now belongs to them and seem opposed to the use of the roadway by pedestrians because they see them as contributing to road traffic accidents after which they go unpunished. This came to light when the interviewer drew their attention to the fact that pedestrians do not have sidewalks and this may explain why they walk in the roadway. Their response was immediate and straightforward:

*“Yes, it’s true, but you know the ‘coal tar’ area is for cars and the ‘cemented’ area is for pedestrians. If there is no ‘cemented area’, it means you can’t walk there. Period. I think pedestrians behave that way because if anything happens they arrest you the driver rather and not the pedestrian. Have you seen or heard that a pedestrian is fined or imprisoned before for causing an accident?”(A driver).*

Pedestrians seem to accept some amount of responsibility for their unsafe traffic behaviour and the resultant road traffic accidents.

*“The problem I see is that because the road is narrow if we’re walking we tend to make the road narrower for drivers and sometimes the good drivers rather keep dodging us. When the drivers complain some people especially the men dare the drivers by saying “and if you had hit me”* (Adult female pedestrian).

However, they do not consider themselves as not having a right to the use of the road as drivers appear to indicate.

*“Yes, I say it because some of the drivers think the road is only for them. So they drive to, like sack you from the road. It’s this misunderstanding which results in people saying ‘and if you had hit me’, you’ll hear it often. It’s a way of telling the drivers we also have the right to use the road”* (Adolescent male pedestrian).

They admit this behaviour becomes more apparent when the young people find themselves walking in group with their peers.

*“There’re times that when coming home from school, for instance, we walk in groups and you will notice we occupy the road more because we’re chatting as we walk and everyone wants to hear the conversation so no one wants to be behind. Even when the driver blows his horn on us we insult him. Jokingly we say “if you like hit me let me claim insurance”* (Adolescent male pedestrian).

They feel some of their road use attitudes are influenced by the nature of the road. For instance, they turn their face against on-coming traffic not because they deliberately want to do so but the situational demands on the road make it inevitable.

*“There’re places on the way to the school where you can only walk at one side of the road with your face against traffic because the other side has no space at all” (Adolescent male pedestrian).*

A male student explains it better *“From MAKROSEC to Nuaso we walk with our face turned against traffic because that’s the only side where the road is broad enough for people to pass. The other side which is the correct place to pass is very small and near a big gutter. Nobody wishes to fall into the gutter”.*

Pedestrian respondents also believe that market days in the area contribute to risky walking or crossing because the volume of traffic on these days is large and brings about traffic congestion. They recognize that pedestrian density seems to be high on these days.

*“People are always going up and down the road, it’s a daily affair and since the numbers of vehicles are increasing so too the roadway is congested and makes crossing or walking more difficult for us” (Adult female pedestrian).*

In their opinion, this does not only force people to cross the road behind and in front of parked vehicles, but also market women carrying heavy loads on their heads use any side of the road which appears to them to be less patronized just so they could reach their destination early (i.e., either to or from the market).

*“On market days you see a lot of people walking along the road sometimes carrying heavy loads with their face turned against traffic. So it’s difficult for them to even look back because they’re carrying something on the head” (Adult male pedestrian).*

They describe situations where traffic congestion on market days seems to be exploited by street hawkers sometimes by children as young as 7 years selling sachet water locally called “pure water” and other items in traffic.

*“During Agormanya market days -Wednesdays and Saturdays the road is completely congested with cars and people. Both adolescents and children sell sachet water (pure water) in traffic and all sorts of items. They cross from one car to another to sell their items without paying much attention”* (Adult male pedestrian).

Drivers again identify pedestrian cell phone use while crossing or walking on the road as another recipe for road traffic accidents. They say some pedestrians talk on the phone while using the road and therefore become potential threats to drivers who are not paying much attention to their surroundings.

*“Pedestrians pick phone calls when crossing the road or walking along it. They talk so loudly that they cannot hear if a vehicle is coming beside or behind them. Using the phone is a fashion so when they’re walking anywhere they reach and get a call, they pick it”* (A driver).

Pedestrians seem to accept this criticism of their road use behaviour. However, they appear to attribute some of the blame to mobile phone booths by the roadside and sale of credit recharge cards dotting the roadside.

*“Even just after buying phone credit they make calls as they cross or walk along the road so if a car fails brake how do you know, your attention is somewhere else.”* (Adult male pedestrian).

In general, drivers seem convinced that the clothing used by pedestrians at night especially at sections of the roadway where there is poor lighting equally renders pedestrians more vulnerable to crashes. Particularly, they think that the use of dark clothing by pedestrians during times when

there is complete blackout in the whole township influences accident causation. They say wearing of dark clothing is rampant on days when funeral ceremonies are held in the area.

*“The roadway is not well light at night especially during ‘light off’. This makes walking quite dangerous for pedestrians. But some pedestrians who walk or cross at night too dress in black clothing especially when there is a funeral in the township. The police are the only people who wear reflector vests at night here”* (A driver).

Pedestrians believe time pressure on them to reach their destination faster also accounts for the inattention and impatience they exhibit on the roadway. Their patience appears to wane fast when high temperatures combine with unyielding drivers.

*“We the pedestrians like the drivers are always in hurry and especially when the sun is hot, you can lose your patience when waiting for long time to cross”* (Adult female pedestrian).

### *3.4. Risk perception*

As far as traffic risk perception is concerned pedestrian descriptions suggest that they are highly aware of the risk of crossing or walking along the roadway.

*“Yeah, I worry, everyone is at risk, no one is safe as long as you walk or cross the road or just stand by the roadside to buy something. Many of the “trotro” cars are used cars and their brakes keep failing now and then”* (Adult male pedestrian).

However, socio-economic and environmental factors make the road use simply an unavoidable practice. To them the situation looks more like a necessary evil with which they have to live. So although they recognize that any foot they set on the road comes with risks, this perception alone is not enough to save them from road accidents.

*“I know walking to school comes with risks but my parents don’t have lorry fare to give me that’s why I walk to school every day. Sometimes, the girls laugh at those of us who walk to and from school. I know many pedestrians have been killed on these roads but I don’t have money to board a vehicle to school”* (Adolescent male pedestrian).

### *3. 5. Aberrant driving*

While drivers do not seem to consider themselves responsible for initiating pedestrian-vehicular crashes, pedestrians on the other hand are convinced that aberrant driving plays no mean role in pedestrian casualties. Their descriptions indicate that they hold drivers responsible for about 70% of pedestrian motor vehicle accidents aside from other factors.

*“The problem with the drivers is about the right-of-way. Though there’re no official sidewalks for pedestrians they know pedestrians use the road all the time. Drivers fail to recognize that people will cross the road anytime and anywhere depending on where they’re coming from, what they want and where they’re going”* (Adult male pedestrian).

Pedestrians specifically cite speeding and dangerous overtaking as the major factors determining pedestrian-vehicular collisions.

*“One problem with the drivers is the speeding and overtaking. They do this to get more passengers so they pay more attention to passengers than pedestrians. The competition for passengers brings about double parking and one driver crossing another and this makes crossing the road very difficult for even adults”* (Adult male pedestrian).

Another criticism pedestrians level against drivers deals with drivers’ general unwillingness to yield to pedestrians crossing. They criticize some of the drivers for engaging in serious

conversations with front seat passengers and sometimes on their mobile handsets while driving to the extent that they lose focus on what other road users are doing on the roadway.

*“Some of the drivers don’t like giving way to pedestrians because they think they alone have the right to use the road. Sometimes, they park the car too close to the shoulders of the road so if you’re walking you have to jump the gutter. Others talk too much with passengers in the front seat or their cell phones while driving so they don’t detect people crossing early”* (Adolescent female pedestrian).

In addition, pedestrians perceive the wrong use of the vehicle horn as another cause of the pedestrian-vehicular crashes. They describe instances where drivers honk repeatedly to alert pedestrians that they are approaching and should watch out. But unknown to many drivers, respondents say, this practice of honking repeatedly rather frightens pedestrians and renders them confused.

*“Some see clearly that someone is ready to cross the road but they don’t give way but rather they honk on the person to frighten him. In the process the pedestrians become confused and go in the direction of the cars.”* (Adult male pedestrian).

### *3.6. Parental negligence*

According to pedestrians, parental negligence is an important cause of most of the motor vehicle crashes involving children.

*“Children run to cross the road rather than waiting to look left and right so I worry for them more. Sometimes I help some to cross the road. You’ll see that they want to cross but they don’t know what to do. Others are wise, they will tell you to help them cross the road”* (Adult female pedestrian).

They seem to criticize some parents for allowing their children to use the roadway without escort.

*“Sure, we play roles in accidents especially children. They normally cross anyhow when they’re unaccompanied by adults. Some play with objects in their hands while walking along the roadway to school”* (Adult male pedestrian).

Notwithstanding the fact that some children who use the street have difficulty crossing the roadway, participants point out that, they are also encouraged by their parents or guardians to go and sell sachet water (pure water) in traffic in order to support the family income.

*“The way some parents too allow their children to use the road either to school or to go and buy items is a cause of concern. Many accidents involving children result from children crossing the road without looking left and right or wrongly estimating the speed of on-coming cars. Normally the children also cross behind parked cars so drivers can’t see them. Now children as young as 7 years are made to sell “pure water” in traffic on market days”* (Adult female pedestrian).

### *3.7. Traffic law enforcement*

From their descriptions, both drivers and pedestrians consider the lack of enforcement of pedestrian traffic regulations as one of the factors for pedestrian- motor vehicle casualties.

However, on one hand drivers are of the opinion that the law is there but the police deliberately turn a blind eye to its enforcement. An adult female pedestrian puts it this way:

*“I am not sure there is any law for pedestrians aside from asking them to look, watch, and listen before crossing the road. If there’s any other law then the police have not done anything about it”.*

#### **4. Discussion**

Several factors have contributed to make walking along roadways one of the major modes of transport. Walking results in high exposure to road traffic. This comes with a cost. The present research focused on exploring pedestrian travel experiences, attitudes and behaviour with the ultimate aim of understanding the proximal and distal risk factors which influence their crash involvement with vehicles. Another aim was to assess drivers' perceptions of pedestrian road use behaviour and their role in road traffic accidents. Over all, participants perceived the following factors as the major causes of the increasing pedestrian casualty problem on the district's roads.

Ameratunga et al., (2006) have stated more clearly the implication of non-existence of pedestrian crossings on a road network. They have reported that roads without pedestrian facilities are common in low-income countries and double the crash risk of pedestrians. This finding is also consistent with a recent study in Ghana which has noted that the apparent lack of attention given to non-motorized facilities during road construction is an important cause of pedestrian crash involvement (Damsere-Derry et al., 2010). As a result, pedestrians maintain that they are left with no other option than to compete with vehicles in their lanes on the roadway. The role of road characteristics in accidents involving pedestrians has long been noted in the traffic safety literature (Zegeer et al., 2002; Carsten et al., 1998; Shriver, 1997; Handy, 1996; Hine & Russell, 1996). For instance, Hine (1996) argues that the 'pedestrianization' of roadways renders pedestrians safer. In Uganda, the protective effect of pedestrian facilities such as overpasses has also been reported (Mutto et al., 2002).

Pedestrians also expressed concern about the poor road signage and signalization and lack of speed calming devices. They pointed out that the non-existence of zebra crossings, pelican and

toucan crosswalks as well as speed humps render them more vulnerable as they have to cross anywhere on the roadway. In a study conducted in the USA, Sisiopiku and Akin (2003) have found that both signalized and unsignalized pedestrian crosswalks help to reduce pedestrian casualties. Consistent with other findings elsewhere (see e.g., Ferguson et al., 1995) that periods of Daylight Savings Time play roles in pedestrian crash reduction, respondents have cited the poor lighting of the roadway as another risk factor influencing pedestrian crashes at night.

In addition, the nearness of residences and stores for trading activities to main roads and streets in the area has been described by pedestrians to pose threats to road use. They mentioned cases where some supermarkets, stores, and kiosks for selling assorted materials have been situated close to the shoulders of the road such that sometimes customers are forced to turn their face against on-coming traffic while transacting business in these areas. They also consider food joints placed by the roadside for selling e.g., “koko”, “kenkey”, “waatse”, etc to the public as other risk factors. This finding is supported by research indicating that the socio-economic activities generated as a result of siting stores, food joints, recreational amenities by the roadside have significant correlations with pedestrian casualties (Damsere-Derry et al., 2010; Donroe et al., 2008; Wedegama et al., 2006; Inclan et al., 2005).

Many of the major roads in the study area pass through residential areas with entrances of homes opening directly into the roadway. Consistent with this finding, a study carried out in Seattle-USA by Harruff et al. (1998) has found that pedestrian accidents are rampant in areas where there are commercial and social activities like motels, fast-food restaurants, entertainment centers and stores. In their very recent study in Ghana, Damsere-Derry et al. (2010) have

observed that Ghanaian roadways are social facilities and commercial hub where hawking goes on briskly because such practices are not punished.

Thus, the lack of bus stops on the roadway as a result of the narrow nature of majority of the streets seems to have made every house by the roadside an unofficial bus stop and crosswalks. This is because people cross to their homes and none of these homes has any official crosswalk markings. Others stand at the entrances to their homes close by the road to chat. Participants cited examples of vehicles entering people's homes when they fail brake. Though not directly mentioned by respondents but linked to the road network and housing is the poor drainage system of the area. Almost on both sides of the roadway at certain sections, there are open gutters some as deep as 8ft. It may be that in trying to run away from approaching vehicles some pedestrians may have fallen into such ditches. This may also explain why at certain portions of the road, pedestrians posited that they had to wait for the vehicles to pass before they could move on. They say this occurs mostly when vehicles have stopped to pick or offload passengers.

Importantly, in line with previous findings, pedestrian actions and inactions on the roadway were considered by both drivers and pedestrians as potential threats to road traffic safety. A comparative study between developing nations and developed ones points to evidence showing that a small number of pedestrians choose not to use crosswalks, even where they are available, and hence wait longer time to cross roadways (Jacobs et al., 1981). Moyano Diaz (2002) has found that pedestrians, especially young males, have high positive attitudes towards committing traffic violations, errors and lapses and do not seem inhibited by subjective norms. On the strength of this finding, Moyano Diaz posits that pedestrians are proportionately responsible for most pedestrian-vehicle accidents.

Driver participants in particular, while trying to absolve themselves of much blame, perceived pedestrian traffic behaviour as the root cause of most vehicle-pedestrian collisions in the area. For instance, though pedestrians are aware of the narrow nature of the road and the fact that they do not have official sidewalks and crosswalks, they walk in the lanes meant for vehicles. When drivers of approaching vehicles try to alert them to the dangers of their behaviour by honking on them repeatedly, they (pedestrians) rather become infuriated and direct their anger at the drivers instead. Some of them, especially the young male ones, challenge the drivers over the right-of-way interpretations. The popular refrain they seem to hurl at drivers is: “And if you had hit me...”, or “If you like, hit me!”.

Pedestrian behaviour, being a crucial part of road accidents, has received a lot of attention from transportation researchers (Retting et al., 2002; Zegeer et al., 2002; Miller, 2000; Ivan et al., 2001). For instance, crossing the roadway outside of the marked crosswalks has been found to correlate very highly with pedestrian casualties (Ward et al., 1994). Then in situations like the site of the current study where there are no such crosswalks and sidewalks, it may not be hard to imagine the pedestrian casualty toll. Similarly, the propensity of young people to resort to traffic risk-taking when in the company of their peers finds support from three studies (Zhou & Horrey, 2010; Miller & Byrnes, 1997; Christensen & Morrongiello, 1997).

Besides, pedestrians cross the roadway anywhere and without much attention. Similar findings have been noted in the literature. For instance, a recent observational study in Israel has concluded that males engage in more risky crossing behaviour than females and that the number of pedestrians waiting to cross at the traffic light has influence on their crossing decisions (Rosenbloom, 2009). Rosenbloom (2003) also reports that younger pedestrians have a high

tendency to engage in unsafe crossing attitudes than older adults. This practice may be dictated by several factors. For example, it is possible that given the lack of marked crosswalks, sidewalks and foot bridges they may assume that they have much right-of-way than drivers do and thus would expect them (drivers) to yield to people on foot.

Added to this is the issue of cellular phone use by pedestrians while using the roadway. Perhaps, in line with the normative fashionable trend brought about by westernization and technological advancement, it is a common sight to see pedestrians picking calls while crossing or walking on the roadway just as majority of drivers in the area do behind the steering wheel. Extant literature suggests that mobile phone use both by drivers and pedestrians is an important contributory factor to vehicle-pedestrian collisions (Violanti, 1998; Violanti & Marshall, 1996; Redelmeier & Tibshirani, 1997a; McKnight & McKnight, 1993).

A recent study in Australia comparing males and females' use of cellular phones while crossing the roadway to a control group of males and females, has observed that female pedestrians who crossed while talking on the phone did so more slowly and often did not look at on-coming traffic before initiating crossing. And at unsignalized crossings, males who talked on the phone while crossing also crossed more slowly (Hatfield & Murphy, 2007). Consequently, Hatfield and Murphy (2007) have concluded that "[t]hese effects suggest that talking on a mobile phone is associated with cognitive distraction that may undermine pedestrian safety" (p. 197). Bungum et al. (2005) have reported similar findings in their study on pedestrians' use of mobile phones. As a result of the implication of cellular phones in road traffic accidents, many countries such as Australia, Israel, Brazil, UK, etc. are said to have passed laws prohibiting their use in vehicles (Maclure & Mittleman, 1997).

The use of visibility aids is not a part of the traffic culture in the country as a whole and Manya Krobo district in particular. Driving and walking at night are prevalent and bring in their wake heightened crash risks. Research indicates that decreased illumination brings about increases in pedestrian casualties (Owen & Sivak, 1996; Sullivan & Flannagan, 2002). The use of retroreflective vests at night is done by the police only and is therefore perceived as the sole preserve of the police. While drivers seemed convinced that the clothing (e.g., dark clothing) worn by pedestrians at night played roles in many accidents in the area especially against the background of the poor street lighting and rampant power outages in the district, pedestrians did not appear to be aware of the impact of their visibility and conspicuity or otherwise on pedestrian-motor vehicle crashes. The difficulty associated with seeing pedestrians at night by motorists has been reported in several studies (see e.g., Wood et al., 2005; Sayer & Mefford, 2004; Leibowitz et al., 1998; Owens & Sivak, 1993; Luoma et al., 1996).

Street hawking has not been a problem for city authorities alone; it is also a traffic threat to motorists. Hawking or selling in the street, often in-between parked vehicles during go slow rush hours, is a growing phenomenon not limited to the Manya Krobo district alone. It is the direct consequence of 'streetism' or the street population problem which is driven by poverty and rural-urban migration. In Ghana, Inklan et al. (2005) have forecast that pedestrian injury emanating from nearby hawking on sidewalks and roadways coupled with social and religious processions along major roads has the likelihood of increasing. The dire socio-economic situation of these often-forgotten members of the society has pushed them to fend for themselves on the street and thereby posing traffic risks to themselves and motorists. The significant relationship between individuals of low-income groups and their high susceptibility to road traffic accidents as

pedestrians has long been established in the traffic literature (Roberts et al., 1995; Christie, 1995b; Mueller et al., 1990; Sharples et al., 1990). While technically these individuals may not be seen as pedestrians, practically they are because they ply their trade on the roadway and contribute to road traffic accidents in much the same way as 'normal' pedestrians do.

There is general agreement among pedestrian respondents that their road use habits leave much to be desired. However, they seemed to suggest that drivers should be held responsible for about 70% of road traffic casualties involving pedestrians. They admitted some of them turn their face against traffic while walking and in some instances covering a large part of the roadway when walking in groups usually as students do when they are returning home from school, often engaged in conversations on serious and emotional topics like politics or football. This behaviour increases their crash risks. Harrell (1991) has noted that number of pedestrians on the kerb waiting to cross or walking diminishes one's alertness and gives rise to diffusion of responsibility.

Hence, drivers' negative perceptions of pedestrians' traffic attitudes and behaviour in the district are manifest in their comparison of pedestrian behaviour to the rain. Drivers criticize pedestrians for running away when the rain shows signs of falling or when it is actually drizzling but fail to run away or give way when a vehicle is approaching.

In the opinion of pedestrians, aberrant driving is the most influential determinant of many crashes involving pedestrians and motorists. They described how drivers engage in careless and inconsiderate driving by speeding, dangerous overtaking, and making and receiving calls while driving. This practice distracts their attention and culminates in late detection of people using the roadway on foot. The high correlation between vehicle speed and the frequency of pedestrian crashes as well as the severity of injury are well known because they have been extensively

studied by researchers. Kloeden et al. (2001) have pointed out that increases in vehicle speed heighten crash risk exponentially in both rural and urban environments. Again, Afukaar (2003) again investigated the effect of speed on road traffic accidents in Ghana and found that the dominant driver mistakes which traffic police have identified were loss of control of vehicles which emanates from extreme speeding. He has noted that speeding alone represented 50% of all road traffic accidents in Ghana between the period of 1998 and 2000.

The break-neck speed is the result of competition for passengers in order to meet their daily sales target and to earn an extra income as well. It is obvious that in pursuing this quest, they look out for passengers, but not pedestrians, from all corners of the roadway and not necessarily only those standing by the roadside to board vehicles. Thus, they are very much susceptible to the phenomenon in traffic research called “looked-but-failed-to-see” errors (Herslund & Jorgensen, 2003; Summla et al., 1996 Hills, 1980; Langham et al., 2002). Cairney and Cachpole (1995) have noted that between 69-80% of head-on collisions at roadway intersections emanate from failure of motorists to detect the presence of other road users.

The overinvolvement of children as pedestrians in motor vehicle accidents is a global burden. From the descriptions of participants, they have attributed the factors of their crash involvement largely to parental negligence resulting from lack of accompaniment of children using the roadway. Assailly (1997) has reported similar findings.

Available research carried out in Kumasi, Ghana by Abantanga (2002) has reviewed 271 cases of children involved in traffic accidents admitted to hospital in the town and has reported that 80.8% of them were injured as pedestrians, 11.8% were involved in crashes as occupants, and 4.4% were knocked down as bicyclists.

Majority of these children walk along major roads to and from school without escort. Their high probability crash rate may not be surprising after all given their high exposure (Tight, 1988; Pardo, 1988) and the stage of their cognitive development (Piaget, 1952, 1955) which influences their walking and crossing decisions (Ampofo-Boateng et al., 1993; Demetre, 1997). Other risk factors influencing child pedestrian crash involvement have been well investigated by transportation researchers (see e.g., Stevenson et al., 1995; Roberts et al., 1995; Thomson et al., 1996; Miller et al., 2004).

Consistent with this finding, Dunne et al. (1992) have established that parents in general overestimate the walking and crossing abilities of their child pedestrians. In the UK, Zeedyk and Kelly (2003) studied adult-child pairs at intersections and have noted that adults accompanying children failed to use the crossing event to impart safe crossing to children and that adults were more likely to hold the hand of girls than boys.

A key factor raised by respondents as being responsible for the continued perpetuation of traffic violations by pedestrians is the lack of interest in enforcing traffic regulations relating to pedestrian road use. While some respondents, mainly motorists, expressed concern over the apparent show of disinterest on the part of the police against the background of the harassment they endure on a daily bases at the hand of the traffic police, majority of pedestrians do not seem to know of the existence of any pedestrian laws on the country's statute books. The provisions in the Road Traffic Act (2004) regarding pedestrian road use lend credence to the situation described by respondents. It states, among other things, that "A person who jaywalks or ignores traffic light signal, commits an offence and is liable on summary conviction to a fine not exceeding 25 penalty units or to a term of imprisonment not exceeding one day" (p. 42). As it

stands now it is hard to imagine how such a law can be enforced in a competent court of law.

The reasons are not far-fetched. First, there are no traffic lights in many districts in Ghana including the Manya Krobo district. Secondly, there are no official sidewalks, crosswalks, and foot bridges for pedestrian use. Thus, it would be extremely difficult for the traffic police to prove that pedestrians' sharing of lanes with vehicles amounts to "jaywalking".

## **5. Limitations**

This study is limited by the small and non-representative nature of the sample resulting from the sampling techniques used. It is worth noting that pedestrian casualties do not result from collisions with commercially operated passenger-carrying vehicles alone. Private vehicles have their share of pedestrian-vehicle crashes. This study focused on commercial drivers mainly because of their sheer numbers in the study area and the increased risk that comes with their day-to-day operations. Future research in this area should attempt to address these shortcomings.

## **6. Conclusion**

As of 2006, pedestrian fatalities accounted for 42% of all traffic casualties in the country (WHO Country Profile Report, 2009). The carnage on the country's roads involving pedestrians has become a big challenge to central government. Available evidence appears to suggest that there is no end in sight to this carnage yet given the known risk factors. It is evident that the pedestrian casualty rate may be reaching intolerable levels among the public. This can be inferred from the swift preparedness of the youth to carry out 'instant justice' (i.e., lynch with impunity any driver who knocks down and kills a pedestrian) and their subsequent desire to create unauthorized artificial speed humps by sandbagging the roadway. Injuries resulting from traffic accidents have

the potential to create permanent disability. This is coming against the backdrop that several institutions and infrastructure in the country are disability-unfriendly. The length of time it has taken the parliament of Ghana and the challenges that characterized the passing of the disability law recently point to the daunting task the nation will grapple with in providing for the welfare of people living with disability. The unavailability of post traumatic care in many medical facilities in rural Ghana is posing health problems already and even where they are available in urban or peri-urban Ghana, the cost of treatment to traffic victims and their families may be pushing more families below the poverty line.

It is commonly held that road traffic crashes are preventable and in fact that ‘road accidents are no accidents’. This means the era of the victim-blaming should be over and all of us should roll our sleeves and set to work to reduce this hidden epidemic. Therefore, the voice of the user should be heard in planning any interventions. The concerns of both pedestrians and drivers should provide the driving force for any safety countermeasures. Baker et al. (1974) could not have put it any better “Development of programs that will effectively reduce pedestrian injuries also requires a better understanding of the drivers whose vehicles have injured and killed pedestrians” (p. 318).

Already, the writing seems to be on the wall that any educational interventions embarked upon by central government will be meaningless unless they are linked to the holistic overhaul of the road infrastructure. The overrepresentation of children in pedestrian casualties is enough evidence for the inclusion of parents and guardians in any interventions to be undertaken.

Hopefully, if we decide to act, we will succeed because there are shining examples of pedestrian casualty rate reductions in many countries across the developed world (e.g., Sweden, Norway,

Netherlands, Australia, etc.). These examples should provide light onto our path in Ghana. But if we choose to downplay the potential the traffic threat poses to our very existence, one by one we are likely to continue burying our collective future as each family buries its traffic victim.

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### **4.3 Summary of results**

In this section a summary of the findings in Papers I and II presented above is made. Reference can be made to the actual papers if more detailed results are required.

#### **4.3.1 Paper I: *Survival of the Fittest: Attitudinal and Motivational Aspects of Aberrant Driving***

A qualitative content analysis of results in Paper I indicated that aberrant driving resulted from a combination of proximal and distal factors. These factors can be grouped under two broad categories-human factors and environmental factors. In the opinion of commercial drivers, their challenging working conditions e.g., the pressure of meeting sales target imposed by car owners, poor remuneration system, rampant threats of lay-offs by car owners, and lack of social security entitlements and social support were the motivations for their risk-taking and dangerous driving behaviour.

They also described the growing motorization, bad road infrastructure, poor road signalization and signage, unsafe passenger behaviours and distractions, bad condition of passenger-carrying vehicles, and ineffective traffic law enforcement as important factors which did not only contribute to aberrant driving but also made the fittest among them survive the daily ordeal associated with occupational driving. In addition, respondents expressed concern about inadequate driver training, road rage behaviours, and risk-taking propensity especially among young drivers and suggested that they had been the causes of a number of road traffic accidents in the district. Fatalistic beliefs, poor traffic risk perception, and the quest to earn extra income to meet family needs made many a commercial driver oblivious to the dire consequences of dangerous driving.

#### **4.3.2 Paper II: “And if you had hit me...”: Pedestrian-Motor Vehicle Crash Involvement**

Participants identified road infrastructure, lack of pedestrian facilities, nearness of stores and supermarkets to major roads, risky pedestrian road use behaviour, and careless driving to be responsible for most pedestrian-vehicular crashes. From their descriptions, a qualitative content analysis indicated that both pedestrians and drivers seemed to suggest that street hawking, time pressure, parental negligence with regard to children, and the general disinterest in prosecuting pedestrians for traffic violations contributed to the increased crash risk of pedestrians. While pedestrians appeared to apportion some blame to themselves for pedestrian-vehicle collisions, drivers on the hand seemed to absolve themselves of any blame.

### **5 Discussions**

#### **5.1 Summary of discussions (Paper I & II)**

Summarized discussions for Papers I and II are presented here. If detailed discussions are required for each paper, recourse can be made to the original papers for the full versions.

##### **5.1.1 Paper I: *Survival of the Fittest: Attitudinal and Motivational Aspects of Aberrant Driving***

In the opinion of drivers, the conditions under which they work are the major causes of inconsiderate driving and accidents. They say they work from dawn to dusk often without any rest periods in-between in order to meet sales targets set for them by their car owners. Their employment and termination are often at the mercy of the car owner. They are poorly paid and have no social security entitlements. They are not entitled to any pay if they do not go to work for weeks or months as a result of vehicle breakdown or sickness. The lack of employment opportunities and the increasing number of commercial vehicles has forced them to work under

fatigued and stressful conditions all year long so as to earn something little to keep body and soul together. The impact of fatigue and stress on road accidents is a common finding in traffic studies (Sabbagh et al., 1999; Tse et al., 2004; 2006; Brown, 1994).

Participants say ineffective enforcement of traffic rules and regulations coupled with extortion of money from motorists has contributed to reckless driving. Previous findings indicate that ineffective traffic law enforcement makes aberrant driving attitudes and behaviour resistant to change (Huang et al., 2006; Factor, Mahalel, & Yair, 2007). Generally, participants consider the condition of used passenger vehicles as another contributory factor to accident causation and severity of injury. Cargo vehicles are converted locally to passenger vehicles and are maintained with used car parts. Mock et al. (1999) have reported similar findings in Ghana.

Bad road infrastructure and equipment are described as major causes of careless driving and accidents. Respondents say the road is narrow and full of potholes. Dodging the potholes leads to fatal head-on collisions and near misses. This combines with poor signage and signalization to bring about road crashes. A study in Israel by Sikron et al. (2008) supports this finding. Drivers suggest that passengers, especially front-seat passengers, contribute to distracted driving by engaging them (drivers) in conversation on sensitive topics like politics and football. They sometimes urge them to speed so they could reach their destination in good time. This finding has been well documented in the traffic safety literature (Chen et al., 2000; Williams; 2001; Regan & Mitsopoulos, 2001; McKenna et al., 1998; Williams & Shabanova, 2002; Cooper et al., 2005; Doherty et al., 1998; Keall et al., 2004).

Participants think inadequate training of commercial drivers before obtaining drivers' licences plays roles in dangerous driving and motor vehicle crashes. About 99% of these drivers trained

for their licenses via driving apprenticeship. With this practice, knowledge of driving is acquired informally on the job only through observational learning. Hence, both good and bad road user behaviours of the master are learned by the mate or apprentice. These novice and inexperienced drivers pose dangers to themselves and other road users (Martinez, 2005). Fatalistic beliefs and poor traffic risk perception render most drivers vulnerable to accidents. Some perceive the risks associated with driving as mere occupational hazards. Religious and cultural beliefs mediate traffic risk perception and may lead to underestimation of risk (Deery, 1999). Fatalistic beliefs about accidents give rise to learned helplessness (Kouabenan, 1998).

### **5.1.2 Paper II: “And if you had hit me...”: Pedestrian-Motor Vehicle Crash Involvement**

According to participants, the pedestrian-unfriendly road infrastructure accounts for many pedestrian-vehicular crashes. Pedestrians consider the lack of sidewalks, marked crosswalks, and foot bridges as key factors which force them to share the lanes meant for vehicles with them and thereby creating accidents (Ameratunga et al., 2006). Inadequate roadway lighting and lack of road signals and signs for directing human and vehicular traffic has further worsened the problem (Owen & Sivak, 1996; Sullivan & Flannagan, 2002; Damsere-Derry et al., 2009).

Participants describe the nearness of supermarkets, stores, and shops to major roads in the township for selling assorted materials as important causes of accidents. This, they say, includes food joints that line the shoulders of the roadway. The location of these facilities and items e.g, porridge patronized by the general public, especially by school children in the mornings, exposes them to traffic risks because they often have no option than to turn their face against traffic when purchasing or accessing these items. Previous studies in Ghana have reported similar findings (Damsere-Dery et al., 2010; Donroe et al., 2008; Inclan et al., 2005).

Generally, it is perceived that pedestrians are their own killers given some of their acts of commissions and omissions on the roadway. Drivers particularly perceive them as dangerous road users. In the absence of designated sidewalks and crosswalks, they walk anywhere they like including the lanes meant for vehicles and seemed not to show any signs of yielding to drivers when they are honked upon. Their origin and destination determine where to cross the road and not necessarily where it is safe. They challenge drivers as to who has the right-of-way. More males than females appear to show this risky road use habits. Participants point out that a good number of pedestrians pick phone calls while crossing the road or walking alongside. Hatfield & Murphy (2007) have found a relationship between road accidents and cellular phone use. Others use the roadway with their face turned against on-coming traffic. Moyano Diaz (2002) has observed young male pedestrians show high positive attitudes towards committing traffic violations, errors and lapses and do not seem inhibited by subjective norms.

Night time walking is common because commercial vehicles close around 9:00 pm and only few families have private vehicles. In the opinion of respondents, poor roadway lighting and the intermittent power outages impact negatively on pedestrian visibility and conspicuity and increase their crash risks. Evidence suggests that decreased road illumination increases pedestrian casualties (Owen & Sivak, 1996; Sullivan & Flannagan, 2002). Use of visibility aids is not part of the traffic culture in Ghana and thus, it is common to see pedestrians at night in dark clothing especially on Saturdays and Fridays when funeral ceremonies are held. The challenges motorists face in seeing pedestrians at night has been extensively studied and correlations have been reported in several studies (see e.g., Wood et al., 2005; Sayer & Mefford, 2004; Leibowitz et al., 1998; Owens & Sivak, 1993; Luoma et al., 1996). The street population

problem has given rise to street hawking or selling in traffic. This is posing traffic problem to road users especially motorists and has been blamed for a number of road crashes (Dampere-Derry et al., 2010).

Participants seem to suggest that speeding and dangerous overtaking are the dominant causes of traffic casualties involving pedestrians. Speeding and traffic accidents are known to be causally related (Kloeden et al., 2001). Commercial drivers compete against their colleagues for passengers by driving at break-neck speed and sometimes tailgating and criss-crossing one another. Respondents appear to indicate that a common feature of commercial driving is that drivers pay more attention to passengers than to other road users. About 50% of road accidents in Ghana are due to speeding alone (Afukaar, 2003). Again, children are overrepresented in pedestrian-vehicle crashes (Tight, 1988; Pardo, 1988). Aside from their cognitive deficiencies which predispose them to road accidents, participants consider parental negligence to be contributing to the casualty rate of children. They say unaccompanied children are often sent to buy items across major streets. Others also walk to school along major roads without any parental escort. Dunne et al. (1992) have reported that parents generally tend to overestimate the walking and crossing abilities of their child pedestrians.

The general lack of interest in enforcing laws related to pedestrians is perceived by drivers to be the reason why pedestrians continue to engage in traffic violations. They point out that since they are not arrested by the traffic police, majority of them use the roadway with impunity while drivers are rather held responsible for pedestrian-vehicle collisions.

## **5.2 General discussion**

Generally, it is assumed that the interaction of personality with distal and proximal factors and situational factors may bring about increased traffic crash risks (Beirness, 1993). The over-

arching aim of the present research was to explore the individual and situational risk factors that influence unsafe road user attitudes and behaviour leading to road traffic accidents. The units of analysis chosen for the study were drivers of commercially-operated passenger-carrying minibuses and pedestrians in a suburban context. Based on the results, the factors implicated in aberrant road use by both groups could be classified into the following three broad themes- person factors, social environmental factors, and structural/physical environmental factors. These factors may also be regarded as accident causal taxonomies and can be further subdivided into specific causal factors. They are discussed here in relation to their relative contributions to theoretical conceptualizations and their implication for designing intervention methodologies. The discussion of these factors should shape our understanding not only of the triggering conditions and their outcome but also facilitate the identification of some of the latent conditions that current road safety education in the country has failed to address.

### **5.2.1 Person factors**

The person factors are largely personality factors and deal with road user attitudes and behaviour. They can also be referred to as human errors (Najm et al., 1995; Sabey et al., 1975; Wierwille et al, 2002). Reason (2000) has observed that some of these person errors on the roadway include carelessness, negligence, forgetfulness, and general recklessness. Hence the physiological and mental states of both drivers and pedestrians impact road traffic safety. For example, in paper I some of the drivers seem to indicate their love for sensation seeking by engaging in road rage behaviours, especially those of them who drive petrol cars. They perceive their friends who drive diesel vehicles to be inferior to them on the roadway by virtue of their vehicle's horsepower.

This combines with the feeling that they have better driving skills and thus are more invulnerable to traffic crashes as compared to their colleagues. Weinstein (1980) calls this optimism bias. Aggression is known to be an instinct possessed by all human beings. Paper I contributes to our understanding of these human instincts. For some of these commercial drivers aggression is synonymous with masculinity and some drive in a manner to express their masculinity over their colleagues by tailgating and overtaking them under dangerous circumstances (Elander, et al., 1993) to reach the passengers first. This practice seems to suggest that the bus stop next is perceived by a number of them to be the 'battle ground' for 'who is who' in driving.

All these unhealthy road use attitudes come against the background that a number of these drivers lack experience and the needed skills to handle the vehicle effectively. By the very nature of their occupation they become stressed up and fatigued after driving throughout the day without rest. Paper I contributes to and highlights this finding by previous research.

Psychologically, stress and fatigue give rise to distracted driving aside from those experienced from passengers, in-car music, and cellular phone use.

On the part of pedestrians, paper II has found that unsafe attitudes such as time pressure, inattention, and talking on the cell phone while crossing or walking along the roadway correlate with road crashes. The cognitive deficiencies in children and the elderly that result in poor gap selection and speed judgment serve to heighten pedestrian-vehicle crash risks. Elsewhere these cognitive and physical vulnerabilities such as poor eyesight have been found to create accidents (Hakamies-Blomqvist, 2003). The demographic variables of sex and age have been reported to play roles in accident causation (Elliott & Baughan, 2003; Daff et al., 1991; Yagil, 2000; Garder, 1989).

### **5.2.2 Social environmental factors**

The social context of the road user cannot be divorced from their attitudes and behaviour because the two make each other up. Markus and Hamedani (2007) have noted that individuals are essentially social and cultural phenomena and that no one can pretend to be asocial or acultural. Therefore the traffic culture in the area including their beliefs, norms, values, and practices inform their level of safety consciousness. For instance, in the Manya Krobo area paper I establishes that participants' religious beliefs do not encourage them to think and talk about the negative consequences of events such as the probability of dying through traffic crashes. In this way the bad emotions associated with the thinking that one could get injured or die through road crashes are attenuated or repressed. The religious belief that whatever the mouth says shall come to pass underlies the lack of assertiveness that vehicle occupants e.g., passengers demonstrate in the face of risky driving.

The end result appears to be that since no one wishes to stand accused of having evil thoughts then the actual risks that are engaged in by drivers and other road users are sustained. Other socio-economic factors like poverty, increasing motorization, volume of traffic, choice of travel mode raise the exposure level of both drivers and pedestrians. Paper II notes that many people, especially school children, walk long distances along major roads because they cannot afford the transport fares charged by drivers of commercial vehicles. The relationship between socio-economic factors and road accident is documented in the traffic literature (Graham et al., 2002; Christie, 1998). The mode of employing commercial drivers is at the core of a number of accidents (paper I). This is because the employment is at the mercy of the car owner and only executed by word of mouth. The driver is not entitled to annual leave, social security benefits,

and can be laid off at the least instance. This seems to explain their risk willingness and risk acceptability.

The system of traffic rules and regulations poses other challenges e.g., the non-enforcement of laws about the use of occupant restraints (seat belts). Driver training and licensing practices are no exceptions. The lack of pedestrian right-of-way laws exposes pedestrians to competition with vehicles with each group trying to assert their right-of-way (paper I). Thus, it is not uncommon that ineffective traffic law enforcement has increased the risk taking and risk tolerance levels of some road users.

### **5.2.3 Structural/physical environmental factors**

These factors include road infrastructure and vehicle factors. The road layout (e.g. narrow roads sandwiched among residential areas), non-availability of standard road furniture such as pedestrian crosswalks, sidewalks, footbridges, etc. and roads with potholes are major contributory factors to road accidents (papers I & II). The mechanical aspects of the vehicles used for commercial purposes are fault-laden because used vehicles maintained with used car parts do break down unexpectedly. These defects make them crash beyond repair when they are involved in accidents.

Research shows that about half of vehicles in low-income countries do not have functioning seat belts (Forjuoh, 2003). The case of the study area is no different because passenger vehicles do not have seat belts and even where they may have they are not used.

Also, roadside objects like kiosks and stores which are used for trading purposes (paper II) along the roadway are not protective in times of crashes. In addition to this is the lack of trained

paramedics to administer pre-hospital care and the lack of ambulances to evacuate accident victims to hospital or clinics. The situation becomes dire in areas where there are no hospitals within the immediate environment to deal with post-traumatic issues arising out of accidents. These conditions lead to high injuries and fatalities.

All in all, the myriad of risk factors that predispose road users to road traffic crashes may be framed for better understanding with the help of contextual models. Building such models means factors distal and proximal to the road user will be isolated to examine their relative influence on the road user. The factors identified in the present research can be conceptualized in the form of an organism-environment model (Brunswik, 1952). The organism may be perceived as the driver or pedestrian at the centre of the model and whose immediate and distant environments shape their individual risk perception, road use attitudes and behaviour. The immediate environment (speeding, traffic violations, etc) may exert direct influence on the organism (road user) at the centre while the effect of the distant environment (cultural beliefs, road infrastructure and vehicle characteristics, weather conditions, etc) may be indirect (Wolf, 2000).

### **5.3 Limitation**

The limitations of each paper have been presented in those papers. A summary of those are presented here to serve as the general shortcomings of the entire research. Firstly, the general sample size is small and not representative because criteria for selection were largely based on convenience. Secondly, translating the interview from the original dialect used (Dangme) to English presented some challenges. As a result of this, vital bits of information may have been lost in the translation process. Thirdly, private vehicles also kill pedestrians but this study concerned itself with only commercial vehicles. Therefore, pedestrians' perceptions of drivers'

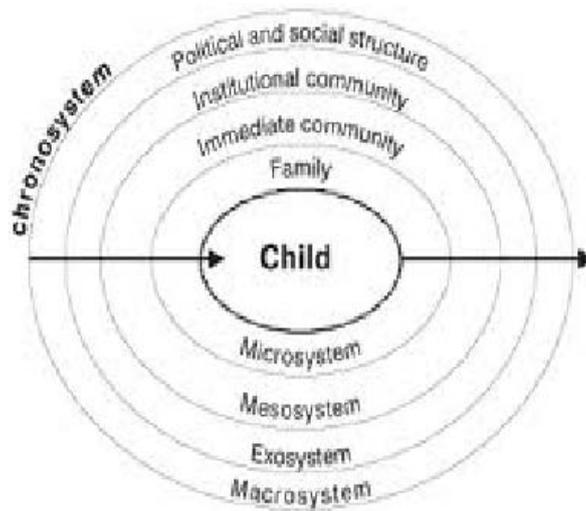
roles in road traffic accidents may have been biased against commercial drivers. Subsequent research should attempt to fill these gaps.

## **5.4 Concluding remarks**

### **5.4.1 Broad accident causal factor conceptualization**

The notion that road safety is a shared responsibility among several actors has been given a boost by the Swedish 'Vision Zero' policy. Salmon et al. (2010) refer to this notion of multi-sectoral collaborative system as 'complex sociotechnical systems' (p. 1226) involving everyone from the policy maker to the road user and all those in-between. In accordance with this notion of sociotechnical system, the factors identified by participants in the present research do exemplify the ecological systems theory propounded by Urie Bronfenbrenner (1979; 1994) and can be represented and explained as such.

The basic assumption of this model is that individual behaviour is determined by five contributory subsystems. Bronfenbrenner names these subsystems as microsystems, mesosystems, exosystems, macrosystems, and chronosystems. Thus, in attempting to understand a social problem like road traffic accidents and address it holistically, it is important to consider the interactions among these subsystems which constitute the road user himself and his environment. Any deficiencies in any of these subsystems e.g, risk taking disposition of the road user, etc is thought to have a repercussion on the other subsystems.



**Figure 7:** Ecological model (Bronfenbrenner, 1994)

#### **5.4.2 Attitude-behaviour relation**

Attitude-behaviour relation has engaged the attention of psychologists for some time now. Both constructs are thought to influence each other but the strength of the influence is the subject of much debate in social psychology. Attitudes are considered to be the most distinctive and important concept in recent studies among social psychologists (Allport, 1935). For instance, attitude to driving may predict actual driving behaviour and vice versa. Broadly, attitudes are made up of affective, behavioural and cognitive components.

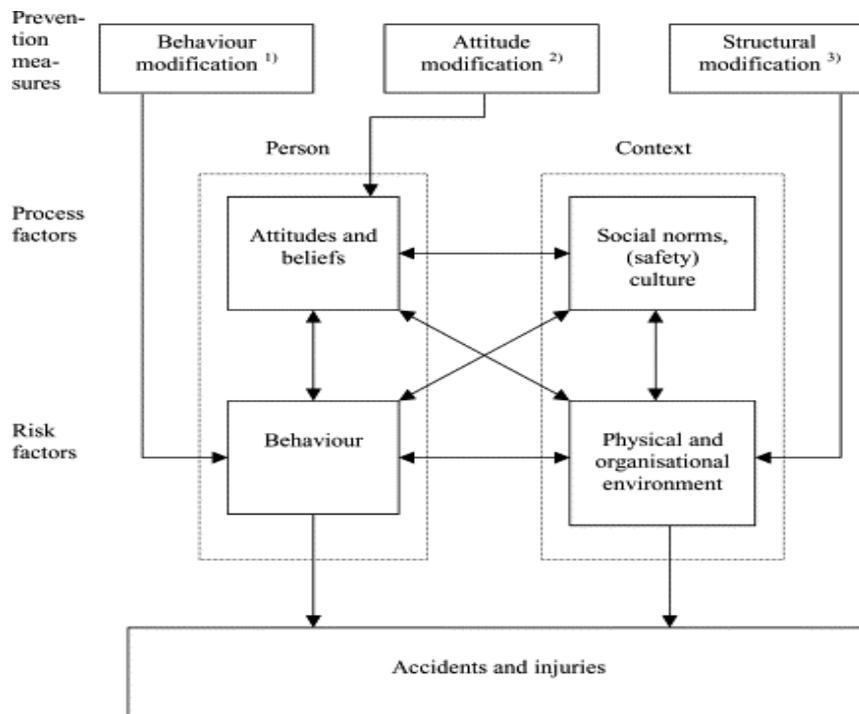
Attitude is “a summary evaluation of an object of thought” (Bohner & Wanke, 2002, p. 5) All types of phenomena can be described as attitude objects. Changes in attitude are believed to be influenced by new messages and contextual characteristics (Bohner & Wanke, 2002). Therefore, one of the ways of changing unsafe road user behaviour may be to provide new information and address the context effects that build up attitudes. Context-dependent factors guide attitude-behaviour correlations. In the theory of reasoned action (TRA) (Ajzen and Fishbein, 1975) and

the theory of planned behaviour (Ajzen, 1991), the authors argue that the immediate determinant of behaviour is behavioural intention. And the intention to engage in a certain action (speeding behaviour) is influenced by one's attitude (the thrill associated with speeding) toward that action (behaviour) and the strength of subjective norm (significant others also speed) and one's own behavioural control otherwise called self-efficacy.

### **5.4.3 Design of interventions**

In planning any interventions to mitigate the effect of road traffic accidents, the focus should not solely be on addressing structural factors but also the components of the latent factors that feed road users' intention ought to be integrated to achieve meaningful results. In the light of the foregoing, an integrated model for designing accident countermeasures proposed by Lund and Aaro (2004) will be instructive. This model is especially relevant because human factors have been found to represent about 90% of accident causal factors (Dekker, 2002). The model is self-explanatory and can be applied in many situations and contexts.

**Figure 8:** A model for accident prevention.



**Source:**Lund & Aarø (2004)

#### 5.4.4 National road safety vision

The national vision for road safety states ‘*Ghana, a country with the safest road transport system in Africa*’ (NRSC, 2007, p. 5). In my candid opinion this vision does not appear to be ambitious enough given what we now know about road traffic crashes. Inherent in this vision is the idea that the country is to measure her road safety successes or failures by comparing with other traffic situations within the African region. This may have the unintended potential of slackening the national focus and efforts into self-gratification. That is, if it can be established that the nation’s traffic record is comparatively better than other countries, efforts are likely to slow down because we will no longer be challenging ourselves but others. The truth is that Ghana

does not compare with any other country on the same demographic features (i.e., from population growth to minimum wage). This will mean attempts to reduce the current fatality rate from 21.91 (1,600 deaths per year) to a single digit may not be achieved any time soon by the 2015 timeline proposed by the National Road Safety Commission.

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## **Appendix I: Interview & discussion guides**

### **Pedestrian interview guide**

Information for interviewee

Dear interviewee, this study is about risk perception, traffic attitudes and behaviour among pedestrians and drivers in Ghana in general and the Krobo district in particular and how these impact road traffic safety. Road traffic crashes are the commonest causes of fatalities and injury-related disabilities in the world today. Available data from the National Road Safety Commission suggest that increasing motorization in the country is bringing about increased traffic crashes.

The human contribution to traffic accidents in Ghana cannot be overemphasized. Traffic safety therefore appears to be one of the topmost priorities of Ghanaians. Through the present study, this researcher hopes to gather relevant data that will provide useful information to complement those of the institutions involved in traffic safety campaign in the country.

If by any chance a question should make you feel uncomfortable, do not answer it. You can also withdraw from the study at any time you change your mind about participating. In this study, we only need to know your position and your age range but not your name. Any information you provide will be held in strictest confidence and be used for academic purposes only. The questions that follow are about your mobility and experiences as a pedestrian. Thank you!

#### **A: Attitudes and behaviour (Pedestrian mobility & road use experiences)**

Do you sometimes walk in the street or cross it on foot, tell me about it?

Are there any challenges you face while crossing or walking along the roadway? How would you describe them?

Do you think pedestrian road use attitudes and behaviour pose danger to traffic safety in this area? In what ways?

Does the road network and condition in this area influence how you or others cross/walk in the roadway?

During the time you walk in the street, do you have any concerns with drivers who ply the road? Describe them!

Do you think the way you or others cross or walk in the roadway affect driving?

Could you describe what people who walk in the street do that you think can bring about motor accidents?

Could you tell me why you think pedestrians in this area behave that way?

Who do you think should be held responsible if a car kills a pedestrian: driver or pedestrian?

What is your impression about traffic law enforcement regarding pedestrians in this area?

Do you know if a pedestrian has been punished before for traffic offences?

**B: Risk perception**

What do you perceive to be the risk factors on the roads while walking?

Do you feel unsafe that as a pedestrian you could be involved and injured in traffic crash?

Do you worry that other pedestrians could be involved and injured in a traffic crash but not you?

**C: Closing remarks**

Is there any information I have not asked for that you wish to share

Do you want to add something or make a correction?

**D: Personal information**

Are you able to tell me about your age or age range?

**Many thanks!**

## **Driver interview guide**

### Information for interviewee

Dear interviewee, this study is about risk perception, traffic attitudes and behaviour among pedestrians and drivers in Ghana in general and the Krobo district in particular and how these impact road traffic safety. Road traffic crashes are the commonest causes of fatalities and injury-related disabilities in the world today. Available data from the National Road Safety Commission suggest that increasing motorization in the country is bringing about increased traffic crashes.

The human contribution to traffic accidents in Ghana cannot be overemphasized. Traffic safety therefore appears to be one of the topmost priorities of Ghanaians. Through the present study, this researcher hopes to gather relevant data that will provide useful information to complement those of the institutions involved in traffic safety campaign in the country.

If by any chance a question should make you feel uncomfortable, do not answer it. You can also withdraw from the study at any time you change your mind about participating. In this study, we only need to know your position and your age range but not your name. Any information you provide will be held in strictest confidence and be used for academic purposes only. Thank you!

#### **A. Background information**

Can you tell me how long you have been driving?

Can you tell me about the daily routine of commercial drivers (your work)?

How did you train for your driver's license?

#### **B. Road use attitudes & behaviour**

In what ways does the nature of your work affect the way you drive?

What attitudes of drivers do you dislike?

How do you perceive pedestrian attitudes to road use?

In your opinion, do we have "Sunday drivers" on our roads here?

What do you think motivates drivers to speed, overload or double-park?

What behaviours of drivers lead to accidents?

What are some of the unsafe behaviours that you engage in as a driver while on the road?

What are the differences between old drivers and young drivers in Manya Krobo?

Do your family (wife, kids, parents, etc) and friends have any influence on the way you drive?

**C. Perceived traffic crash risk**

As a driver, do you feel unsafe that you could be involved in a traffic accident?

Do you worry that you could be injured should you get involved in a traffic accident?

How probable do you think is it for yourself to be involved and injured in a traffic crash?

How concerned are you about traffic crash risks and think you could be a victim?

Do you feel it's more probable for other road users to be victims of traffic crash but not you?

**D. Closing questions**

Is there any information I have not asked for that you wish to share?

Do you have any suggestions for drivers and pedestrians, passengers as well as the institutions involved in promoting road traffic safety?

Do you want to add something or make a correction?

**E: Personal information**

Are you able to tell me about your age or age range?

**Many thanks!**

**Appendix II: Informed consent**

Informed consent form

**The researcher**

Enoch Teye-Kwadjo is my name. I am a student at the Norwegian University of Science and Technology (NTNU, Norway). I am conducting a study on risk perception, road user attitudes and behaviour among commercial drivers and pedestrians. Your opinion on this issue will be crucial for this research project as it will help plan safety interventions. I would be glad if you could take part in this study.

**Information for the participant**

Your participation in this research project is voluntary. Your participation or non-participation will not bring punishments or rewards to you. Even if you decide to partake and somewhere along the line, you feel uncomfortable to continue you can withdraw from it. Your withdrawal will not be penalized or communicated to anyone. If a line of questioning during the interview or focus group discussion appears offensive to you, you have the free will not to answer or discuss it. The information you provide will be strictly anonymous and confidential and will be used for academic purposes only.

**My decision**

I agree to take part in this project. The aim of the project has been explained to me. I understand that my decision to participate or not to participate is a voluntary one and that I can withdraw from the study any time I like. I am convinced the information I provide will be subjected to strict anonymity and confidence. I am okay with the planned data storage procedures and I agree that the information I provide could be audio-taped.

Name of participant :.....

Signature:..... Date:.....

Many thanks!

**Appendix III: NSD clearance notice**



Harald Hårfagres gate 29  
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Berit Overå Johannesen  
Psykologisk institutt  
NTNU  
Dragvoll  
7491 TRONDHEIM

Vår dato: 27.05.2010

Vår ref:24225 / 2 / IB

Deres dato:

Deres ref:

## TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 15.04.2010. Meldingen gjelder prosjektet:

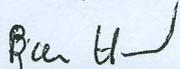
24225	<i>Risk Perception, Traffic Attitudes and Behaviour among Pedestrians and Commercial Minibus (tro-tro) Drivers in Ghana: A Case Study of Many Krobo District</i>
Behandlingsansvarlig	NTNU, ved institusjonens øverste leder
Daglig ansvarlig	Berit Overå Johannesen
Student	Enoch Teye-Kwadjo

Etter gjennomgang av opplysninger gitt i meldeskjemaet og øvrig dokumentasjon, finner vi at prosjektet ikke medfører meldeplikt eller konsesjonsplikt etter personopplysningslovens §§ 31 og 33.

Dersom prosjektopplegget endres i forhold til de opplysninger som ligger til grunn for vår vurdering, skal prosjektet meldes på nytt. Endringsmeldinger gis via et eget skjema, [http://www.nsd.uib.no/personvern/forsk\\_stud/skjema.html](http://www.nsd.uib.no/personvern/forsk_stud/skjema.html).

Vedlagt følger vår begrunnelse for hvorfor prosjektet ikke er meldepliktig.

Vennlig hilsen

  
Bjørn Henriksen

  
Inga Brautaset

Kontaktperson: Inga Brautaset tlf: 55 58 26 35

Vedlegg: Prosjektvurdering

Kopi: Enoch Teye-Kwadjo, Herman Krag's vei 1-51, 7050 TRONDHEIM



## Prosjektvurdering - Kommentar

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24225

Ombudet kan ikke se at det i prosjektet behandles personopplysninger med elektroniske hjelpemidler, eller at det opprettes manuelt personregister som inneholder sensitive personopplysninger. Prosjektet vil dermed ikke omfattes av meldeplikten etter personopplysningsloven.

Ombudet legger til grunn at man ved overføring av data til PC, ikke registrerer opplysninger som gjør det mulig å identifisere enkeltpersoner. Alle opplysninger som behandles elektronisk i forbindelse med prosjektet må være anonyme.

Med anonyme opplysninger forstås opplysninger som ikke på noe vis kan identifisere enkeltpersoner i et datamateriale, verken direkte gjennom navn eller personnummer, indirekte gjennom bakgrunnsvariabler eller gjennom navneliste/koblingsnøkkel eller krypteringsformel og kode.